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The track record of the Commission Forecasts

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Abstract

This paper argues that the Commission forecasts dispose of a reasonable track record. Most of the traditional tests for examining the quality of predictions are passed in a satisfactory way. The comparisons with forecasts made by the IMF, OECD and national forecast institutes are not unfavourable for the European Commission. In particular it is found that there is no strong evidence of presenting an overly optimistic picture of the economy in the European Commission short-term forecasts. The rosy gloss which, according to some, sometimes hangs over the Commission forecasts is related to some form of cycle denial. This could maybe lead to an optimistic bias further ahead in the future, but applying this to the short-term forecasts of the European Commission is unjustified.

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I. Introduction

Twice a year (in spring and autumn) the European Commission produces short-term macroeconomic projections, which concentrate on the Member States of the European Union. The forecasts are not based on a centralised econometric model, but are the result of the analysis of the country desks using to a different degree statistical methods. With respect to the time horizon, the focus is on the current year and the next, but in the autumn exercise an additional year is added. The forecasts mainly concern annual data.

These forecasts are most relevant for short-term economic policy analysis, where the objective is to take timely corrective action if appropriate. In the recent past they have attracted more attention than usual because they contained projections on key variables, notably the government deficit/GDP ratio, which was part of the Maastricht criteria for entering Economic and Monetary Union (EMU). Note, however, that the decisions in May 1998 on EMU participation were not based on forecasts, but on outcomes or their estimates. With the central role that the Stability and Growth Pact plays in EMU, the attention given to the Commission forecasts, and the therein included budgetary projections, is also unlikely to decrease.

Because of the single monetary policy in EMU, euro-zone aggregates will receive more attention in the future. Indeed, monetary policy decisions will be based on euro-zone wide variables. However, forecasts for individual countries consistent with the EU-11 aggregate will remain important. Knowledge about the impact of the monetary stance on an individual country cannot be obtained without a country analysis. Examining a country is indispensable if it is necessary to formulate a reply to commonly defined monetary conditions which may be less appropriate at the level of a single country. Within the constraints imposed by the Stability and Growth Pact Member States could use fiscal policy to arrive at a better policy-mix.

The purpose of this study is to examine the (ex post) accuracy of the projections both at the level of the EU and its Member States. Although this type of assessment is important to judge the value of the forecasts, it should not be the only criterion. The outlook (ex ante) is useful for many observers as it offers a coherent framework in which recent and expected economic developments can be analysed. Furthermore, it reflects the opinion of the services of the European Commission, which could be interesting in comparison with other private and public forecast institutions.

The forecast accuracy ex post does not only depend on the quality of the forecaster, but also on the set of external assumptions and policy hypotheses taken into account. Although providing a weak excuse for large discrepancies between forecasts and realisations, it could influence the forecast error. In the absence of certain information on policy measures, the projections are based on the assumption of unchanged policies. In particular the practice of incorporating in the forecasts only the policy measures which are adopted by the authorities or known in sufficient detail, could colour the results. This practice is common to most international institutions (Artis, 1996). Notably in the budgetary field the outcomes could be sensitive. In the autumn when forecasts have to be made for the following year, national budgets were often not known in sufficient detail to be taken on board¹. Hence, the forecasts will be produced under the unchanged policy rule, while the forecaster may have

¹ Nowadays national budgets for most Member States are known by early October, but not for Greece, Ireland, Portugal and the United Kingdom.

preferred to introduce some changes which are evident given the economic situation and which, he expects, will figure in the national budgets. The same applies to policy measures that are likely to be taken if the forecast materialises.

The exchange rate and interest rate assumptions lead to similar problems. There is no attempt to forecast exchange rates, which are instead based on technical assumptions. Depending on the currency its value is set in accordance with purchasing power parity or as a function of the exchange rate regime to which it belongs. Interest rates are fixed in a neutral way. The economic situation may be such that these technical assumptions are rather unrealistic, but uncertainties about the scale and timing of any future exchange rate adjustment make such assumptions difficult to improve upon.

In the next section a brief account is given of the procedures followed in establishing the Commission forecasts and how they have evolved over time. A description of the variables selected and the data used to compare forecasts and their realisations is presented in section III. In section IV an overview of the methods used to analyse the accuracy is presented. In order to put the forecast errors into perspective, the basic descriptive statistics of the sample data on which the analysis is based are presented in section V. A first impression of the quality of the forecasts is given in section VI by presenting the basic facts. The following sections VII to XVI go more into the detail of what the different techniques of assessment have to tell about the forecast errors. A comparison with the forecasts produced by the IMF and OECD is made in section XVII. Section XVIII summarises the main conclusions.

II. Forecasting at the European Commission

In the beginning of the sixties existed the Conjunctural Policy Committee. It was composed of representatives of the Member States and DG II (the directorate general at the European Commission² responsible for economic and financial affairs). This committee offered a forum for discussion of the national budgets of the Member States. Starting from the national budgets and underlying economic forecasts on which they were based, DG II presented the overall view and gave comments on the national submissions. The European Commission did not make forecasts on its own. As each country followed national practices, the degree of harmonisation with respect to concepts and external assumptions was low. In order to enhance the comparability a Working Group on Economic Budgets was created in 1962 with representatives of the European Commission and the Member States.

The 1964 budgets were prepared in three steps. Hence in 1963, before the summer a preliminary forecast containing the broad lines concerning the world economy and trade both inside and outside the EU was prepared. After the summer a revised forecast was discussed. Finally, towards the end of the year a complete forecast was presented. From 1964 to 1970 the revision of the preliminary budget was skipped to arrive immediately at the complete version, but in 1971 the three-step approach was resumed.

² European Union (EU) and European Commission and are used throughout this study to indicate respectively, the group of Member States as a whole and the organisation to which DG II belongs. These terms were only introduced with the Maastricht Treaty (1993). Before reference should be made to the European Economic Community (EEC) and its Commission.

The time horizon was one year and the focus was on the national public finances. Nevertheless, under the impulse of the European Commission because of its responsibilities in trade policy a lot of attention was given to trade developments. The discussions on the national budgets and the underlying economic forecasts occurred in the Working Group on Economic Budgets. A report was addressed to the Conjunctural Policy Committee which could formulate policy recommendations.

From 1969 onwards the “preliminary” forecasts became more “complete” so that a full set of forecasts for the major macroeconomic variables was available more than once a year. This development reflected similar ones at the level of the Member States where forecasting and macroeconomic planning (fine tuning) became increasingly popular.

In the beginning of the seventies, there was a growing concern that the national approach to forecasting was geared to a certain budgetary policy and could not be considered objective. Furthermore, the timely preparation of the overview by DG II was dependent on Member States’ respect of the deadlines for submission of their projections. In Spring 1971 the delays were such that DG II made at that occasion its first comprehensive forecasts. At the end of that year, however, the outlook was again based on the national submissions. A similar situation was encountered in 1972, but even at the end of the year some Member States were missing. From 1973 onwards DG II produced a full set of forecasts in parallel to the Member States.

One of the reasons for DG II to produce its own forecasts was the normative nature of the national projections. However, the very early DG II forecasts could not be considered completely objective as, to some extent, policy measures or economic development not yet materialised were taken on board. Arguably their degree of realism was considered higher than that of the national budgets. The unchanged policy assumption became the rule from spring 1974, leading to what was then called “probabilistic” (or “positive”) forecasts. The interpretation of the rule is that only measures decided upon or known in sufficient detail are incorporated in the forecasts.

From providing a support to the preparation of the national budgets, the forecasting exercises at the European Commission had gradually shifted to become the basis for the discussions on policy co-ordination at the Community level. A Council Decision³ in 1974 formalised this evolution. The discussions took place in the Economic Policy Committee, which replaced the Conjunctural Policy Committee and in the Monetary Committee which was transformed into the Economic and Financial Committee in 1999. In order to facilitate policy debate, DG II made on two occasions (in 1976 and 1977) an explicit distinction between “normative” and “positive” forecasts. The former presented a detailed and quantified set of desirable developments against which the latter type of forecasts was assessed.

The exchange of views between DG II and the national experts⁴ in the Working Group on Economic Budgets did not give rise to a formal revision of the DG II projections within the same forecasting round until spring 1978. From then onwards the forecasts of DG II were

³ Council Decision of 18 February 1974 on the attainment of a high degree of convergence of the economic policies of the Member States of the European Community (74/120/EEC).

⁴ The group of national experts is composed of representatives from Member States’ ministries (mainly finance, economics, budget, labour), central banks, other public bodies (institute of statistics, planning office).

the basis of the discussions in the Working Group on Economic Budgets, where the national experts were invited to comment on them. This is a reversal of the initial situation where the national forecasts constituted the basis for the discussions in the Working Group. Both sides continued to be independent with respect to economic analysis and outlook.

In the beginning of the 1980s the internal forecasting procedures (Colasanti, Jones and Steinherr, 1982) were further improved leading to a structure which has broadly remained in place until now. It has the following main characteristics:

- A considerable amount of human resources of DG II is involved in the forecasts. About 40 staff members participate in a forecasting exercise.
- A forecasting round starts with a position paper, including the monetary assumptions and the outlook for the world economy and international trade. In the light of new information these external assumptions can be adapted in the course of a forecasting exercise.
- The major forecasting work is done by country desks which follow a judgmental approach. By aggregation the EU-wide data are obtained. The forecasts by the country desks are confronted with the econometric projections of DGII's QUEST-model (for documentation see: Roeger and in't Veld, 1997). A separate trade consistency model is used to check bilateral import and export flows and prices and to ensure consistency both at the EU level and at the world level (Jones, 1983; Kieler, 1995).
- A preliminary forecast is discussed internally in DG II and eventually adapted to what is called a provisional forecast which is sent to the national experts. An exchange of views between national experts and DG II takes place in the Working Group on Economic Forecasts⁵ leading to the final version of the forecasts the main figures of which are published⁶.
- It has to be noted that the European Commission (i.e. the college of Commissioners) does not formally adopt the forecasts but is informed of the outcome by the Commissioner in charge of economic and financial affairs. After having informed his colleagues, the Commissioner informs the European Parliament and releases the forecasts usually through a press conference. The forecasts have to be considered a technical exercise prepared independently by DG II.
- Until 1989 three forecasts per year were produced: in winter (or summer), spring and autumn. From 1990 the winter exercise was dropped and the autumn round was scheduled somewhat later.

⁵ This group is the successor of the Working Group of Economic Budgets. Note that in French the name "Groupe d'experts des budgets économiques" reminding the origin of forecasting at the Commission is still often used as well as "Budgets économiques" to indicate the forecasts.

⁶ The economic forecasts were published for the first time in Supplement A of European Economy, No 4, April 1982.

III. Variables and data

First a brief motivation is given for the selection of the variables assessed. The next topic in this section is the treatment of the EU aggregates. Finally, the choice of forecast and outturn data is explained.

1. Variables

The short-term economic forecasts cover a wide range of economic variables. Given the relation which exists between them, a selection of the key variables will be sufficient to have a fair idea about the accuracy of the projections. The examination is done in terms of annual changes (not levels) except for three equilibrium variables where relevant ratios are used. The growth rate of GDP in volume terms and the inflation rate as measured by the private consumption deflator are chosen for the key role they play in any economic analysis. As far as domestic demand components are concerned only total private investment (representing a share of about 20 % of GDP) was chosen as it seemed interesting to look at the forecasting record of this volatile series. Private consumption which accounts for 60 % of GDP was not selected because its forecast performance is likely to be similar to that of GDP. Because of the importance they play in the policy debate, three major equilibrium variables are examined: the unemployment rate (the number of unemployed as a percentage of the labour force), the general government deficit/GDP ratio and the current account (as a percentage of GDP). The importance of the international context is examined with the growth rates of global export and import volumes of goods and the change in the associated export and import prices.

The definition of the variables may have shifted over time. This could lead to a difference between projection and outturn which cannot be qualified as a forecast error. No attempt has been made to correct for this. In the early days GNP was used rather than GDP. The unemployment rate moved from national concepts to a harmonised one. While the deficit concept used was always based on general government, changes in definition cannot be excluded. From 1994 the Maastricht definition of the general government deficit was applied. The definitions of total investment, exports and imports of goods were probably less subject to revisions.

2. Member States and EU aggregates

The focus of the Commission forecasts is on the Member States. In the beginning they were six, now they are 15. Countries not belonging to the EU or preparing accession are not examined in as much detail. Hence, the time series with forecasts/outturns is much longer for the original countries than for those joining later. Austria, Finland and Sweden which joined the EU in 1995 are not included in the study as not enough data are available to say something meaningful on the forecast accuracy for these countries. The significance of the results for Portugal and Spain, which entered the EU in 1986 is lower than for the other Member States for which more data are available.

German unification took place in 1990; the data set takes account of this from 1993 onwards. There was no mismatch of coverage of forecasts and realisations as the Commission made projections both for West Germany and unified Germany between

Spring 1992 and Spring 1994; the EU aggregates were adapted accordingly in the published forecasts.

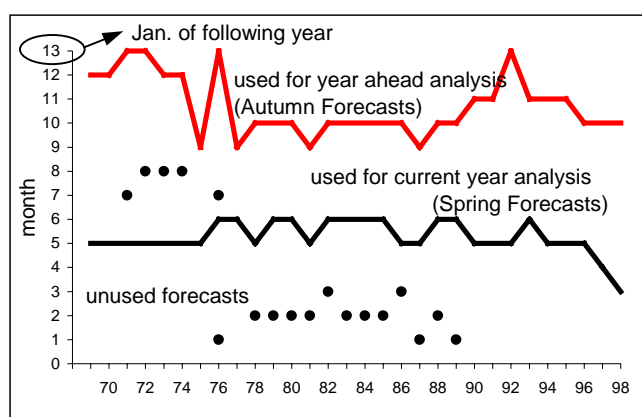
The variable composition of the EU also implies that the meaning of the EU aggregate is not the same through time. In the beginning it was composed of only 6 Member States whose weight gradually decreased when the number of Member States increased. From 1995 all 15 Member States are in the EU aggregate used in this study even if Austria, Finland and Sweden are not individually examined due to shortage of data. When new countries joined there was usually a mismatch for the year of entry and the year before as in general the forecast for the EU average made prior to entry did not include the new arrivals while the realisations taken from publications after entry did. This unequal coverage of the EU average has been corrected in this analysis. More precisely, the outturn data for the EU aggregate were recalculated without the newcomers (see annex B for details).

3. The choice of forecast and outturn data

The selection of the series representing forecasts and outturns is not without importance as it might influence the size and the meaning of the forecast error. In order to examine the sensitivity of the forecast performance with respect to the time horizon, two types of forecasts and their associated outturns are analysed. The current year forecast is concerned with the quality of the projection made in the beginning of the year for the same year while the year ahead forecast deals with the following year. The month of the finalisation of the forecasts is used as decision criterion with respect to the calendar (see figure 1). Other possibilities like the date of the press conference which is one to three weeks later or the cut-off date for inclusion of information which is somewhat earlier than the finalisation date were not withheld due to lack of information (see annex A).

a. The forecast calendar

Figure 1: Finalisation dates of the forecasts



Over time the forecast calendar has varied (see figure 1). Since 1990 only two exercises per year have been organised, one in Spring and one in Autumn. This was different earlier on: from 1971 to 1989 an additional forecasting exercise was conducted in Summer or Winter bringing the number to three. Furthermore, the month of finalisation has varied. The Spring forecasts were most often released

in May. The Autumn forecasts⁷ were most often released in October, but there was a tendency to delay to November in the nineties when there were only two forecasting rounds. Special factors have influenced the forecast calendar. For example, due to the severe exchange rate tensions in the ERM at the end of 1992 leading to the departure of pound sterling and Italian lira from the exchange rate mechanism, the Autumn forecasts were postponed until January 1993. Another example was the publication of the Spring

⁷ In the seventies some of the projections were finalised in December or January and Winter forecasts would be a more appropriate label.

1998 forecasts as early as 25 March (finalisation date: 18 March), in order to have a data set coherent with the one in the Commission Convergence Report (released on the same day) used for deciding on EMU entry at the European Council of 2-3 May.

b. The forecast data

The current year forecast is represented by data selected from projections finalised in Spring, typically May (see figure 1). In the early 70's an alternative was offered by forecasts released in the Summer. In the late 70's and 80's a January publication formed an alternative. No use was made of these possibilities as it would interfere with the analysis of the stability of the forecast accuracy over time. Moreover, the January forecasts should be considered more a year ahead forecasts as most of the work is done earlier. The later (earlier) in the year a forecast is made for the current year, the more (less) information is available and the more (less) precise a projection is likely to be.

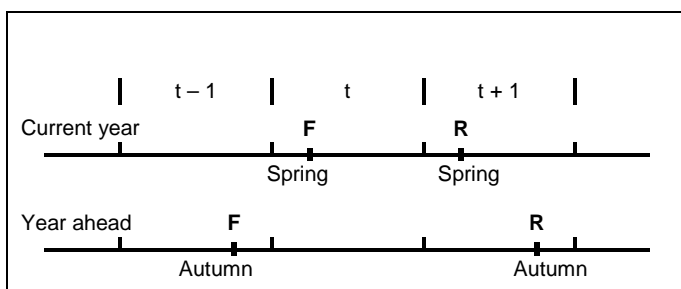
The year ahead forecasts are taken from the Autumn forecasts. As illustrated in figure 1 their timing has been less stable compared to the Spring forecast. The months in which year ahead forecasts have been selected, varied from September (of the year before) to January (of the year to be forecast).

c. The outturn data

There again exists a wide choice for the selection of the outturn data and it can be expected that the forecast accuracy is sensitive to it. A universally accepted definition does not exist. Following Kenen and Schwarz (1986) and Artis (1988, 1996) the realisation data for the current year forecasts ("first available estimates" in their terminology) are found in the Spring forecasts following the year to be forecast. The outturn data for the year ahead forecasts are taken from the Autumn forecasts following on the year to be forecast ("first settled estimates"). Figure 2 represents schematically the time relation between forecast (F) and outturn (R), both in the case of current year and year ahead projections.

The use of first available estimates in the assessment of current year forecast accuracy is motivated by the greater attention usually attracted by first available estimates, compared to later revisions. Indeed, a quick evaluation is necessary if a policy reaction is required. The greater precision of the first settled estimates is an attractive feature and they have been used in the analysis of the year ahead forecasts.

Figure 2: The time perspective of forecast and outturn data



Realisations are continuously revised as a result of new information and of methodological changes (e.g.: change of base year, change of treatment of particular transactions in the government accounts, ...) and another approach would be to identify them with the most recent revised

data, presumed to reflect best the truth. According to some authors "it is crucial to use the most accurate estimate of the actual data in order to avoid penalising the best prediction of what actually happened as opposed to the best prediction of what initially was mistakenly

thought to have happened". The quote is from Mc Nees and Ries (1983) and reproduced by Artis (1996). For a recent application see Verbeek (1999). Such an approach is more demanding for the forecaster as he not only has to predict the immediate evolution of the variable, but also all future revisions and possibly also definitional changes. Furthermore, it is likely that older data have been subject to several revisions, while the recent data just to a few. This would alter the nature of the forecast error through time and make the affirmation that the forecast accuracy has increased through time less robust. Therefore, it was preferred to work with a constant vintage of outturn data, but the sensitivity of the test results is analysed with an alternative set of realisation data. In section XVI the latest available outturns are used for this analysis.

IV. Method and overview

There are numerous techniques for assessing the quality of forecasts. The simple observation that mistakes are small is not enough. Some of the evaluation methods permit to test the statistical significance of the results, other only give a qualitative indication. This is particularly the case for graphical analysis, which has, however, the advantage of being straightforward. With respect to the evaluation criteria this study applies the most commonly used techniques for non-model based forecasts. As the Commission's forecasts are not based on an econometric model it is not possible to decompose forecast errors rigorously into those resulting from assumption errors, data revisions, model-related problems as for example done in Deutsche Bundesbank (1989).

With mean error (section V), mean absolute error and root mean squared error (section VI) the essential information on the size of the forecast mistake is given. It is important to assess the forecast performance relative to alternative prediction techniques. A first insight is provided by a comparison of the forecast errors with those generated by easily available alternative procedures. This analysis is traditionally conducted (Theil, 1966) in terms of a no-change forecast and a trend forecast. Section VI also presents these results, but later in the study (section XVII) the comparison with alternatives (the IMF and OECD forecasts) is continued.

A desirable characteristic of a good forecast is absence of correlation in the errors and absence of bias. Evidence of the contrary could be used to improve the forecast. These topics are the subject of section VII and VIII, respectively.

By efficiency is meant that all information available at the time of the forecast is exploited. Otherwise, the error could be reduced. Section IX restricts the information set to the forecast values themselves and examines whether an improvement would have been possible.

Have the forecast mistakes diminished through time ? This question is dealt with in section X.

In the following three sections the size of the forecast error is left for what it is, and the focus is on the direction of the change. Especially with respect to turning points forecasting in the business cycle the sign of the change matters more than the forecast value itself. Section XI examines the significance of the number of correctly predicted changes as far as the sign is concerned. Section XII compares the projected cycle over a three-year

horizon with the actual outcome. Section XIII analyses whether forecasts are revised in the right direction when the forecast horizon shortens.

In section XIV attention is paid to the international context in which the forecasts for the Member States are made. The accuracy of GDP projections for the United States and Japan as well as some international trade variables is checked.

Economic theory suggests certain relations between variables, while economic integration has made national economies interdependent. These relations should not only be reflected in the variables as such, but may also have left a trace in the forecast errors. With a correlation analysis of forecast errors across variables and across countries section XV attempts to find some pattern in the mistakes.

Finally, as a complement to the error analysis by varying the forecast horizon, section XVI examines the results against the light of an alternative set of realisation data.

V. Basic characteristics of the sample data

Some elementary descriptive statistics can be helpful in the interpretation of forecast errors. They are given in tables 1 and 2. The mean value (MV) gives an idea about the order of magnitude of a variable. The more volatile a variable, the more difficult to forecast in general. A measure for this is the standard deviation⁸ (STD). Absence of skewness and kurtosis are also desirable sample distribution characteristics.

The difference between the average forecast and the average outturn is the mean error (ME). It can be interpreted only as a first impression of the quality of the forecast as positive and negative errors can offset each other and thus reduce the size of the error. In the next section the mean absolute error (MAE) takes account of this. A negative sign indicates underestimation, a positive sign overestimation. Note that in the case of the deficit/GDP ratio a negative sign indicates overestimation of the deficit as a net borrowing requirement in the data is represented with a minus. One can read, for example, that the average error in forecasting real GDP in the current year is 0.08 percentage points for the EU as a whole, which increases to 0.32 percentage points if real GDP a year ahead is forecast. Aggregate EU inflation is forecast very accurately in the current year (the mean error is 0.02 percentage point), but the average error widens to -0.31 percentage point for the year ahead.

Forecasting investment is apparently more difficult. The mean EU forecast error for the current year is 0.58 percentage points which increases to 0.78 percentage points in the case of the year ahead forecast. Volatility of the investment series explains this difficulty: the standard deviation is about double the average value and larger than any other standard deviation.

⁸ However, variables can move in large swings producing a high value for the standard, but to the extent that the swing is regular, the increased difficulty to predict is questionable.

Table 1: Basic characteristics of the sample data – current year

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
Sample	69/97	73/97	69/97	81/97	86/97	69/97	73/97	69/97	69/97	69/97	86/97	73/97	69/97
No of obs.	29	25	29	17	12	29	25	29	29	29	12	25	29
MV(F)	2.22	1.99	2.56	1.35	2.68	2.70	3.34	2.73	2.07	2.28	2.86	1.66	2.55
MV(R)	2.35	1.86	2.52	1.42	2.90	2.73	3.82	2.33	2.67	2.42	2.86	1.68	2.47
ME	-0.13	0.13	0.04	-0.08	-0.22	-0.03	-0.48	0.39	-0.60	-0.14	0.00	-0.01	0.08
STD(R)	2.01	1.81	2.23	1.37	1.78	2.13	3.03	2.13	2.74	1.67	1.88	2.03	1.88
Skewness(R)	-0.09	-0.08	-0.25	0.01	-0.72	0.36	0.08	-0.62	-1.78**	-0.36	-0.83	-0.24	-0.12
Kurtosis(R)	-0.26	-0.87	1.66	-1.32	0.79	0.70	-0.31	0.97	6.66**	0.44	0.41	-0.51	1.38
Inflation													
Sample	69/97	73/97	69/97	81/97	86/97	69/97	73/97	69/97	69/97	69/97	86/97	73/97	69/97
No of obs.	29	25	29	17	12	29	25	29	29	29	12	25	29
MV(F)	4.99	5.96	3.66	15.86	5.32	6.22	8.68	9.70	4.85	4.41	8.02	7.96	6.31
MV(R)	4.89	6.25	3.58	15.83	5.51	6.25	8.57	9.79	4.73	4.42	8.40	7.85	6.29
ME	0.10	-0.29	0.08	0.03	-0.18	-0.02	0.11	-0.09	0.12	-0.01	-0.38	0.12	0.02
STD(R)	3.14	3.87	1.89	5.27	1.67	3.92	6.85	5.87	2.98	3.12	3.99	5.16	3.09
Skewness(R)	1.02*	0.45	0.16	-0.35	0.35	0.40	0.60	0.57	0.55	0.46	-0.34	1.12*	0.73
Kurtosis(R)	0.67	-0.75	-0.35	-0.62	1.42	-1.21	-1.24	-1.30	-0.71	-0.91	-1.42	0.77	-0.58
Investment													
Sample	69/97	73/97	69/97	81/97	86/97	69/97	73/97	69/97	69/97	69/97	86/97	73/97	69/97
No of obs.	29	25	29	17	12	29	25	29	29	29	12	25	29
MV(F)	2.58	1.50	3.21	3.25	5.31	2.46	3.89	2.43	2.49	1.56	6.83	1.13	2.68
MV(R)	2.49	0.66	2.61	1.63	5.27	1.99	3.22	1.30	3.25	1.66	7.57	0.60	2.10
ME	0.09	0.83	0.60	1.62	0.04	0.47	0.67	1.13	-0.76	-0.10	-0.73	0.53	0.58
STD(R)	5.40	9.60	4.83	6.30	7.62	3.90	7.54	5.35	5.71	4.89	6.22	4.70	3.70
Skewness(R)	0.06	-0.01	-0.11	0.14	-0.58	0.02	0.07	-0.88	0.56	-0.58	0.27	-0.05	-0.26
Kurtosis(R)	0.19	-0.90	-0.01	-0.83	-0.19	-0.45	-1.16	1.11	0.89	0.65	0.54	0.90	0.09
Unemployment rate													
Sample	69/97	73/97	69/97	81/97	86/97	70/97	73/97	69/97	75/97	69/97	86/97	73/97	69/97
No of obs.	29	25	29	17	12	28	25	29	23	29	12	25	29
MV(F)	8.42	7.22	5.35	7.97	20.24	7.81	13.32	8.64	1.66	7.07	6.54	8.20	7.51
MV(R)	8.38	7.24	5.31	7.79	20.03	7.80	13.01	8.74	1.68	6.85	6.14	8.16	7.56
ME	0.04	-0.02	0.03	0.18	0.22	0.00	0.30	-0.10	-0.02	0.23	0.40	0.04	-0.05
STD(R)	3.87	2.48	2.99	1.51	2.74	3.65	4.43	3.88	0.90	4.00	1.39	3.04	3.67
Skewness(R)	-0.42	-0.90	-0.17	-1.92**	-0.31	-0.44	-0.15	-0.33	0.84	0.57	-0.05	-0.36	-0.45
Kurtosis(R)	-0.87	0.96	-1.29	5.51**	-1.17	-1.25	-1.45	-1.26	0.15	-0.49	-0.61	-1.04	-1.38
Government balance as % of GDP													
Sample	71/97	77/97	69/97	82/97	86/97	69/97	74/97	69/97	74/97	69/97	86/97	73/97	69/97
No of obs.	27	21	29	16	12	29	24	29	24	29	12	25	29
MV(F)	-6.32	-2.31	-2.26	-11.46	-4.27	-2.09	-7.95	-8.64	0.70	-3.40	-6.47	-3.16	-3.80
MV(R)	-6.55	-2.37	-2.10	-11.92	-4.55	-1.96	-7.72	-8.83	1.28	-3.13	-5.89	-3.32	-3.78
ME	0.23	0.05	-0.15	0.46	0.28	-0.13	-0.23	0.19	-0.58	-0.27	-0.58	0.16	-0.02
STD(R)	3.04	3.19	1.83	4.26	1.65	1.88	5.14	3.09	2.12	2.28	1.65	2.21	1.68
Skewness(R)	-0.66	-0.46	0.40	0.07	-0.27	-0.37	0.11	0.60	0.10	0.56	0.36	0.18	0.80
Kurtosis(R)	-0.19	-0.13	0.03	-0.77	-1.01	-0.36	-1.51	-0.39	-0.72	-0.24	0.57	0.29	-0.31
Current account as % of GDP													
Sample	71/97	73/97	71/97	82/97	86/97	71/97	73/97	71/97	71/97	71/97	86/97	73/97	71/97
No of obs.	27	25	27	16	12	27	25	27	27	27	12	25	27
MV(F)	0.77	-1.59	0.84	-3.51	-1.20	-0.25	-1.53	-0.08	20.34	2.52	-0.96	-0.79	0.09
MV(R)	0.87	-1.69	1.01	-4.05	-1.24	-0.17	-1.07	-0.14	20.27	2.62	-0.58	-0.63	0.17
ME	-0.09	0.10	-0.17	0.54	0.04	-0.07	-0.46	0.06	0.06	-0.10	-0.37	-0.16	-0.08
STD(R)	2.98	2.48	1.84	1.73	1.95	1.31	5.50	1.86	14.95	1.93	1.85	1.75	0.73
Skewness(R)	-0.78	0.65	0.34	-1.17	0.06	0.21	-0.21	0.10	-0.39	-0.69	1.44	-0.48	-0.01
Kurtosis(R)	0.41	-0.65	-0.78	2.28	-1.40	0.16	-1.06	-0.44	-0.97	-0.02	2.35	0.34	-0.59
ME = MV(F) – MV(R): the mean error is equal to the mean forecast minus the realised average													
STD(R): standard deviation of realisation data													
*, ** indicate skewness/kurtosis of the realisation data at the 5 % , respectively 1 % significance level													

The mean error is small in the case of forecasting the unemployment rate. The current year average forecast error is –0.05 percentage point for the EU and it remains 0.02 percentage point in the case of the year ahead forecast. The average error in forecasting the government deficit as a percentage of GDP is –0.02 percentage point in the current year; the year ahead mean forecast error widens to 0.16 percentage point. At the EU level the

mean forecast error for the current account is -0.08 percentage point for the current year and absent for the year ahead forecast.

Skewness and kurtosis are indications of the deviation of the observed frequency distribution from the normal distribution. The presence of a flat tail (skewness) or a peak (kurtosis) does not appear significant in most of the cases.

Table 2: Basic characteristics of the sample data – year ahead

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
Sample	70/97	74/97	70/97	82/97	87/97	70/97	74/97	70/97	70/97	70/97	87/97	74/97	70/97
No of obs.	28	24	28	16	11	28	24	28	28	28	11	24	28
MV(F)	2.37	2.15	2.67	1.46	2.79	2.82	3.27	2.85	2.27	2.16	2.84	1.92	2.66
MV(R)	2.15	1.97	2.35	1.51	2.86	2.54	3.91	2.19	2.17	2.26	2.74	1.64	2.34
ME	0.21	0.18	0.36	-0.04	-0.07	0.29	-0.64	0.66	0.11	-0.10	0.10	0.28	0.32
STD(R)	1.99	1.70	2.06	1.37	1.91	1.88	3.17	2.16	2.94	1.76	1.91	1.96	1.74
Skewness(R)	-0.20	-0.25	-0.74	-0.04	-0.70	0.10	0.65	-0.59	-1.36**	-0.49	-0.71	-0.56	-0.49
Kurtosis(R)	0.41	-0.91	1.03	-0.90	0.42	-0.11	-0.12	0.82	3.77**	-0.08	0.27	-0.64	0.98
Inflation													
Sample	70/97	74/97	70/97	82/97	87/97	70/97	74/97	70/97	70/97	70/97	87/97	74/97	70/97
No of obs.	28	24	28	16	11	28	24	28	28	28	11	24	28
MV(F)	4.98	5.55	3.51	14.34	4.86	5.76	7.88	8.73	4.76	4.58	7.23	7.53	6.06
MV(R)	4.88	6.07	3.59	15.25	5.22	6.24	8.20	10.05	4.87	4.37	8.29	7.95	6.37
ME	0.10	-0.52	-0.08	-0.91	-0.35	-0.48	-0.32	-1.32	-0.11	0.21	-1.06	-0.42	-0.31
STD(R)	3.09	3.91	1.93	4.82	1.30	4.03	6.95	5.81	3.02	3.18	3.90	5.43	3.18
Skewness(R)	0.94	0.52	0.06	-0.52	-1.04	0.45	0.66	0.54	0.41	0.51	-0.22	1.19*	0.72
Kurtosis(R)	0.33	-0.72	-0.39	-0.55	0.55	-1.19	-1.21	-1.36	-0.81	-0.93	-1.40	1.01	-0.54
Investment													
Sample	70/97	74/97	70/97	82/97	87/97	70/97	74/97	70/97	70/97	70/97	87/97	74/97	70/97
No of obs.	28	24	28	16	11	28	24	28	28	28	11	24	28
MV(F)	2.87	2.20	3.18	3.76	5.44	2.91	3.77	2.95	1.09	1.31	6.77	1.88	2.96
MV(R)	2.06	0.80	2.56	2.32	5.47	1.97	2.93	1.48	2.52	2.08	7.41	1.01	2.19
ME	0.80	1.41	0.61	1.44	-0.04	0.94	0.85	1.48	-1.44	-0.77	-0.64	0.87	0.78
STD(R)	5.81	9.71	4.47	5.18	6.33	3.24	8.14	4.70	6.43	4.92	6.15	5.13	3.18
Skewness(R)	-0.75	0.05	-0.35	0.24	0.21	0.04	0.09	-0.85	0.26	-0.51	0.82	0.05	-0.36
Kurtosis(R)	2.87**	-0.97	0.40	-1.35	-1.32	-0.78	-1.28	2.11*	-0.23	0.43	0.09	0.50	0.52
Unemployment rate													
Sample	71/97	74/97	71/97	82/97	87/97	71/97	74/97	71/97	76/97	71/97	87/97	74/97	71/97
No of obs.	27	24	27	16	11	27	24	27	22	27	11	24	27
MV(F)	8.87	7.47	5.58	8.06	19.67	7.87	13.77	8.82	1.63	7.48	6.42	8.46	7.86
MV(R)	8.57	7.42	5.53	8.19	19.82	7.91	13.23	8.89	1.69	7.26	5.83	8.32	7.84
ME	0.31	0.06	0.05	-0.14	-0.15	-0.04	0.54	-0.07	-0.06	0.21	0.59	0.14	0.02
STD(R)	3.62	1.99	2.69	0.98	2.90	3.41	4.19	3.37	0.87	3.88	1.30	2.77	3.28
Skewness(R)	-0.33	-0.46	-0.21	-0.06	-0.19	-0.47	-0.14	-0.54	0.53	0.59	-0.01	-0.34	-0.64
Kurtosis(R)	-0.68	0.17	-0.99	-0.06	-1.35	-1.09	-1.45	-0.83	-0.33	-0.55	-2.06	-0.90	-1.03
Government balance as % of GDP													
Sample	71/97	77/97	70/97	82/97	87/97	70/97	74/97	70/97	75/97	70/97	87/97	74/97	70/97
No of obs.	27	21	28	16	11	28	24	28	23	28	11	24	28
MV(F)	-5.80	-2.34	-2.26	-10.87	-4.10	-2.03	-7.78	-8.54	0.29	-3.12	-5.98	-2.99	-3.67
MV(R)	-6.31	-2.48	-2.20	-11.67	-4.64	-2.05	-7.73	-9.09	1.41	-3.01	-5.45	-3.42	-3.83
ME	0.51	0.14	-0.06	0.80	0.54	0.01	-0.05	0.55	-1.12	-0.11	-0.54	0.43	0.16
STD(R)	3.21	3.18	1.63	4.25	1.66	1.84	5.24	2.88	2.16	2.50	1.75	2.15	1.57
Skewness(R)	-0.40	-0.40	0.39	-0.23	-0.50	-0.37	0.09	0.68	-0.05	0.54	0.18	0.13	0.93
Kurtosis(R)	0.01	-0.18	0.31	-0.22	-0.90	-0.29	-1.44	0.10	-0.88	-0.38	-0.35	0.10	-0.04
Current account as % of GDP													
Sample	71/97	74/97	71/97	82/97	87/97	71/97	74/97	71/97	73/97	71/97	87/97	74/97	71/97
No of obs.	27	24	27	16	11	27	24	27	25	27	11	24	27
MV(F)	0.63	-1.13	0.93	-3.65	-1.60	-0.30	-1.39	0.06	20.22	2.53	-1.10	-0.85	0.12
MV(R)	0.89	-1.51	1.05	-4.09	-1.52	-0.08	-1.36	-0.23	20.94	2.68	-1.53	-0.80	0.12
ME	-0.25	0.37	-0.13	0.44	-0.08	-0.21	-0.04	0.30	-0.72	-0.15	0.43	-0.05	-0.01
STD(R)	2.85	2.90	1.89	1.68	1.74	1.39	5.50	2.00	13.83	1.92	1.61	1.81	0.80
Skewness(R)	-0.60	0.50	0.36	-0.97	0.07	0.28	-0.28	-0.10	-0.45	-0.66	0.50	-0.30	-0.07
Kurtosis(R)	-0.12	-1.09	-0.81	1.64	-1.73	0.04	-1.15	0.22	-0.68	0.10	0.76	-0.65	-0.60
ME = MV(F) – MV(R): the mean error is equal to the mean forecast minus the realised average													
STD(R): standard deviation of realisation data													
*, ** indicate skewness/kurtosis of the realisation data at the 5 % , respectively 1 % significance level													

VI. Basic characteristics of the forecast errors

1. The mean absolute error

As positive and negative errors may offset each other, the mean error (discussed above) could give a flattering picture of forecast accuracy. The mean absolute error (MAE) avoids this problem. It can be compared with the mean absolute value (MAV) to put the size of the error into perspective across countries. For variables which cannot turn negative (e.g. the unemployment rate) the mean absolute value is equal to the mean value.

Both, for real GDP growth and inflation the mean absolute error at the EU level is about 0.5 percentage point (table 3: 0.53 and 0.37, respectively) for the current year, while about doubling in the year ahead forecast (table 4: 0.94 and 0.99, respectively). Forecasting the aggregate is clearly easier than at the country level. Especially for the smaller Member States the mean absolute error is in some cases large: more than 2 percentage points for the year ahead forecast of real GDP and inflation in Ireland. Inflation forecasting a year ahead in Italy and the UK appears also difficult (MAE: 1.69 and 1.75, respectively).

Table 3: Basic characteristics of the forecast errors - current year

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
MAV	2.65	2.18	2.88	1.58	3.07	2.91	4.09	2.69	3.27	2.61	3.06	2.24	2.68
MAE	0.72	0.70	0.96	0.85	0.70	0.56	1.60	0.94	1.43	0.69	0.73	0.77	0.53
RMSE	0.87	0.91	1.23	1.03	0.94	0.77	1.93	1.32	2.01	0.86	0.89	0.98	0.77
THEIL1	0.42	0.37	0.45	0.61	0.61	0.35	0.64	0.45	0.54	0.57	0.62	0.45	0.37
THEIL2	0.44	0.51	0.56	0.77	0.55	0.37	0.65	0.63	0.74	0.52	0.50	0.49	0.42
Inflation													
MAV	4.89	6.25	3.61	15.8	5.51	6.25	8.57	9.79	4.73	4.44	8.40	7.85	6.29
MAE	0.59	0.66	0.33	1.15	0.40	0.49	1.05	0.75	0.54	0.43	0.63	0.84	0.37
RMSE	0.74	0.80	0.44	1.53	0.52	0.73	1.44	1.03	0.71	0.58	0.86	1.35	0.49
THEIL1	0.40	0.40	0.38	0.48	0.37	0.44	0.45	0.37	0.39	0.37	0.48	0.42	0.31
THEIL2	0.24	0.21	0.24	0.30	0.33	0.19	0.21	0.18	0.24	0.19	0.22	0.27	0.16
Investment													
MAV	4.56	7.79	4.39	5.11	7.48	3.51	6.57	4.19	5.16	4.19	8.22	3.60	3.53
MAE	2.31	3.94	2.26	3.59	3.24	1.60	3.48	2.85	3.07	2.58	3.67	2.05	1.14
RMSE	3.05	4.86	2.87	4.77	3.58	2.01	4.36	3.85	3.90	3.27	4.40	2.58	1.63
THEIL1	0.61	0.44	0.63	0.80	0.58	0.53	0.50	0.55	0.80	0.56	0.78	0.47	0.45
THEIL2	0.57	0.52	0.60	0.75	0.50	0.52	0.59	0.73	0.70	0.68	0.74	0.56	0.45
Unemployment rate													
MAV	8.38	7.24	5.31	7.79	20.0	7.80	13.0	8.74	1.68	6.85	6.14	8.16	7.56
MAE	0.46	0.62	0.30	0.65	0.63	0.35	0.68	0.79	0.26	0.74	0.68	0.31	0.28
RMSE	0.61	0.95	0.48	0.96	0.80	0.47	0.93	1.25	0.33	1.26	0.83	0.35	0.41
THEIL1	0.61	0.66	0.37	0.90	0.44	0.59	0.54	0.88	0.83	0.75	0.89	0.24	0.46
THEIL2	0.16	0.39	0.16	0.66	0.31	0.13	0.21	0.33	0.37	0.32	0.62	0.12	0.11
Government balance as % of GDP													
MAV	6.55	3.00	2.43	11.9	4.55	2.18	7.80	8.83	2.05	3.41	5.89	3.51	3.78
MAE	0.45	0.89	0.80	2.03	0.99	0.68	1.44	1.09	1.67	0.86	0.96	0.72	0.46
RMSE	0.66	1.23	0.94	2.43	1.29	0.92	1.89	1.54	2.03	1.13	1.20	0.93	0.56
THEIL1	0.51	0.56	0.62	0.82	0.85	0.83	0.93	0.76	1.04	0.91	1.00	0.60	0.54
THEIL2	0.22	0.40	0.52	0.59	0.82	0.50	0.38	0.51	0.98	0.50	0.76	0.43	0.34
Current account as % of GDP													
MAV	2.47	2.61	1.67	4.05	1.84	1.05	4.73	1.56	21.4	2.91	1.53	1.34	0.59
MAE	0.90	0.75	0.57	1.21	0.79	0.48	1.55	0.75	2.33	0.81	1.14	0.85	0.31
RMSE	1.15	0.96	0.74	1.68	1.06	0.60	2.14	0.95	3.59	1.04	1.41	1.04	0.41
THEIL1	0.80	0.67	0.72	0.85	0.84	0.55	0.68	0.56	0.47	0.80	0.94	0.56	0.62
THEIL2	0.39	0.40	0.41	1.00	0.57	0.46	0.40	0.52	0.25	0.55	0.80	0.61	0.57

It is no surprise to find that forecasting total investment is difficult as it is among the more volatile variables. At the country level the absolute error in year ahead forecasting is in Ireland and Luxembourg more than 5 percentage points representing more than 80 % of the mean absolute outturn.

Errors in forecasting the unemployment rate appear small compared to its average level. The mean absolute forecast error in forecasting the EU government deficit is 0.46 % of GDP in the current year; at the country level this statistic varies between 0.45 (Belgium) to 1.67 (Luxembourg). In the case of year ahead forecasts, the mean forecast errors for all Member States widen to more than 1 % of GDP except in France. It remains limited to 0.69 % for the EU as a whole.

The absolute forecast error for the current account is relatively large compared to its average in absolute terms. This could be expected as the actual current account is often close to zero producing the effect of relatively large errors.

2. The root mean squared error

Large errors are usually considered more harmful than small differences between forecasts and outturns. To penalise large mistakes a root mean squared error (RMSE) can be used. It has the same dimension as the mean absolute value to which it can be compared to have an impression on the relative size of the error. The difference between the mean absolute error and the root mean squared error suggests that in some cases large errors are registered in certain years. This is notably the case for investment.

Table 4: Basic characteristics of the forecast errors - year ahead

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
MAV	2.54	2.20	2.75	1.66	3.06	2.70	3.97	2.63	3.07	2.52	2.95	2.25	2.56
MAE	1.19	1.03	1.31	1.14	1.06	0.94	2.36	1.36	1.89	1.08	0.99	1.25	0.94
RMSE	1.62	1.33	1.75	1.47	1.32	1.28	2.71	1.89	2.61	1.36	1.18	1.56	1.33
THEIL1	0.77	0.58	0.68	0.83	0.66	0.61	0.83	0.65	0.77	0.85	0.75	0.73	0.67
THEIL2	0.83	0.80	0.87	1.11	0.72	0.70	0.87	0.89	0.91	0.79	0.65	0.81	0.78
Inflation													
MAV	4.88	6.07	3.62	15.25	5.22	6.24	8.20	10.05	4.87	4.40	8.29	7.95	6.37
MAE	1.13	1.38	0.76	1.57	0.57	1.15	2.08	1.69	1.49	0.75	1.43	1.75	0.99
RMSE	1.72	2.17	0.95	2.36	0.84	1.78	3.04	2.80	1.80	1.00	2.18	2.58	1.51
THEIL1	0.81	0.99	0.74	0.71	0.66	0.88	0.73	0.88	0.83	0.57	1.14	0.63	0.76
THEIL2	0.57	0.57	0.50	0.51	0.68	0.45	0.45	0.49	0.61	0.32	0.59	0.49	0.48
Investment													
MAV	4.39	7.95	4.17	4.45	6.33	3.06	7.18	3.65	5.44	4.29	7.54	4.07	3.24
MAE	3.71	5.65	3.18	3.39	3.71	1.97	6.28	3.14	5.60	3.28	3.73	3.15	1.74
RMSE	5.22	7.17	3.78	3.88	4.35	2.63	7.35	3.97	6.82	4.04	4.67	3.97	2.51
THEIL1	0.96	0.67	0.76	0.77	0.70	0.74	0.83	0.57	1.13	0.73	0.93	0.65	0.66
THEIL2	0.92	0.75	0.86	0.77	0.75	0.83	0.92	0.86	1.08	0.84	0.80	0.79	0.80
Unemployment rate													
MAV	8.57	7.42	5.53	8.19	19.82	7.91	13.23	8.89	1.69	7.26	5.83	8.32	7.84
MAE	0.86	1.18	0.83	1.27	1.53	0.64	1.15	1.18	0.36	1.27	1.15	0.71	0.52
RMSE	1.18	1.43	1.14	1.56	1.80	0.82	1.58	1.75	0.44	1.70	1.52	0.94	0.80
THEIL1	0.79	0.84	0.88	1.03	0.70	0.98	0.71	1.00	0.93	0.77	0.95	0.61	0.73
THEIL2	0.33	0.74	0.43	1.64	0.65	0.25	0.38	0.53	0.51	0.45	1.23	0.35	0.25
Government balance as % of GDP													
MAV	6.31	3.06	2.39	11.67	4.64	2.23	7.80	9.09	2.10	3.41	5.45	3.56	3.83
MAE	1.19	1.79	1.07	2.56	1.21	0.75	2.28	1.51	2.32	1.14	1.39	1.36	0.69
RMSE	1.63	2.12	1.34	3.05	1.61	1.07	2.72	1.90	2.65	1.40	1.76	1.64	0.87
THEIL1	0.96	0.68	0.68	0.75	0.82	0.82	0.94	0.90	0.93	0.85	0.86	0.86	0.76
THEIL2	0.52	0.68	0.83	0.74	1.02	0.59	0.53	0.67	1.25	0.57	1.05	0.78	0.56
Current account as % of GDP													
MAV	2.42	2.86	1.72	4.09	1.83	1.11	4.83	1.65	21.91	2.94	1.85	1.56	0.65
MAE	1.41	1.79	0.90	1.30	1.25	0.77	2.46	1.27	6.97	1.26	1.34	1.10	0.49
RMSE	1.78	2.45	1.18	1.63	1.57	0.96	3.16	1.75	9.42	1.57	1.57	1.69	0.68
THEIL1	0.81	1.03	0.82	0.82	0.81	0.93	0.98	0.91	1.05	0.91	0.74	1.03	0.88
THEIL2	0.63	0.86	0.64	1.00	0.95	0.70	0.59	0.89	0.69	0.83	1.02	0.95	0.86

3. The errors of naïve alternative forecasting techniques

The value of a forecast should not only be appreciated in terms of its own errors, but compared to naïve or easily available alternatives. Two easily available alternatives are the “no change forecast” and the “average forecast”. If these easily available alternatives perform systematically better than the Commission approach to forecasting, a straightforward improvement of the accuracy is offered. It should, however, be remarked that the “no change forecast” is often not that naïve as it is based on a random walk which is a characteristic of many economic time series like asset prices and exchange rates (Artis, 1996). It would imply that the best forecast is the observed value in the preceding period.

The THEIL1-statistic is the ratio between the root mean squared error of the Commission forecast to the root mean squared error of the “no change forecast”, while THEIL2 refers to the ratio between the root mean squared errors of Commission forecast and “average forecast”. The smaller the ratio the higher the quality of the Commission forecast compared to the naïve alternative. If the THEIL-statistics are large than one, the competing forecasts are better.

In general both THEIL statistics are smaller than one, implying that the forecast errors made with the Commission approach are smaller than those obtained with the two naïve alternatives. With respect to the current year forecasts the root mean squared errors are less than or about half the size of those obtained from naïve projections in the case of GDP, inflation, investment and unemployment. The score is somewhat less favourable in the case of the government deficit and current account where the ratio is about 2/3.

Table 5: Persistence in current year forecast error

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
Signif $\rho_1=0$	0.12	0.47	1.00	0.78	0.17	0.15	0.25	0.48	0.11	0.80	0.05	0.18	0.67
Signif $\rho_2=0$	0.24	0.60	0.66	0.90	0.39	0.36	0.40	0.70	0.25	0.73	0.08	0.36	0.89
Signif $\rho_3=0$	0.26	0.71	0.82	0.98	0.57	0.51	0.47	0.53	0.18	0.89	0.12	0.54	0.94
Inflation													
Signif $\rho_1=0$	0.95	0.56	0.46	0.54	0.07	0.37	0.07	0.35	0.78	0.41	0.27	0.85	0.47
Signif $\rho_2=0$	0.92	0.70	0.61	0.57	0.19	0.52	0.19	0.46	0.86	0.70	0.19	0.52	0.47
Signif $\rho_3=0$	0.16	0.65	0.14	0.68	0.13	0.69	0.34	0.35	0.96	0.80	0.33	0.63	0.31
Investment													
Signif $\rho_1=0$	0.14	0.35	0.37	0.80	0.18	0.95	0.50	0.97	0.36	0.86	0.92	0.28	0.59
Signif $\rho_2=0$	0.33	0.58	0.66	0.92	0.38	0.95	0.66	0.26	0.61	0.64	0.96	0.50	0.59
Signif $\rho_3=0$	0.17	0.35	0.37	0.82	0.59	0.88	0.35	0.36	0.72	0.28	0.91	0.51	0.73
Unemployment rate													
Signif $\rho_1=0$	0.03	0.19	0.07	0.57	0.57	0.19	0.53	0.21	0.13	0.27	0.10	0.12	0.90
Signif $\rho_2=0$	0.01	0.42	0.16	0.83	0.29	0.38	0.56	0.40	0.20	0.51	0.10	0.30	0.92
Signif $\rho_3=0$	0.00	0.47	0.25	0.79	0.11	0.58	0.76	0.60	0.32	0.69	0.18	0.14	0.08
Government balance as % of GDP													
Signif $\rho_1=0$	0.55	0.40	0.63	0.97	0.77	0.96	0.78	0.20	0.16	0.44	0.35	0.65	0.65
Signif $\rho_2=0$	0.51	0.44	0.37	0.57	0.67	0.74	0.88	0.43	0.31	0.57	0.23	0.74	0.69
Signif $\rho_3=0$	0.72	0.41	0.35	0.77	0.74	0.71	0.83	0.55	0.49	0.75	0.40	0.89	0.68
Current account as % of GDP													
Signif $\rho_1=0$	0.36	0.52	0.87	0.74	0.51	0.98	0.56	0.61	0.07	0.23	0.71	0.89	0.41
Signif $\rho_2=0$	0.41	0.77	0.81	0.08	0.59	1.00	0.80	0.46	0.14	0.48	0.61	0.78	0.68
Signif $\rho_3=0$	0.50	0.90	0.67	0.13	0.76	0.94	0.39	0.64	0.09	0.69	0.65	0.92	0.82

The test for serial correlation is based on the Ljung-Box Q statistic, which is asymptotically distributed as χ^2 . The significance level of the null hypothesis of absence of autocorrelation up to three lags is reported. Numbers above 0.05 indicate no serial correlation at the 5 % significance level.

The relative accuracy of the Commission projections deteriorate for the year ahead forecasts, but in general continues to outperform the naïve alternative models. The current account forecasts are best served with the naïve alternatives. In particular the high THEIL2-

ratio (0.90 in some cases) suggest that using the average current account balance as next year's forecast will not produce a forecast error much larger than the one calculated from the Commission forecasts.

VII. Persistence of forecast errors

Absence of correlation between prediction errors is a desirable property. It means that once an error is made, it does not feed into the next forecast. It disappears or the next error bears no relation to previous mistakes. If a systematic relation between errors would exist, it could be exploited to improve the forecast.

Table 6: Persistence in year ahead forecast error

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
Signif $\rho_1=0$	0.18	0.42	0.79	0.95	0.18	0.79	0.01	0.50	0.81	0.92	0.19	0.16	0.96
Signif $\rho_2=0$	0.41	0.50	0.59	0.25	0.41	0.82	0.03	0.10	0.84	0.42	0.28	0.36	0.38
Signif $\rho_3=0$	0.57	0.66	0.77	0.27	0.62	0.91	0.06	0.16	0.81	0.54	0.42	0.24	0.58
Inflation													
Signif $\rho_1=0$	0.10	0.09	0.01	0.15	0.65	0.75	0.04	0.41	0.00	0.12	0.05	0.05	0.04
Signif $\rho_2=0$	0.27	0.24	0.01	0.29	0.40	0.95	0.10	0.66	0.01	0.20	0.14	0.13	0.10
Signif $\rho_3=0$	0.24	0.26	0.01	0.47	0.60	0.96	0.09	0.31	0.01	0.36	0.26	0.21	0.09
Investment													
Signif $\rho_1=0$	0.53	0.39	0.22	0.30	0.30	0.28	0.99	0.38	0.04	0.17	0.40	0.35	0.28
Signif $\rho_2=0$	0.59	0.68	0.40	0.55	0.58	0.47	0.90	0.04	0.02	0.38	0.66	0.21	0.06
Signif $\rho_3=0$	0.53	0.63	0.52	0.75	0.16	0.43	0.95	0.09	0.03	0.21	0.75	0.02	0.06
Unemployment rate													
Signif $\rho_1=0$	0.00	0.05	0.00	0.21	0.02	0.38	0.00	0.01	0.16	0.16	0.12	0.21	0.00
Signif $\rho_2=0$	0.00	0.14	0.00	0.18	0.07	0.68	0.00	0.02	0.33	0.21	0.08	0.08	0.00
Signif $\rho_3=0$	0.00	0.17	0.00	0.18	0.09	0.77	0.00	0.03	0.21	0.32	0.15	0.02	0.01
Government balance as % of GDP													
Signif $\rho_1=0$	0.63	0.01	0.69	0.10	0.35	0.14	0.10	0.66	0.40	0.08	0.93	0.34	0.98
Signif $\rho_2=0$	0.87	0.02	0.11	0.25	0.50	0.33	0.12	0.66	0.46	0.22	0.71	0.30	0.21
Signif $\rho_3=0$	0.94	0.02	0.19	0.28	0.38	0.46	0.12	0.67	0.64	0.31	0.48	0.40	0.25
Current account as % of GDP													
Signif $\rho_1=0$	0.00	0.99	0.64	0.65	0.35	0.62	0.36	0.54	0.74	0.10	0.46	0.84	0.19
Signif $\rho_2=0$	0.01	0.08	0.67	0.61	0.50	0.81	0.65	0.41	0.05	0.26	0.75	0.93	0.42
Signif $\rho_3=0$	0.02	0.18	0.85	0.80	0.71	0.84	0.84	0.42	0.10	0.29	0.08	0.97	0.12

The test for serial correlation is based on the Ljung-Box Q statistic, which is asymptotically distributed as χ^2 . The significance level of the null hypothesis of absence of autocorrelation up to three lags is reported. Numbers above 0.05 indicate no serial correlation at the 5 % significance level.

The null hypothesis of no serial correlation among the forecast errors can be tested with the Ljung-Box Q-statistic. The significance levels of absence of correlation up to three orders, are reported in tables 5 and 6.

Serial correlation among current year forecast errors is absent or limited. There is only clear evidence of correlation in the Belgian unemployment forecasts. The figures for GDP, inflation and the government deficit illustrate that the forecast errors are in general small and are soon reversed.

There are more cases of less satisfactory results with the year ahead forecasts. In particular one failed to learn from past errors in forecasting unemployment. Also inflation projections for the year ahead display some persistence in the errors (especially in Germany). The figures, however suggest that the larger mistakes were committed in the past. By contrast, the year ahead forecast errors for the government deficit were quickly reversed except in the case of Denmark; the figure illustrates the long period of overestimation of the deficit in the middle of the '80s and its underestimation in the early '90s. The persistence of the forecast errors with Irish GDP is also noteworthy.

Figure 3: Real GDP growth – current year

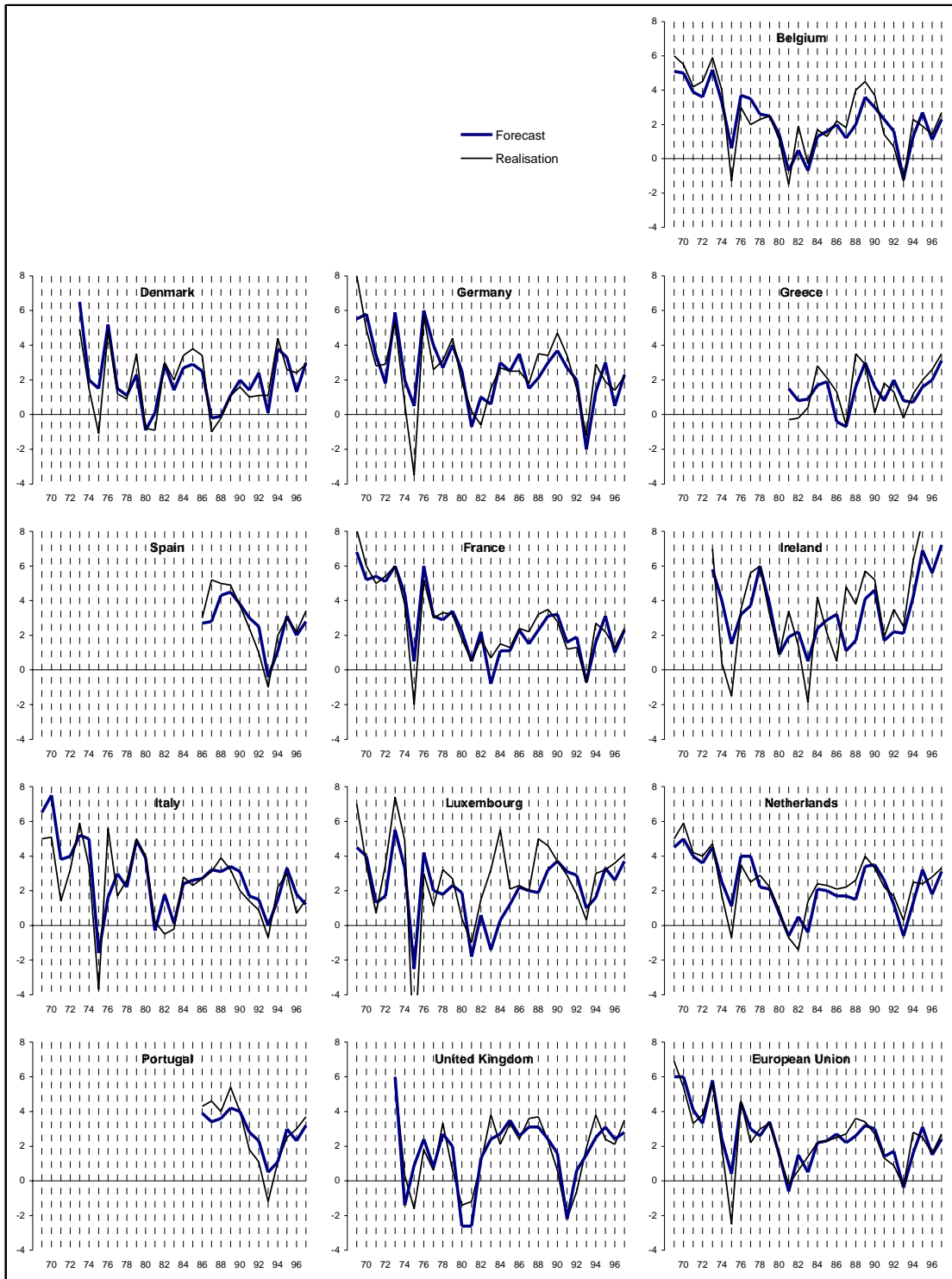


Figure 4: Real GDP growth – year ahead

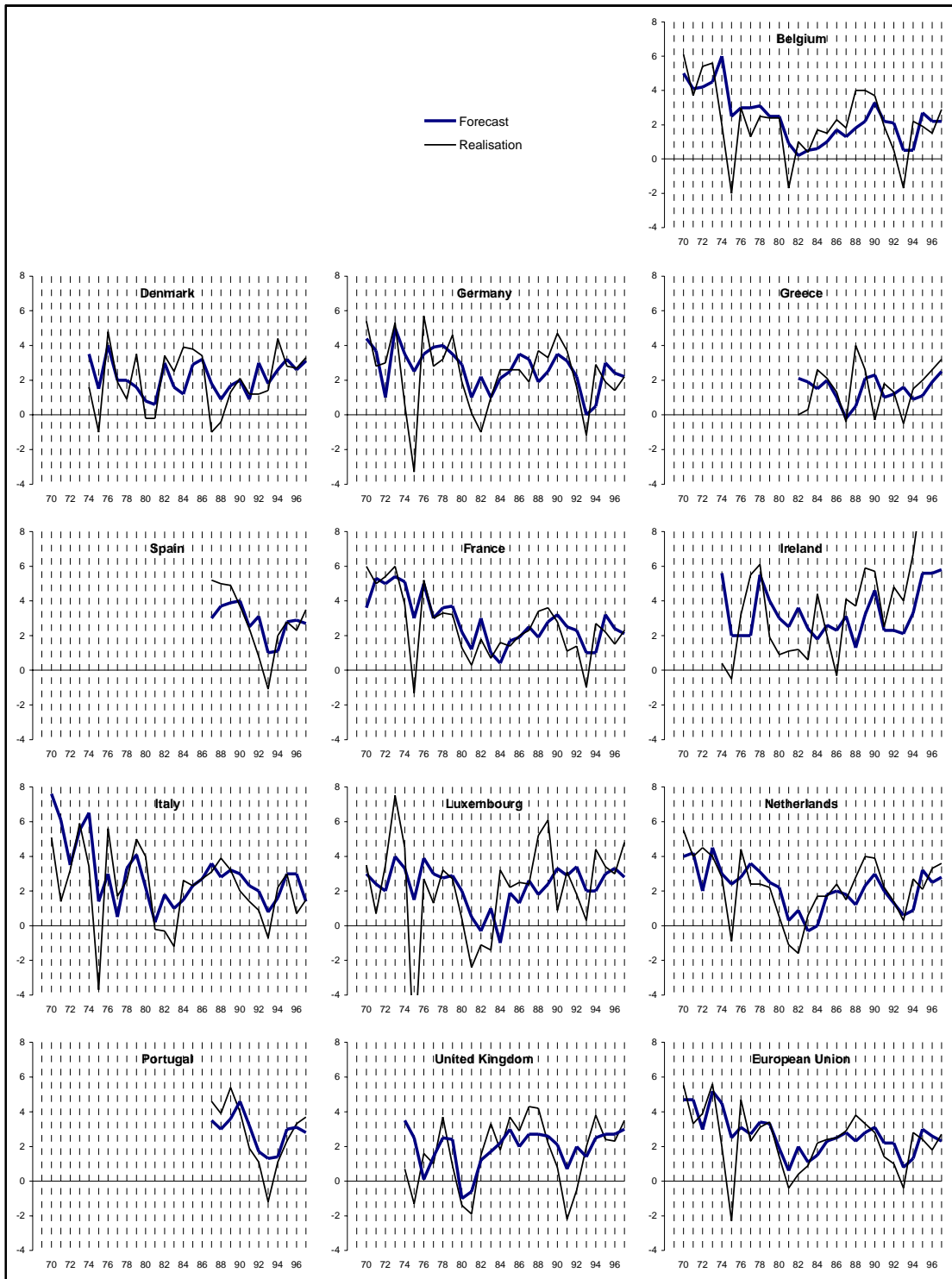


Figure 5: Inflation – current year

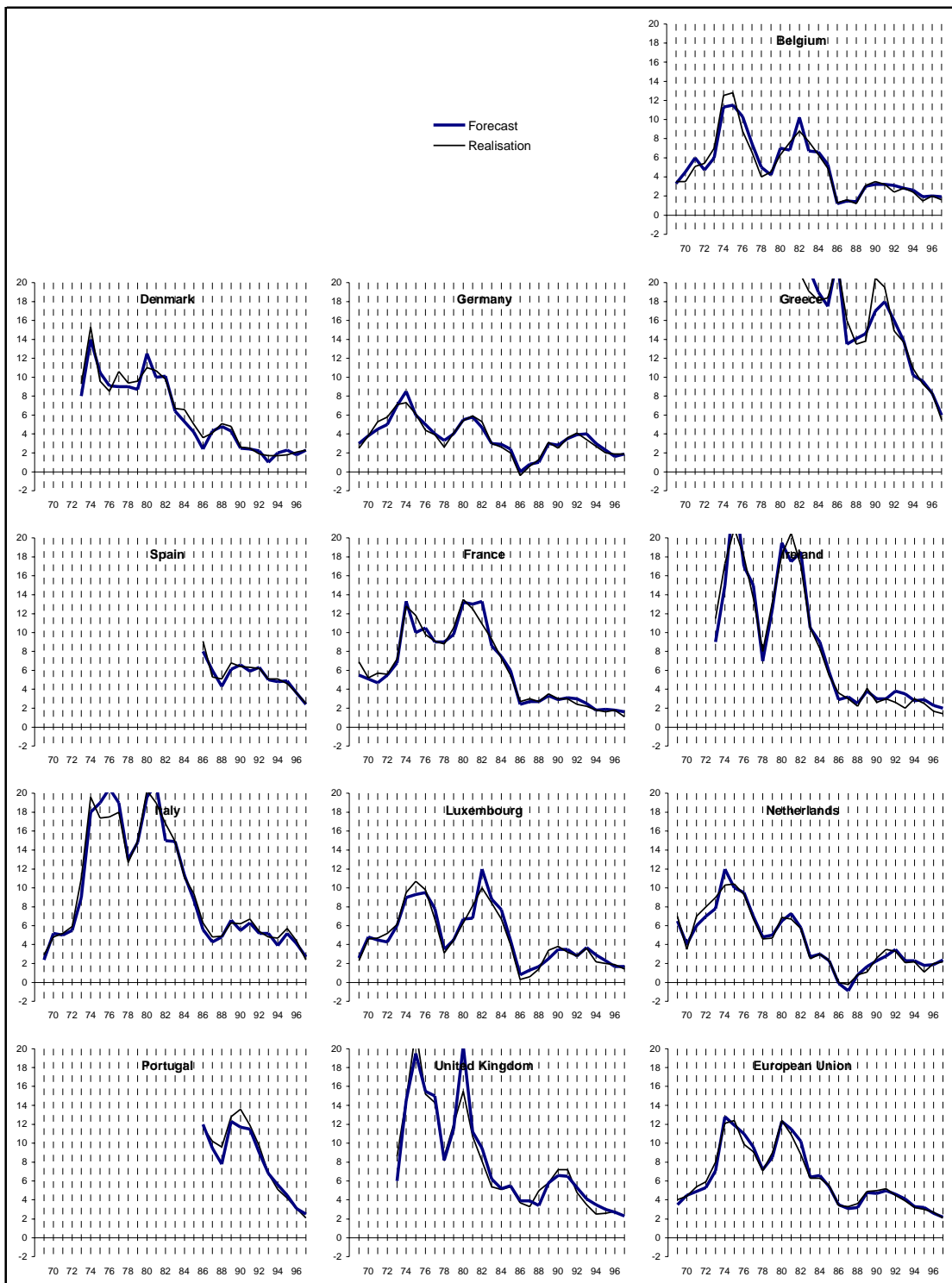


Figure 6: Inflation – year ahead

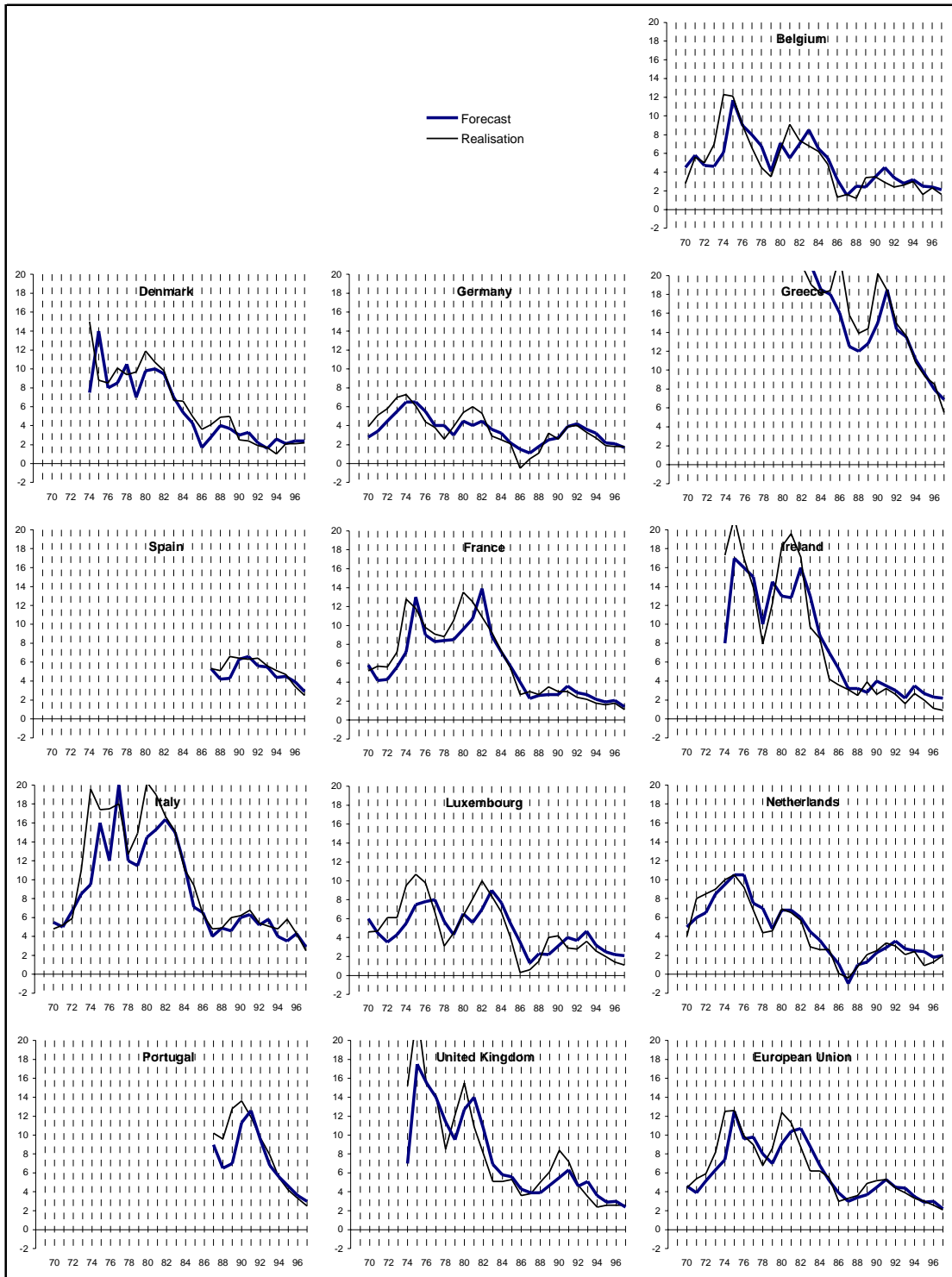


Figure 7: Government balance as % of GDP – current year

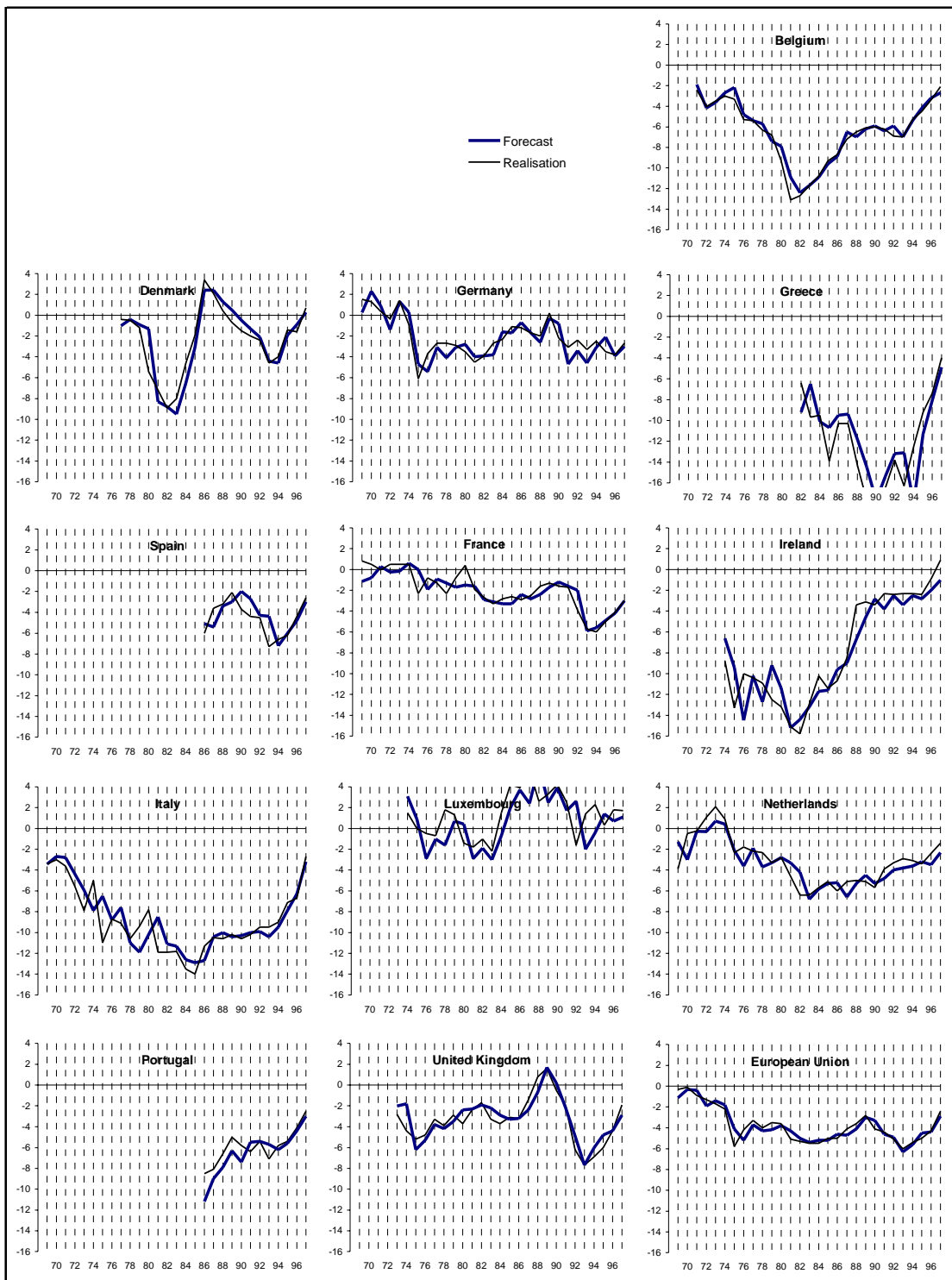
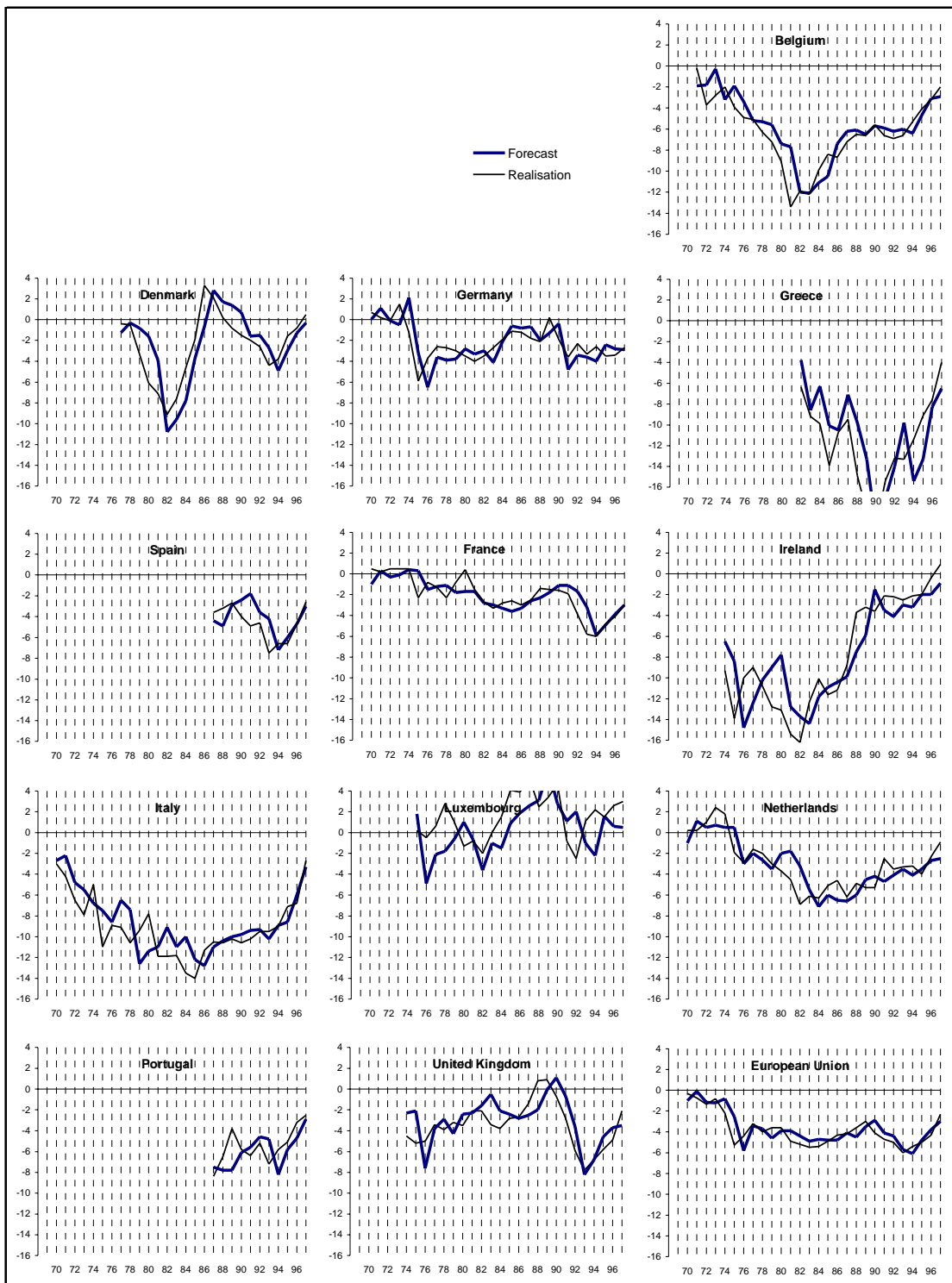


Figure 8: Government balance as % of GDP – year ahead



VIII. Unbiasedness

Are the Commission forecasts too rosy ? Public national or international forecasters are often accused of presenting too optimistic forecasts. A rationale for this behaviour could be the belief/attempt to influence the course of events by presenting coloured projections, hoping that economic agents will act accordingly by adjusting their expectations. It is the theory of the self fulfilling prophecy. For the variables examined here it would mean that real GDP growth is systematically too high, inflation too low, investment too high, unemployment too low, the government deficit too low and the current account balance too high in the forecasts.

While projecting a too optimistic picture is in general the accusation, it can also go in the other direction. Public authorities could have an interest to present a more pessimistic – for the matter prudent – forecast in order to trigger a policy reaction. It would be a self-destroying forecast. This could notably be the case in budgetary forecasting. By so doing a safety margin is built in to meet budgetary targets, also in case of slippage in government revenues or expenditures.

The issue at stake is the absence of bias. It means that on average the forecast error is zero or in other words that there is no systematic over- or underestimation. It can be formally examined by regressing the forecast error ($e = F - R$) on a constant (α) and an error term (μ).

$$e = \alpha + \mu$$

and testing the null hypothesis

$$H_0: \alpha = 0$$

In tables 7 and 8 the average forecast error is given (the estimate of the constant) and the probability value of the null hypothesis. It is customary to accept the null hypothesis if the probability value is larger than 0.05. In order to test whether the bias is hidden in a subperiod and changes in nature, the sample period is cut in approximately two equal halves. The first subperiod runs from 1969 to 1982; the second from 1983 to 1997. The break in 1983 was selected because it corresponds to the establishing of the forecasting procedures followed at this moment. Due to insufficient or absence of forecast data for Greece, Spain and Portugal which joined the European union only in the '80s, these countries are not covered in the first sub period. The number of observations is not equal for all Member States because of differences in accession dates. With respect to the first subperiod the sample for Denmark, Ireland and the United Kingdom is smaller; Spain and Portugal have fewer observations in the second subperiod (see tables 1 and 2, basic characteristics of the sample data, for the details)

In the case of current year forecasts, absence of bias taking the whole sample is generally observed at the country level and as far as EU aggregates are concerned, only investment is not very convincing. There is a tendency to overestimate investment growth by 0.58 percentage points.

Although usually not significant in a statistical sense, with a few exceptions, there are noteworthy shifts in the bias over time. While there was a tendency to overestimate GDP growth in the first sub period, underestimation was the rule in the second period. Only in the Netherlands is the shift from an overestimation of 0.24 percentage points to an underestimation of -0.49 percentage points significant.

The shift from underestimation to overestimation of the unemployment rate is more significant as several countries (Belgium, Germany, Netherlands) present statistics leading to the rejection of the null hypothesis of equality of the coefficients.

With respect to the year ahead forecasts, a similar conclusion as in the case of the current year forecasts of absence of bias in the sample as a whole is arrived at, although it would have been preferred that the probability values exceeded by a more comfortable margin the 5 % threshold. The exceptions are Italy where inflation is significantly underestimated by -1.32 percentage points and Luxembourg where the government deficit is overestimated by -1.12 percentage points.

Table 7: Bias - current year

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
α	-0.13	0.13	0.04	-0.08	-0.22	-0.03	-0.48	0.39	-0.60	-0.14	0.00	-0.01	0.08
Signif $\alpha=0$	0.42	0.49	0.87	0.77	0.45	0.85	0.22	0.11	0.11	0.40	1.00	0.95	0.61
α_1	0.01	0.52	0.44			0.19	0.31	0.61	-0.10	0.24		0.03	0.32
α_2	-0.26	-0.13	-0.33	-0.27	-0.22	-0.23	-1.01	0.19	-1.07	-0.49	-0.00	-0.04	-0.15
Signif $\alpha_1=\alpha_2$	0.42	0.08	0.10			0.16	0.09	0.38	0.19	0.02		0.87	0.10
Inflation													
α	0.10	-0.29	0.08	0.03	-0.18	-0.02	0.11	-0.09	0.12	-0.01	-0.38	0.12	0.02
Signif $\alpha=0$	0.49	0.07	0.32	0.94	0.24	0.86	0.70	0.64	0.38	0.93	0.14	0.68	0.80
α_1	0.14	-0.29	0.04			-0.11	-0.23	0.07	-0.02	-0.04		0.16	0.06
α_2	0.06	-0.29	0.12	-0.13	-0.18	0.06	0.34	-0.25	0.25	0.02	-0.37	0.09	-0.01
Signif $\alpha_1=\alpha_2$	0.79	0.99	0.64			0.54	0.35	0.42	0.32	0.78		0.90	0.68
Investment													
α	0.09	0.83	0.60	1.62	0.04	0.47	0.67	1.13	-0.76	-0.10	-0.73	0.53	0.58
Signif $\alpha=0$	0.88	0.40	0.27	0.17	0.97	0.22	0.45	0.12	0.30	0.87	0.59	0.31	0.05
α_1	0.31	3.22	0.64			-0.05	1.92	0.98	-1.11	1.06		0.57	0.59
α_2	-0.12	-0.76	0.56	1.05	0.04	0.95	-0.16	1.27	-0.43	-1.19	-0.73	0.51	0.57
Signif $\alpha_1=\alpha_2$	0.72	0.04	0.94			0.18	0.26	0.84	0.65	0.07		0.95	0.98
Unemployment rate													
α	0.04	-0.02	0.03	0.18	0.22	0.00	0.30	-0.10	-0.02	0.23	0.40	0.04	-0.05
Signif $\alpha=0$	0.73	0.90	0.73	0.47	0.37	0.96	0.10	0.68	0.76	0.34	0.10	0.58	0.54
α_1	-0.30	-0.22	-0.18			-0.04	0.13	-0.44	0.08	-0.31		0.03	-0.19
α_2	0.36	0.11	0.23	0.36	0.22	0.04	0.42	0.23	-0.07	0.73	0.40	0.05	0.08
Signif $\alpha_1=\alpha_2$	0.00	0.42	0.02			0.68	0.44	0.16	0.32	0.02		0.91	0.09
Government balance as % of GDP													
α	0.23	0.05	-0.15	0.46	0.28	-0.13	-0.23	0.19	-0.58	-0.27	-0.58	0.16	-0.02
Signif $\alpha=0$	0.07	0.85	0.39	0.46	0.48	0.46	0.56	0.51	0.16	0.20	0.10	0.42	0.82
α_1	0.51	0.48	-0.06			-0.31	0.71	0.44	-0.49	-0.17		0.17	-0.01
α_2	0.01	-0.12	-0.25	0.68	0.28	0.04	-0.79	-0.04	-0.64	-0.37	-0.58	0.15	-0.03
Signif $\alpha_1=\alpha_2$	0.04	0.34	0.60			0.32	0.06	0.42	0.86	0.64		0.96	0.93
Current account as % of GDP													
α	-0.09	0.10	-0.17	0.54	0.04	-0.07	-0.46	0.06	0.06	-0.10	-0.37	-0.16	-0.8
Signif $\alpha=0$	0.68	0.62	0.25	0.21	0.90	0.54	0.29	0.75	0.93	0.61	0.38	0.44	0.32
α_1	-0.09	0.13	0.02			0.06	-0.92	0.10	-0.54	0.10		-0.48	-0.02
α_2	-0.10	0.07	-0.31	0.43	0.04	-0.17	-0.15	0.03	0.55	-0.27	-0.37	0.05	-0.13
Signif $\alpha_1=\alpha_2$	0.98	0.88	0.25			0.34	0.39	0.84	0.46	0.38		0.23	0.51

α : coefficient in the regression $e = \alpha + \mu$ where e is the forecast error; without subscript: whole period; subscripts 1 and 2 refer to the first (until 1982) and second subperiod (from 1983); see table 1 (basic characteristics of sample data) for the exact years.

Signif $\alpha=0$ and Signif $\alpha_1=\alpha_2$: respectively the significance level of the t-statistic for $\alpha=0$ and of the F-statistic for $\alpha_1=\alpha_2$.

Numbers above 0.05 indicate absence of bias, respectively absence of change in bias between the two subperiods at the 5 % significance level.

Table 8: Bias - year ahead

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
α	0.21	0.18	0.31	-0.04	-0.07	0.29	-0.64	0.66	0.11	-0.10	0.10	0.28	0.32
Signif $\alpha=0$	0.49	0.53	0.36	0.91	0.86	0.25	0.29	0.06	0.84	0.71	0.79	0.39	0.21
α_1	0.75	0.48	0.77			0.47	1.16	0.92	0.93	0.49		0.80	0.66
α_2	-0.25	-0.01	-0.09	-0.19	-0.07	0.13	-1.71	0.44	-0.61	-0.61	0.10	-0.03	0.02
Signif $\alpha_1=\alpha_2$	0.10	0.41	0.20			0.49	0.01	0.49	0.13	0.03		0.21	0.20
Inflation													
α	0.10	-0.52	-0.08	-0.91	-0.35	-0.48	-0.32	-1.32	-0.11	0.21	-1.06	-0.42	-0.31
Signif $\alpha=0$	0.76	0.25	0.67	0.13	0.17	0.16	0.62	0.01	0.75	0.27	0.11	0.44	0.28
α_1	-0.49	-1.01	-0.61			-1.18	-2.47	-2.32	-1.08	0.10		-1.17	-0.87
α_2	0.62	-0.22	0.38	-1.03	-0.35	0.13	0.97	-0.46	0.73	0.31	-1.06	0.03	0.17
Signif $\alpha_1=\alpha_2$	0.09	0.40	0.00			0.05	0.01	0.05	0.01	0.59		0.28	0.07
Investment													
α	0.80	1.41	0.61	1.44	-0.04	0.94	0.85	1.48	-1.44	-0.77	-0.64	0.87	0.78
Signif $\alpha=0$	0.43	0.35	0.40	0.14	0.98	0.06	0.58	0.05	0.27	0.32	0.67	0.29	0.10
α_1	2.45	4.84	1.07			1.11	1.24	1.72	-1.22	1.15		1.73	1.22
α_2	-0.62	-0.65	0.22	1.37	-0.04	0.79	0.61	1.27	-1.62	-2.43	-0.64	0.35	0.39
Signif $\alpha_1=\alpha_2$	0.13	0.07	0.56			0.75	0.84	0.75	0.88	0.02		0.42	0.37
Unemployment rate													
α	0.31	0.06	0.05	-0.14	-0.15	-0.04	0.54	-0.07	-0.06	0.21	0.59	0.14	0.02
Signif $\alpha=0$	0.18	0.85	0.83	0.74	0.80	0.82	0.09	0.83	0.54	0.52	0.21	0.47	0.90
α_1	-0.52	-0.86	-0.47			-0.25	-0.10	-0.53	0.06	-0.54		-0.26	-0.40
α_2	0.97	0.61	0.46	0.03	-0.15	0.13	0.93	0.29	-0.11	0.82	0.59	0.38	0.35
Signif $\alpha_1=\alpha_2$	0.00	0.01	0.04			0.25	0.11	0.25	0.41	0.04		0.12	0.01
Government balance as % of GDP													
α	0.51	0.14	-0.06	0.80	0.54	0.01	-0.05	0.55	-1.12	-0.11	-0.54	0.43	0.16
Signif $\alpha=0$	0.10	0.78	0.82	0.31	0.29	0.95	0.93	0.12	0.04	0.70	0.33	0.20	0.32
α_1	1.23	1.31	0.03			-0.24	1.66	0.85	-1.36	0.39		0.40	0.23
α_2	-0.07	-0.33	-0.13	0.68	0.54	0.23	-1.07	0.29	-0.99	-0.53	-0.54	0.45	0.11
Signif $\alpha_1=\alpha_2$	0.03	0.12	0.76			0.26	0.02	0.43	0.74	0.09		0.94	0.71
Current account as % of GDP													
α	-0.25	0.37	-0.13	0.44	-0.08	-0.21	-0.04	0.30	-0.72	-0.15	0.43	-0.05	-0.01
Signif $\alpha=0$	0.47	0.46	0.59	0.30	0.87	0.26	0.95	0.39	0.71	0.63	0.39	0.88	0.96
α_1	0.19	0.72	0.07			-0.06	0.53	0.70	-2.54	-0.25		0.01	0.23
α_2	-0.61	0.17	-0.28	0.38	-0.08	-0.33	-0.38	-0.03	0.50	-0.07	0.43	-0.09	-0.19
Signif $\alpha_1=\alpha_2$	0.25	0.60	0.47			0.48	0.51	0.30	0.45	0.77		0.89	0.12

α : coefficient in the regression $e = \alpha + \mu$ where e is the forecast error; without subscript: whole period; subscripts 1 and 2 refer to the first (until 1982) and second subperiod (from 1983); see table 2 (basic characteristics of sample data) for the exact years.
Signif $\alpha=0$ and Signif $\alpha_1=\alpha_2$: respectively the significance level of the t-statistic for $\alpha=0$ and of the F-statistic for $\alpha_1=\alpha_2$.
Numbers above 0.05 indicate absence of bias, respectively absence of change in bias between the two subperiods at the 5 % significance level.

The change in the bias from the first to the second subperiod is now somewhat more marked. In addition to unemployment, also the year ahead inflation forecasts are widely affected. In several Member States (Germany, France, Ireland, Luxembourg) there is a significant shift from underestimation to overestimation. Note that in the case of Italy there has been a significant reduction in the underestimation.

Summing up, there is some evidence of bias, and in certain cases it is significant. However, it does not go in the direction of presenting a too optimistic picture in the second subperiod. Investment is among the variables where the tendency to overestimate is strongest, but not all Member States fit this generalisation.

Nevertheless, sometimes the Commission forecasts are considered too rosy. Later in the note (in section XII on cycle recognition) the issue is taken up again to try to find out what could provoke such critical remarks.

IX. Efficiency

Forecasts are efficient if all information available in the data is used. Weak efficiency can be tested with the realisation-forecast equation

$$R = \alpha + \beta F + \mu$$

where the null hypothesis is

$$H_0: \alpha = 0 \text{ and } \beta = 1$$

Table 9: Efficiency – current year

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
α	-0.08	0.00	0.03	0.23	-0.11	0.02	-0.46	-0.03	0.48	0.30	-1.47	0.21	-0.15
Signif $\alpha=0$	0.78	1.00	0.93	0.62	0.87	0.95	0.56	0.94	0.40	0.32	0.04	0.41	0.60
β	1.09	0.94	0.97	0.89	1.12	1.00	1.28	0.87	1.06	0.93	1.51	0.88	1.03
Signif $\beta=1$	0.35	0.57	0.83	0.68	0.60	0.96	0.18	0.28	0.78	0.51	0.03	0.23	0.76
Signif $\alpha=0, \beta=1$	0.47	0.68	0.96	0.88	0.66	0.98	0.19	0.16	0.27	0.57	0.08	0.48	0.84
\bar{R}^2	0.81	0.74	0.67	0.38	0.69	0.86	0.62	0.64	0.48	0.73	0.84	0.76	0.82
DW	1.39	1.68	1.84	1.67	1.44	1.40	1.66	2.39	1.37	1.85	1.87	2.31	2.08
Inflation													
α	-0.15	0.31	-0.04	1.04	-0.19	0.21	0.12	0.74	-0.04	0.10	-0.51	0.34	0.37
Signif $\alpha=0$	0.59	0.31	0.82	0.41	0.75	0.44	0.81	0.04	0.87	0.62	0.38	0.51	0.07
β	1.01	1.00	0.99	0.93	1.07	0.97	0.97	0.93	0.99	0.98	1.11	0.94	0.94
Signif $\beta=1$	0.83	0.94	0.81	0.37	0.52	0.42	0.56	0.03	0.75	0.59	0.11	0.29	0.03
Signif $\alpha=0, \beta=1$	0.77	0.21	0.59	0.66	0.41	0.71	0.78	0.09	0.65	0.86	0.09	0.52	0.09
\bar{R}^2	0.94	0.96	0.94	0.91	0.90	0.96	0.95	0.97	0.94	0.96	0.97	0.93	0.98
DW	2.05	2.13	1.69	1.72	2.83	2.11	2.43	1.80	1.85	2.24	2.18	1.63	1.78
Investment													
α	-0.68	-1.48	-0.59	-1.83	-1.31	-0.64	-1.78	-0.75	1.12	-0.07	-1.05	-0.35	-0.74
Signif $\alpha=0$	0.34	0.10	0.41	0.24	0.40	0.19	0.12	0.35	0.18	0.92	0.74	0.51	0.07
β	1.23	1.43	1.00	1.06	1.24	1.07	1.28	0.84	0.86	1.11	1.26	0.84	1.05
Signif $\beta=1$	0.15	0.01	0.98	0.83	0.26	0.57	0.12	0.32	0.35	0.58	0.53	0.14	0.57
Signif $\alpha=0, \beta=1$	0.35	0.01	0.55	0.39	0.51	0.40	0.23	0.18	0.38	0.84	0.71	0.20	0.14
\bar{R}^2	0.68	0.81	0.64	0.43	0.78	0.73	0.68	0.51	0.53	0.52	0.44	0.72	0.82
DW	1.65	2.27	1.67	1.77	1.20	1.92	1.60	2.03	1.43	1.92	2.14	1.64	1.88
Unemployment rate													
α	0.48	0.98	0.24	2.35	1.18	0.12	-0.21	0.78	0.08	0.46	1.35	0.16	0.23
Signif $\alpha=0$	0.07	0.08	0.18	0.01	0.52	0.59	0.72	0.18	0.62	0.31	0.10	0.45	0.19
β	0.94	0.87	0.95	0.68	0.93	0.98	0.99	0.92	0.97	0.90	0.73	0.98	0.98
Signif $\beta=1$	0.03	0.07	0.08	0.01	0.45	0.54	0.88	0.19	0.69	0.08	0.04	0.31	0.25
Signif $\alpha=0, \beta=1$	0.08	0.19	0.20	0.02	0.51	0.83	0.27	0.39	0.88	0.14	0.03	0.51	0.42
\bar{R}^2	0.98	0.86	0.98	0.73	0.91	0.98	0.96	0.90	0.86	0.91	0.79	0.99	0.99
DW	1.37	2.51	1.45	1.92	1.62	2.46	2.15	2.41	2.43	2.37	0.98	2.59	2.01
Government balance as % of GDP													
α	-0.14	-0.40	-0.28	-1.13	-1.51	0.11	0.52	-1.24	0.90	0.33	-1.62	-0.24	0.00
Signif $\alpha=0$	0.65	0.22	0.27	0.60	0.23	0.72	0.53	0.16	0.02	0.45	0.07	0.51	0.99
β	1.02	0.85	0.81	0.94	0.71	0.99	1.04	0.88	0.55	1.02	0.66	0.97	0.99
Signif $\beta=1$	0.73	0.07	0.03	0.75	0.29	0.92	0.68	0.21	0.01	0.88	0.02	0.78	0.99
Signif $\alpha=0, \beta=1$	0.18	0.17	0.06	0.73	0.44	0.76	0.78	0.36	0.01	0.44	0.01	0.70	0.97
\bar{R}^2	0.96	0.86	0.77	0.64	0.37	0.75	0.86	0.75	0.35	0.75	0.73	0.77	0.88
DW	1.75	1.64	1.96	1.78	1.84	1.86	2.10	2.39	2.10	2.06	1.61	1.69	2.06
Current account as % of GDP													
α	0.17	-0.04	0.22	-1.90	-0.34	0.11	0.33	-0.06	0.50	0.34	0.13	0.18	0.09
Signif $\alpha=0$	0.45	0.88	0.17	0.20	0.32	0.34	0.46	0.75	0.69	0.34	0.78	0.47	0.29
β	0.90	1.04	0.94	0.61	0.75	1.17	0.92	0.97	0.97	0.90	0.75	1.03	0.92
Signif $\beta=1$	0.18	0.68	0.42	0.33	0.08	0.16	0.29	0.82	0.58	0.41	0.35	0.88	0.51
Signif $\alpha=0, \beta=1$	0.36	0.82	0.38	0.29	0.21	0.30	0.33	0.93	0.85	0.63	0.44	0.74	0.49
\bar{R}^2	0.85	0.84	0.84	0.10	0.74	0.80	0.85	0.72	0.94	0.70	0.41	0.62	0.68
DW	1.45	1.81	1.91	1.78	1.34	2.25	1.76	2.01	2.57	1.40	1.60	1.94	2.13

α and β : coefficients in the regression $R = \alpha + \beta F + \mu$

Signif (.): significance level of the t-statistic (single test) or F-statistic (joint test) of the null hypothesis; numbers above 0.05 indicate that the null hypothesis can be accepted at the 5 % significance level.

Table 10: Efficiency – year ahead

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
α	0.25	-0.39	-0.04	1.39	-1.01	-0.24	0.01	0.14	-0.24	0.34	-1.67	-0.35	-0.32
Signif $\alpha=0$	0.68	0.59	0.97	0.11	0.46	0.68	1.00	0.83	0.83	0.54	0.16	0.60	0.63
β	0.81	1.10	0.90	0.08	1.39	0.98	1.19	0.72	1.06	0.89	1.55	1.04	1.00
Signif $\beta=1$	0.38	0.75	0.72	0.09	0.41	0.92	0.63	0.15	0.90	0.61	0.17	0.90	1.00
Signif $\alpha=0, \beta=1$	0.53	0.78	0.62	0.22	0.69	0.51	0.48	0.06	0.97	0.82	0.35	0.69	0.46
R^2	0.32	0.34	0.25	-0.07	0.46	0.52	0.26	0.33	0.15	0.37	0.63	0.33	0.41
DW	1.52	1.59	2.05	1.81	1.40	1.73	0.74	1.99	1.89	1.89	1.80	1.35	1.94
Inflation													
α	-0.30	0.87	-0.61	1.48	0.66	0.29	-0.99	0.47	-0.59	-0.17	0.41	-0.11	0.37
Signif $\alpha=0$	0.70	0.32	0.21	0.48	0.60	0.67	0.38	0.64	0.50	0.64	0.81	0.92	0.59
β	1.04	0.94	1.20	0.96	0.94	1.03	1.17	1.10	1.15	0.99	1.09	1.07	0.99
Signif $\beta=1$	0.78	0.63	0.13	0.77	0.80	0.74	0.17	0.34	0.39	0.88	0.68	0.58	0.92
Signif $\alpha=0, \beta=1$	0.92	0.47	0.29	0.31	0.40	0.36	0.34	0.02	0.65	0.54	0.27	0.64	0.57
R^2	0.67	0.69	0.76	0.77	0.58	0.81	0.81	0.81	0.63	0.90	0.71	0.76	0.77
DW	1.44	2.04	1.13	1.22	1.54	1.94	1.05	1.93	0.98	1.42	1.04	0.89	1.25
Investment													
α	-0.91	-3.30	-0.22	-3.80	-0.82	-0.56	-0.57	-1.02	2.24	0.53	-0.91	-1.07	-0.61
Signif $\alpha=0$	0.58	0.04	0.85	0.04	0.76	0.47	0.81	0.30	0.10	0.55	0.81	0.29	0.45
β	1.04	1.86	0.87	1.63	1.16	0.87	0.93	0.84	0.26	1.18	1.23	1.11	0.94
Signif $\beta=1$	0.93	0.02	0.65	0.12	0.70	0.52	0.87	0.47	0.07	0.59	0.67	0.71	0.80
Signif $\alpha=0, \beta=1$	0.73	0.04	0.63	0.10	0.92	0.14	0.85	0.11	0.11	0.53	0.83	0.54	0.26
R^2	0.15	0.56	0.26	0.54	0.43	0.39	0.12	0.35	-0.02	0.31	0.32	0.38	0.40
DW	1.78	2.00	1.39	1.86	1.35	1.50	1.88	1.72	1.21	1.58	1.12	1.59	1.57
Unemployment rate													
α	0.88	2.70	0.75	6.03	2.90	0.53	0.94	2.01	0.29	1.00	3.10	0.83	0.73
Signif $\alpha=0$	0.09	0.00	0.12	0.00	0.55	0.19	0.36	0.02	0.15	0.13	0.04	0.16	0.05
β	0.87	0.63	0.86	0.27	0.86	0.94	0.89	0.78	0.86	0.84	0.43	0.89	0.90
Signif $\beta=1$	0.02	0.00	0.07	0.00	0.57	0.18	0.14	0.01	0.20	0.04	0.02	0.09	0.03
Signif $\alpha=0, \beta=1$	0.02	0.00	0.18	0.00	0.82	0.39	0.08	0.04	0.35	0.09	0.02	0.18	0.09
R^2	0.92	0.68	0.83	0.21	0.55	0.94	0.88	0.77	0.75	0.83	0.26	0.89	0.95
DW	1.09	1.45	0.79	1.23	0.71	1.67	0.59	1.00	1.26	1.43	0.49	1.42	0.87
Government balance as % of GDP													
α	-1.01	-0.80	-0.82	-3.70	-2.42	-0.10	0.06	-2.36	1.30	-0.27	-2.47	-1.31	-0.72
Signif $\alpha=0$	0.14	0.14	0.02	0.09	0.09	0.77	0.96	0.03	0.01	0.55	0.22	0.02	0.09
β	0.91	0.72	0.61	0.73	0.54	0.96	1.00	0.79	0.39	0.88	0.50	0.71	0.85
Signif $\beta=1$	0.41	0.04	0.00	0.14	0.16	0.76	0.99	0.08	0.00	0.31	0.13	0.05	0.16
Signif $\alpha=0, \beta=1$	0.19	0.10	0.01	0.20	0.20	0.95	1.00	0.07	0.00	0.54	0.19	0.07	0.22
R^2	0.76	0.61	0.50	0.53	0.19	0.64	0.71	0.62	0.15	0.68	0.14	0.50	0.71
DW	1.63	0.78	1.89	0.92	1.13	1.36	1.31	1.75	1.28	1.24	1.53	1.13	1.77
Current account as % of GDP													
α	0.37	-0.71	0.25	-1.88	-0.67	0.27	-0.12	-0.27	5.04	1.02	-0.97	-0.30	0.04
Signif $\alpha=0$	0.30	0.21	0.34	0.28	0.19	0.18	0.86	0.41	0.16	0.04	0.05	0.46	0.76
β	0.82	0.70	0.86	0.60	0.53	1.20	0.89	0.67	0.79	0.66	0.51	0.58	0.71
Signif $\beta=1$	0.16	0.17	0.32	0.39	0.02	0.37	0.40	0.13	0.15	0.03	0.03	0.11	0.17
Signif $\alpha=0, \beta=1$	0.29	0.29	0.52	0.41	0.06	0.35	0.70	0.21	0.33	0.08	0.06	0.28	0.38
R^2	0.62	0.30	0.60	0.05	0.46	0.53	0.65	0.27	0.54	0.41	0.38	0.15	0.29
DW	0.67	1.74	1.59	1.79	0.91	1.93	2.02	1.43	1.64	1.08	2.31	1.01	1.34
α and β : coefficients in the regression $R = \alpha + \beta F + \mu$													
Signif (.): significance level of the t-statistic (single test) or F-statistic (joint test) for the null hypothesis; numbers above 0.05 indicate that the null hypothesis can be accepted at the 5 % significance level.													

If α is significantly different from zero and β significantly different from unity, the forecast is correlated with the forecast error and the forecast can be improved exploiting this information. In the tables both the probability values for the restrictions imposed on the coefficients separately (t-test) and jointly (F-test) are given. The appropriate test is the latter one as the estimates of α and β are likely to be correlated (Wallis, 1989). Attention should also be paid to the presence of serial correlation in the error terms which makes hypothesis testing less reliable. The analysis of the persistence of the forecast errors

(section VII) and the Durbin Watson statistic (DW) in this section give indications on this issue.

The forecasts are in general efficient, but the year ahead forecast to a lesser extent as the significance levels for the joint test exceed by less the customary 0.05 level.

At the country level Italy often forms a problem and occasionally the forecasts of smaller Member States are not efficient. Noteworthy is the doubtful efficiency of inflation forecasting for the EU. The efficiency of German inflation and deficit forecasting appears also doubtful, especially for the year ahead, and this despite the relatively good record in terms of mean absolute error (tables 3 and 4) and bias (tables 7 and 8).

With respect to variables, the unemployment rate are among those which are least efficiently predicted and where the accuracy could be improved by making better use of past mistakes. This is indicated by the low significance of the joint F-test. Furthermore, the low DW-statistic hints at the presence of autocorrelation.

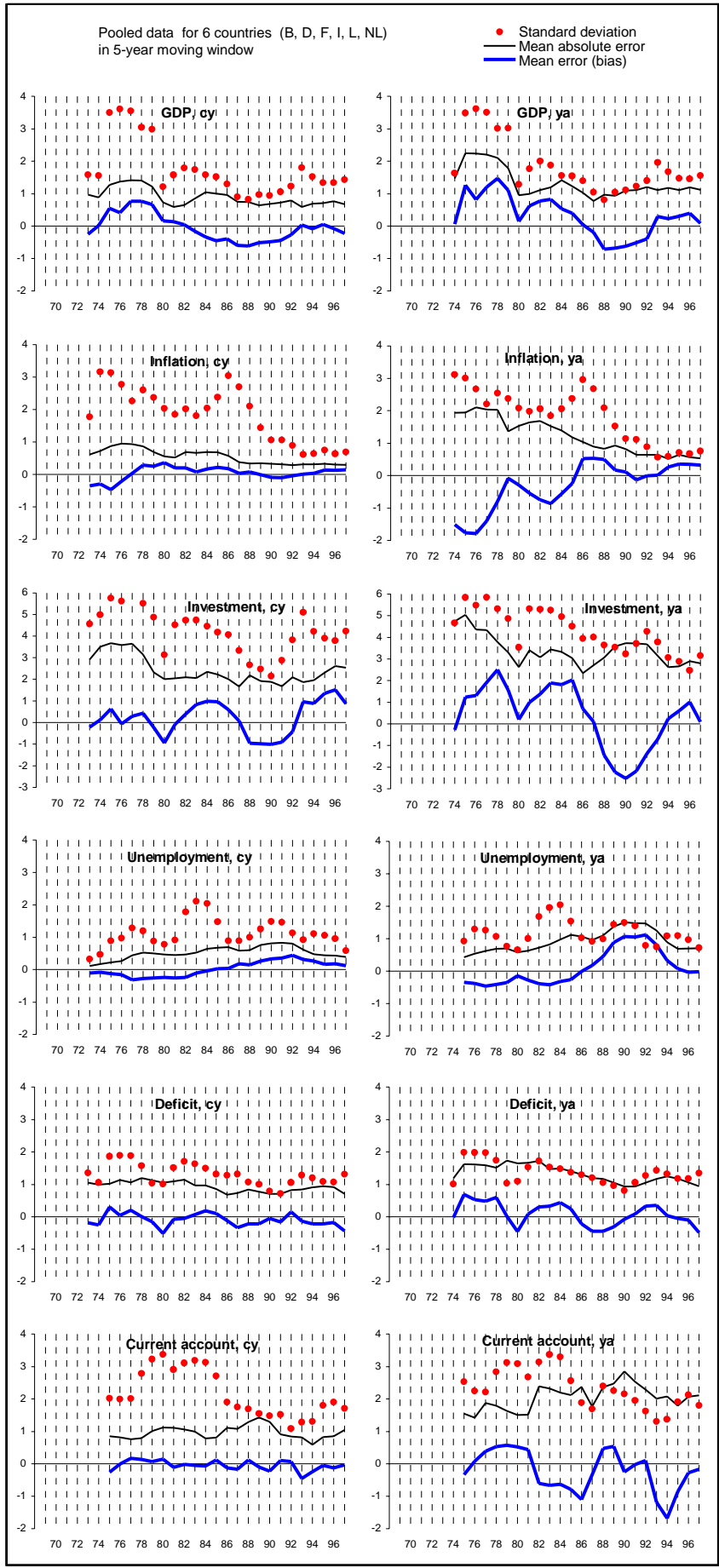
X. Accuracy through time

In this section the issue is examined whether the forecast accuracy improved over time. To that end the series are pooled for which a long forecast record exists at the European Commission. These pooled series comprise the six founding Member States of the European Union: Belgium, Germany, France, Italy, Luxembourg and the Netherlands. The analysis is conducted in terms of two key summary statistics: the mean absolute error and the mean error. In order to detect more easily the basic trend, the statistics are calculated as 5-year moving averages. The lower the statistics, the better the forecasting record. Inspection of the sign of the mean error allows also a verdict on a possible shift over time in the direction of the bias.

However, lower forecast errors are not necessarily an indication of improved accuracy. It may well be that the economy is easier to forecast. This would then be the explanation and not greater precision in the techniques or procedures used in forecasting. To control for that, a measure reflecting the predictability of economic series is required. It is generally thought that the greater the volatility of the series, the more difficult they are to forecast. The standard deviation of the realisation data can be used as a measure of volatility. In analogy with the error statistics, it is calculated in a 5-year moving window.

The general message of figure 9 is that the forecast accuracy improved, but that this is largely due to the better predictability of the economy as evidenced by the lower moving standard deviation of the underlying variable. The first oil price hike in 1973 and the second oil price increase in 1979, culminating in the recessions of 1975 and 1981 have made the first half of the sample more turbulent, leaving clear marks on forecast accuracy. In the nineties the economy appears to be more stable compared to the seventies, but volatility increased compared to the middle of the eighties. This can probably be linked to the German unification shock in 1989, which contributed to a boom/bust cycle.

Figure 9: Accuracy through time



Other interesting observations:

- The larger improvement over time is observed in the year ahead forecasts. In particular, year ahead inflation forecasting improved significantly. The tendency to underestimate inflation until the early eighties also disappeared.
- Contrary to the declining pattern observed for the other variables, the mean absolute forecast error for unemployment gradually increased until the early nineties. It reflects the unexpected increase in the unemployment rate. Since 1992, the forecast errors have started shrinking. The largest forecast errors are associated with an overestimation of the unemployment rate at a moment when a decline in the unemployment rate set in.
- Accuracy of GDP forecasting has hardly deteriorated, although the economy has become more volatile since the mid-80's, which is an encouraging result

XI. Directional accuracy

Up to now the forecast performance was assessed in a quantitative manner. At least as important (Leitch and Tanner, 1991) is to have the direction of the change correct. It is a first step to evaluate the timely prediction of turning points in the business cycle. Studies of directional accuracy of forecasts can be found in Artis (1996), Ash, Smyth and Heravi (1998).

The data can be arranged in a 2x2 contingency table (see Wonacott and Wonacott, 1977):

		outturns	
		<	≥
Forecasts	<	success	failure
	≥	failure	success

The rows indicate a forecast of either a decrease or an increase in the variable under consideration compared to the previous year and the columns do the same for the outturns. A success is obtained when the sign of the forecast change is verified ex post. The first entry on the leading diagonal gives the number of forecast negative changes met by a decline, while the second entry on the leading diagonal combines positive changes in forecasts and realisations. Opposite changes in forecasts and results are a failure. The larger the number of the successes, the greater the directional forecast accuracy. A score of at least 50 % correct matches seems a minimum requirement. Otherwise one might as well flip a coin.

It can formally be tested, applying a χ^2 -test, if there exists a significant relation between the direction of change of the outturns and the one of the forecasts. If this is not the case, this measure puts a question mark behind the usefulness of making forecasts. On the contrary, if the null hypothesis of independence can be rejected, the association of correct signs between forecasts and outturn is not by accident. The χ^2 -test statistic should be lower than 0.05 in order to reject at the customary 5 % significance level the null hypothesis of independence. It corresponds to achieving a success rate of about 70 %.

With respect to forecasts made in the beginning of the year, the score is very good. A judgement on the significance of this result is of course more robust for the Member States which belong to the European Union since the beginning and for which a long series of observations exist. It is in particular noteworthy that sign prediction of the very volatile investment series is good. Forecasts for Greece and Luxembourg are among the more difficult. Forecasting the sign of the budget change correctly was most difficult in Ireland, but also the result for France and the Netherlands is disappointing.

Table 11: Contingency table of directional accuracy – current year

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
$\Delta F \geq 0$ and $\Delta R < 0$	3	2	2	1	1	2	2	2	1	3	1	2	2
$\Delta F < 0$ and $\Delta R \geq 0$	2	2	1	0	1	2	1	0	4	4	2	2	3
$\Delta F < 0$ and $\Delta R < 0$	13	10	14	6	6	14	11	12	14	13	4	10	12
$\Delta F \geq 0$ and $\Delta R \geq 0$	10	10	11	9	3	10	10	14	9	8	4	10	11
Success rate	0.83	0.83	0.89	0.94	0.82	0.86	0.88	0.93	0.82	0.75	0.73	0.83	0.82
Signif indep	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.01	0.12	0.00	0.00
Inflation													
$\Delta F \geq 0$ and $\Delta R < 0$	0	0	0	1	1	4	3	1	1	2	0	2	1
$\Delta F < 0$ and $\Delta R \geq 0$	2	1	1	1	1	1	1	0	3	2	1	1	4
$\Delta F < 0$ and $\Delta R < 0$	13	14	14	11	8	15	13	14	12	11	9	11	14
$\Delta F \geq 0$ and $\Delta R \geq 0$	13	9	13	3	1	8	7	13	12	13	1	10	9
Success rate	0.93	0.96	0.96	0.88	0.82	0.82	0.83	0.96	0.86	0.86	0.91	0.88	0.82
Signif indep	0.00	0.00	0.00	0.01	0.20	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Investment													
$\Delta F \geq 0$ and $\Delta R < 0$	2	3	4	3	1	4	2	6	1	0	1	2	2
$\Delta F < 0$ and $\Delta R \geq 0$	3	2	1	0	2	1	3	1	4	2	1	2	1
$\Delta F < 0$ and $\Delta R < 0$	10	10	13	5	5	12	7	11	11	14	4	8	12
$\Delta F \geq 0$ and $\Delta R \geq 0$	13	9	10	8	3	11	12	10	12	12	5	12	13
Success rate	0.82	0.79	0.82	0.81	0.73	0.82	0.79	0.75	0.82	0.93	0.82	0.83	0.89
Signif indep	0.00	0.00	0.00	0.01	0.14	0.00	0.01	0.00	0.00	0.00	0.04	0.00	0.00
Unemployment rate													
$\Delta F \geq 0$ and $\Delta R < 0$	4	1	3	6	0	3	1	5	4	3	1	1	1
$\Delta F < 0$ and $\Delta R \geq 0$	4	1	4	2	0	0	1	2	5	2	1	1	2
$\Delta F < 0$ and $\Delta R < 0$	7	8	7	0	8	4	9	4	3	11	5	8	7
$\Delta F \geq 0$ and $\Delta R \geq 0$	13	14	14	8	3	20	13	17	10	12	4	14	18
Success rate	0.71	0.92	0.75	0.50	1.00	0.89	0.92	0.75	0.59	0.82	0.82	0.92	0.89
Signif indep	0.03	0.00	0.01	0.24	0.00	0.00	0.00	0.04	0.67	0.00	0.04	0.00	0.00
Government balance as % of GDP													
$\Delta F \geq 0$ and $\Delta R < 0$	2	5	4	2	4	5	4	4	2	2	1	3	1
$\Delta F < 0$ and $\Delta R \geq 0$	0	1	2	2	0	5	6	3	6	9	2	1	1
$\Delta F < 0$ and $\Delta R < 0$	9	8	12	4	0	9	7	7	11	10	2	8	13
$\Delta F \geq 0$ and $\Delta R \geq 0$	15	6	10	7	7	9	6	14	4	7	7	12	13
Success rate	0.92	0.70	0.79	0.73	0.64	0.64	0.57	0.75	0.65	0.61	0.82	0.83	0.93
Signif indep	0.00	0.04	0.00	0.09	NA	0.13	0.51	0.01	0.18	0.13	0.07	0.00	0.00
Current account as % of GDP													
$\Delta F \geq 0$ and $\Delta R < 0$	5	4	2	3	2	2	2	4	1	4	1	2	2
$\Delta F < 0$ and $\Delta R \geq 0$	4	3	5	3	2	4	3	0	6	6	1	4	1
$\Delta F < 0$ and $\Delta R < 0$	7	7	9	3	4	9	9	11	12	5	6	9	10
$\Delta F \geq 0$ and $\Delta R \geq 0$	10	10	10	6	3	11	10	11	7	11	3	9	13
Success rate	0.65	0.71	0.73	0.60	0.64	0.77	0.79	0.85	0.73	0.62	0.82	0.75	0.88
Signif indep	0.09	0.10	0.01	0.52	0.38	0.01	0.00	0.00	0.01	0.32	0.04	0.01	0.00

For each variable the first two rows indicate the number of failures, the next two rows the number of successes. The success rate is the percentage share of successes. Signif indep is the significance level of the χ^2 -statistic for independence of forecasts and realisations. With numbers below 0.05 the null hypothesis of independence can be rejected at the 5 % significance level.

While the success rate for current year forecasts is in general reassuring, directional forecasts made at the end of the year for the year afterwards are less good for some Member States/variables. The performance of sign prediction for the various EU aggregates remains, however, very acceptable. In particular forecasting the change of the deficit ratio in the following year appeared to be difficult. Only for the UK next year are changes in the deficit ratio forecast with a significant degree of success. An explanation for this rather poor result is the hypothesis of unchanged policies under which the forecasts are

made if policy measures are not formally known. Nevertheless, the forecaster may have a fair idea of the measures that the government will take, but cannot incorporate them in the forecast because he/she is not sure about his/her information. This is often the case at the end of the year for the budget.

Table 12: Contingency table of directional accuracy – year ahead

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP													
$\Delta F \geq 0$ and $\Delta R < 0$	3	3	4	4	2	5	4	4	8	6	1	3	4
$\Delta F < 0$ and $\Delta R \geq 0$	1	2	2	1	0	1	2	3	2	6	0	1	2
$\Delta F < 0$ and $\Delta R < 0$	12	8	10	3	5	9	7	11	7	9	4	10	9
$\Delta F \geq 0$ and $\Delta R \geq 0$	11	10	11	7	3	12	10	9	10	6	5	9	12
Success rate	0.85	0.78	0.78	0.67	0.80	0.78	0.74	0.74	0.63	0.56	0.90	0.83	0.78
Signif indep	0.00	0.01	0.01	0.18	0.04	0.00	0.02	0.01	0.10	0.60	0.01	0.00	0.00
Inflation													
$\Delta F \geq 0$ and $\Delta R < 0$	6	4	2	1	2	2	4	2	3	6	1	0	0
$\Delta F < 0$ and $\Delta R \geq 0$	3	4	4	3	1	5	1	8	5	2	2	4	5
$\Delta F < 0$ and $\Delta R < 0$	10	10	12	10	6	15	12	12	10	6	7	11	14
$\Delta F \geq 0$ and $\Delta R \geq 0$	8	5	9	1	1	5	6	5	9	13	0	8	8
Success rate	0.67	0.65	0.78	0.73	0.70	0.74	0.78	0.63	0.70	0.70	0.70	0.83	0.81
Signif indep	0.07	0.20	0.00	0.42	0.49	0.03	0.01	0.15	0.03	0.04	0.60	0.00	0.00
Investment													
$\Delta F \geq 0$ and $\Delta R < 0$	7	6	5	5	1	5	4	7	6	5	2	4	4
$\Delta F < 0$ and $\Delta R \geq 0$	6	2	6	1	2	3	5	4	8	5	2	2	2
$\Delta F < 0$ and $\Delta R < 0$	5	6	10	4	4	10	5	8	7	8	3	8	8
$\Delta F \geq 0$ and $\Delta R \geq 0$	9	9	6	5	3	9	9	8	6	9	3	9	12
Success rate	0.52	0.65	0.59	0.60	0.70	0.70	0.61	0.59	0.48	0.63	0.60	0.74	0.74
Signif indep	0.93	0.11	0.38	0.26	0.20	0.03	0.35	0.30	0.86	0.18	0.53	0.02	0.01
Unemployment rate													
$\Delta F \geq 0$ and $\Delta R < 0$	5	4	4	5	0	5	1	5	4	2	1	1	1
$\Delta F < 0$ and $\Delta R \geq 0$	2	1	4	5	3	5	1	9	3	4	2	3	4
$\Delta F < 0$ and $\Delta R < 0$	5	6	5	0	5	2	8	2	3	10	3	7	5
$\Delta F \geq 0$ and $\Delta R \geq 0$	14	12	13	5	2	14	13	10	11	10	4	12	15
Success rate	0.73	0.78	0.69	0.33	0.70	0.62	0.91	0.46	0.67	0.77	0.70	0.83	0.77
Signif indep	0.04	0.01	0.10	0.05	0.11	0.91	0.00	0.39	0.31	0.01	0.20	0.00	0.01
Government balance as % of GDP													
$\Delta F \geq 0$ and $\Delta R < 0$	11	4	6	4	3	7	6	8	5	8	4	4	6
$\Delta F < 0$ and $\Delta R \geq 0$	2	2	3	1	2	6	3	5	7	4	1	2	2
$\Delta F < 0$ and $\Delta R < 0$	2	8	10	3	0	7	4	3	5	5	0	6	6
$\Delta F \geq 0$ and $\Delta R \geq 0$	13	6	9	7	6	8	10	12	6	11	6	12	14
Success rate	0.54	0.70	0.68	0.67	0.55	0.54	0.61	0.54	0.48	0.57	0.55	0.75	0.71
Signif indep	0.88	0.07	0.05	0.18	0.34	0.70	0.38	0.90	0.85	0.51	0.43	0.02	0.03
Current account as % of GDP													
$\Delta F \geq 0$ and $\Delta R < 0$	3	10	4	0	1	5	4	7	3	5	0	2	3
$\Delta F < 0$ and $\Delta R \geq 0$	6	3	6	5	2	5	5	2	9	3	2	4	2
$\Delta F < 0$ and $\Delta R < 0$	7	1	6	5	4	5	4	7	10	4	4	8	6
$\Delta F \geq 0$ and $\Delta R \geq 0$	10	9	10	5	3	11	10	10	2	14	4	9	15
Success rate	0.65	0.43	0.62	0.67	0.70	0.62	0.61	0.65	0.50	0.69	0.80	0.74	0.81
Signif indep	0.11	0.31	0.26	0.05	0.20	0.34	0.44	0.07	0.77	0.14	0.04	0.02	0.00

For each variable the first two rows indicate the number of failures, the next two rows the number of successes. The success rate is the percentage share of successes. Signif indep is the significance level of the χ^2 -statistic for independence of forecasts and realisations. With numbers below 0.05 the null hypothesis of independence can be rejected at the 5 % significance level.

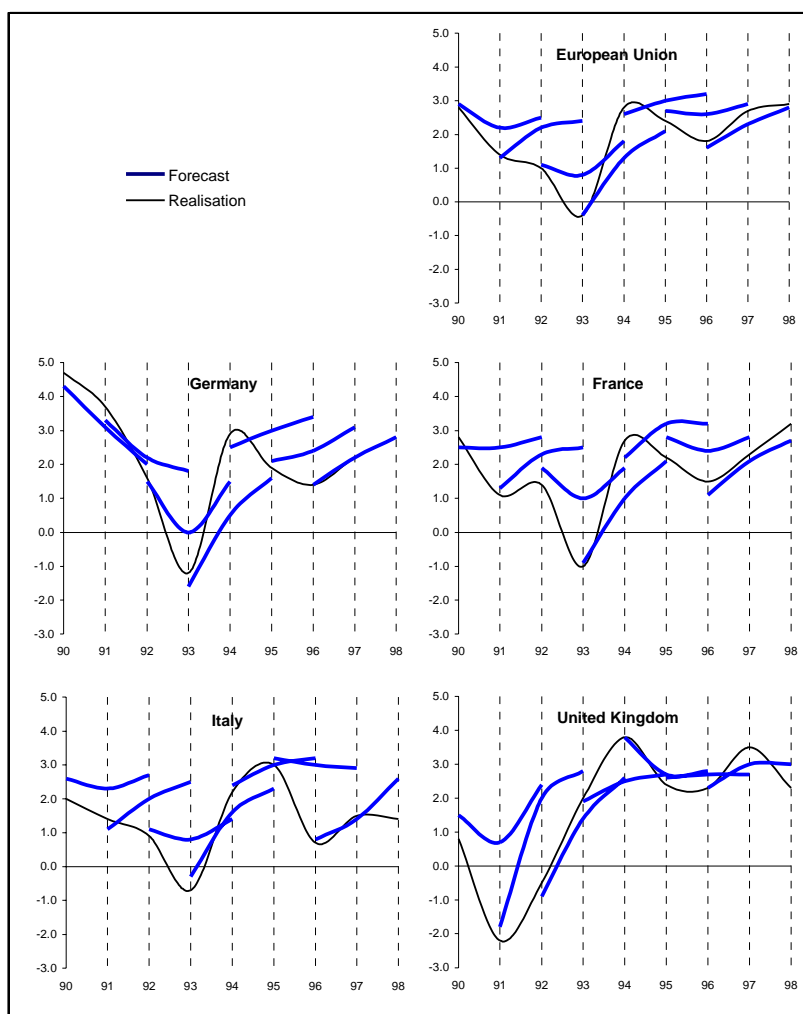
XII. Cycle recognition

While in the previous section the focus was on directional accuracy one period ahead, it of interest to examine if the forecaster spotted the broad movement of the business cycle⁹ beyond the next period. This is of help in the timely recognition of turning points. Typically, the short-term forecasts of the Commission cover the current year and the next year. In 1990 it was decided to add in each Autumn exercise one extra year to the forecast

⁹ The business cycle is here assessed in terms of GDP growth rates and not the output gap.

horizon. From then onwards it means that in the forecast round at the end of the year, three projections are available compared to only two before: for the year t , for the year $t+1$ and for the year $t+2$. For this reason the comparison of cycle perception with the actual development is limited to the nineties. The actual development in figure 10 is represented by the outturn data collected in the following Autumn Forecast except for 1998, when the Spring 1999 Forecast was used as the Autumn 1999 Forecast was not made at the time of writing. To be concrete in respect to cycle perception: the forecast line starting in, say, 1991 in figure 10 represents the forecasts made in autumn 91 for the same year, 1992 and 1993.

Figure 10: Cycle recognition in real GDP growth



The figures suggest:

- (i.) Swings from extreme values (very high growth or recession) appear well anticipated, but not their size. Reference is made to the correct forecast of a slowdown from high levels in Germany in 1991 and the pick-up after a recession in all Member States. The intuitive reason for this success is the experience that exceptional circumstances usually do not last very long. However, the swings have been more marked than expected: the slowdown was sharper and the rebound stronger (except in the United Kingdom where the rebound was weaker than first expected). In particular, a recession was not anticipated. Note, in this respect that in 1991 in Italy, the European Union and to a lesser extent France the perceived business cycle direction was totally in opposition to what actually happened.

- (ii.) Small downward corrections, the so-called growth pauses, are ill perceived. The decline in growth in 1995/96 from about 3 % came as a surprise in Germany, France, Italy and the European Union as a whole. The slowdown from 4 % in the United Kingdom was correctly anticipated, but this falls probably into the category “exceptional circumstances do not last long”.
- (iii.) Of the countries displayed and based on the experience in the nineties the broad cyclical movement appeared to be best spotted in the UK case. Cycle recognition is most difficult in Italy: in particular the interruption of the rebound in 1998 is a disappointment.

Let us return to the issue of the optimistic nature of the Commission forecasts. It was not in general verified in the error statistics concerning the current year and year ahead forecasts discussed in section VIII on the possible existence of a bias. Figure 10 suggests that there is some denial of the cycle in the Commission forecasts. A slowdown is projected to be minor and an expansion is projected to last, leading to the failure of predicting, respectively, a recession and a growth pause. This could explain where the optimistic gloss on the Commission forecasts comes from. The distinction between short-term forecasting and medium-term forecasting is not sharp enough.

XIII. Forecast revision through the cycle

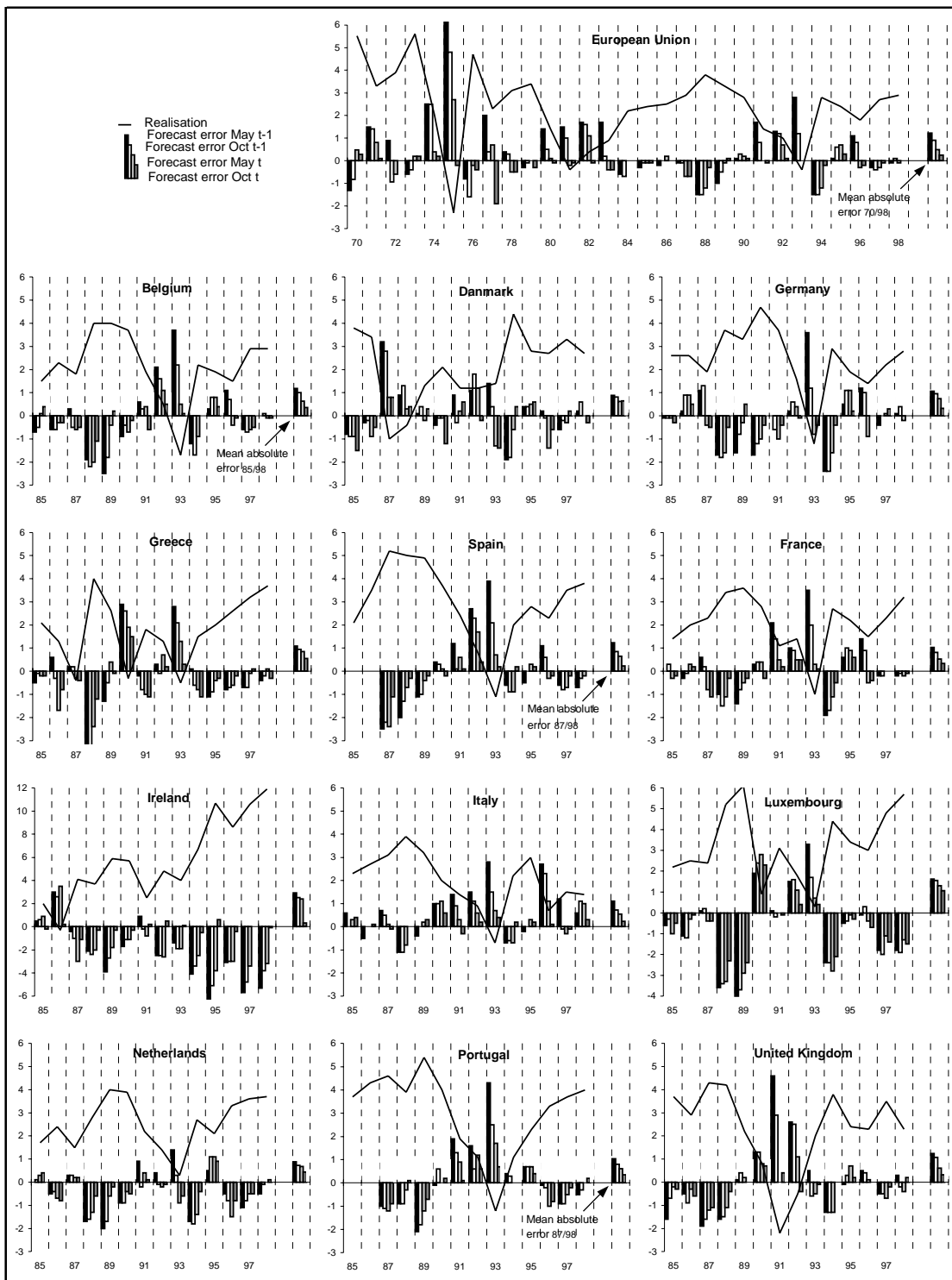
Another way of looking at the ability to spot the development of the cycle over time, is by examining the errors of successive forecasts for the same year. In figure 11 the outturn is displayed as given in the Autumn forecast of the following year as well as 4 prediction errors associated with forecasts made at a different time (May of the previous year, October of the previous year, May of the current year and October of the current year). Because presenting readable charts for all Member States would occupy too much space, long series are given only for the European Union.

With the passing of time more information becomes available, so that one may expect that the shorter the forecast horizon, the smaller the prediction errors. This is confirmed on average, as illustrated by the decreasing mean absolute errors between the first and the fourth forecast of the same year (far right bars, figure 11).

However, there are some exceptions.

- For 1995 the initial forecast (made in May 1994) was better than the following two which is evidence that the incoming news was badly interpreted: rather than accelerating, the economy was decelerating.
- In 1987 and 1988 the strength of the economy was not spotted because of the gloom spread by the stock market in October 1987. Hence, the May 1986 forecast for 1987 was better than the later ones. The early pessimistic forecasts for 1988 proved also particularly sticky.
- The strength of the recovery in 1976 appeared also incorrectly assessed.

Figure 11: Forecast revision through the cycle of real GDP growth



- While missing the trend for 1995 and 1987/88 was fairly general, the failure to correctly adjust the consecutive forecasts was more limited with respect to 1990 (mainly Denmark, Italy, Luxembourg, Portugal and the United Kingdom). The strength of the economy in 1997 appeared to be better assessed in some countries (Belgium, Spain, United Kingdom) by the first forecast than in the following ones.
- Other more isolated cases of forecast adjustments in the wrong direction were: Germany (1986, 1992), Greece (1991, 1994), Italy (1998), the Netherlands (1996), Portugal (1996).
- The track record of the Irish GDP forecasts clearly illustrates the growth miracle: only at the end one believes it. The absence of quarterly GDP statistics contributes also to the explanation.
- The relatively high prediction errors for Denmark and Luxembourg in some of the October forecasts made for the same year is curious. Instability in the statistical base is a tentative explanation.

While in general the consecutive forecasts for the same year are corrected in the right direction, the adjustment is slow and one sticks for too long to the initial guess. This is evidence that the development of the cycle is only late taken into account. In particular, the quantified forecasts do not indicate a recession.

Compared to the seventies, since the mid-80s the prediction errors have been smaller, but there appear more adjustments in the wrong direction (1976, 1977 versus 1984, 1987, 1990, 1995, 1997). The cycle has become smoother, but more difficult to discover.

XIV. The international context

1. US and Japanese GDP

The EU represents about 20 % of world GDP and, obviously, its outlook depends on what happens in the rest of the world, which in turn is influenced by developments in the EU. This is reflected in the way the forecasting exercise is organised. At the same moment when projections are done for Member States, forecasts for the major countries outside the EU are made. Actually these forecasts come first, but revisions in the course of the forecasting exercise are possible. Particular attention is given to the GDP forecasts for the United States and Japan.

Measured by the mean absolute error the GDP predictions for the United States and Japan are somewhat less good compared to the results obtained for the EU as a whole. For example in the case of the United States: the current year MAE is 0.74 (table 14) compared to 0.53 for the EU (table 3); the comparable year ahead figures are 1.13 (table 20) and 0.94 (table 4). Noteworthy is that the differences in year ahead RMSE between the EU as a whole on the one hand and the US and Japan on the other hand are not proportional to the differences which exist between the MAEs, suggesting relatively fewer big errors have been made in forecasting US and Japanese GDP one year ahead. Compared to the four big EU countries the accuracy of France is better, but Germany, Italy and the UK are less well predicted than the US and Japan.

GDP forecasts for the US and Japan pass the performance statistics, which have also been reported for the EU Member States, with one exception. There appears to be some persistence in the GDP forecast errors for the USA in the current year (table 15). The test statistic suggests some first order serial correlation in the error meaning failure to learn from the mistake made in the previous period. This type of error disappears for the year ahead forecast. Alternative easily available forecasts (THEIL1 and THEIL2) are inferior (table 14 and 20). Absence of bias can be accepted, although there is a tendency to underestimate GDP growth in the second subperiod. Particularly accurate is forecasting the direction of change.

Table 13: Basic characteristics of the sample data - current year

	US	Japan	World	Rest	European Union			
	GDP		World		Volumes		Prices	
			Import volume	World	Export	Import	Export	Import
Sample	74/97	74/97	74/97	74/97	69/97	69/97	69/97	69/97
No of obs.	24	24	24	24	29	29	29	29
MV(F)	2.22	3.25	4.85	5.15	5.53	5.47	4.40	4.60
MV(R)	2.30	3.36	5.01	5.15	5.82	5.74	5.10	5.23
ME	-0.08	-0.11	-0.16	-0.01	-0.30	-0.27	-0.70	-0.63
STD(R)	2.39	2.16	4.27	4.80	4.14	5.24	5.94	9.98
Skewness(R)	-0.40	-0.65	-1.34	-1.20	-0.44	-0.52	1.28	2.23
Kurtosis(R)	0.01	-0.36	3.08	2.48	0.48	0.43	4.07	9.08

Table 14: Basic characteristics of the forecast errors - current year

	US	Japan	World	Rest	European Union			
	GDP		World		Volumes		Prices	
			Import volume	World	Export	Import	Export	Import
MAV	2.90	3.51	5.79	6.16	6.24	6.78	5.75	6.83
MAE	0.74	0.86	2.01	2.35	1.86	2.18	1.48	2.20
RMSE	1.03	1.15	2.85	3.21	2.41	2.76	2.46	4.07
THEIL1	0.36	0.60	0.46	0.50	0.45	0.42	0.44	0.35
THEIL2	0.44	0.54	0.68	0.68	0.59	0.54	0.42	0.42

Table 15: Persistence in forecast errors - current year

	US	Japan	World	Rest	European Union			
	GDP		World		Volumes		Prices	
			Import volume	World	Export	Import	Export	Import
Signif $\rho_1=0$	0.04	0.34	0.10	0.36	0.12	0.53	0.45	0.44
Signif $\rho_2=0$	0.10	0.39	0.24	0.56	0.25	0.60	0.40	0.59
Signif $\rho_3=0$	0.20	0.45	0.42	0.76	0.30	0.52	0.57	0.77

Table 16: Bias - current year

	US	Japan	World	Rest	European Union			
	GDP		World		Volumes		Prices	
			Import volume	World	Export	Import	Export	Import
α	-0.08	-0.11	-0.16	-0.01	-0.30	-0.27	-0.70	-0.63
Signif $\alpha=0$	0.71	0.65	0.79	0.99	0.52	0.61	0.13	0.41
α_1	0.04	0.04	1.14	1.80	0.16	0.24	-1.55	-1.81
α_2	-0.15	-0.20	-0.94	-1.09	-0.73	-0.74	0.10	0.47
Signif $\alpha_1=\alpha_2$	0.66	0.64	0.09	0.03	0.34	0.35	0.06	0.14

Table 17: Efficiency - current year

	US	Japan	World	Rest	European Union			
	GDP		World		Volumes		Prices	
			Import volume	World	Export	Import	Export	Import
α	0.32	-0.29	-2.14	-2.18	-0.10	-1.24	0.07	-0.76
Signif $\alpha=0$	0.28	0.60	0.13	0.15	0.92	0.19	0.91	0.34
β	0.89	1.12	1.47	1.43	1.07	1.28	1.14	1.30
Signif $\beta=1$	0.23	0.42	0.08	0.11	0.63	0.06	0.14	0.00
Signif $\alpha=0, \beta=1$	0.45	0.65	0.20	0.27	0.72	0.15	0.10	0.01
R^2	0.81	0.70	0.58	0.57	0.64	0.74	0.84	0.87
DW	2.16	2.04	2.60	2.35	2.49	2.14	1.83	1.72

Table 18: Directional accuracy - current year

	US	Japan	World	Rest World	European Union			
					Volumes		Prices	
	GDP		Import volume	Export	Import	Export	Import	
$\Delta F \geq 0$ and $\Delta R < 0$	0	0	1	1	1	0	2	1
$\Delta F < 0$ and $\Delta R \geq 0$	2	3	1	5	6	4	2	2
$\Delta F < 0$ and $\Delta R < 0$	10	10	11	10	13	14	13	12
$\Delta F \geq 0$ and $\Delta R \geq 0$	11	10	10	7	8	10	11	13
Success rate	0.91	0.87	0.91	0.74	0.75	0.86	0.86	0.89
Signif indep	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00

2. The trade variables

An important mechanism by which external developments influence the EU, and vice versa, is via trade links. The impact of financial variables like exchange rates and interest rates can also not be underestimated, but they are not analysed in this paper. The EU international trade (average of exports and imports outside the EU) represents about 20 % of the world total, and amounts to about 10 % of EU GDP. If also trade inside the EU (60 % of total EU trade) is brought into the picture, the share in world trade is 35 % and the corresponding figure in terms of EU GDP is 25 %.

The focus is on export market developments, for which here two approximations are used: world import volume growth and import volume growth outside the EU. Furthermore, the accuracy of EU exports and imports in volumes and their prices, is examined. The EU trade variables are forecast together with the other EU variables, but some degree of exogeneity can be attributed to export volumes (linked to real developments at the world level) and to import prices (influenced by exchange rates for which technical assumptions are used and by commodity prices largely determined outside the EU). The reported EU trade variables include flows among Member States as well as trade between Member States and the rest of the world.

The trade variables are less correctly predicted than US and Japanese GDP. In particular for the year ahead forecasts large mean absolute errors are observed. Also the naïve alternative forecasts (THEIL1 and THEIL2) perform well compared to the Commission procedures followed in forecasting world imports. There is some evidence of bias, not for the period as a whole, but for the subperiods (tables 16 and 22). There appears to be a shift from overestimation to underestimation for the trade volume variables (both at the world and EU level), while the opposite shift occurred for trade prices.

Directional accuracy remains, however, very satisfactory (tables 18 and 24). Persistence of forecast errors in the trade variables is also generally absent; while only the current year import prices seem inefficiently forecast (table 17).

Table 19: Basic characteristics of the sample data - year ahead

	US	Japan	World	Rest World	European Union			
					Volumes		Prices	
	GDP		Import volume	Export	Import	Export	Import	
Sample	75/97	75/97	74/97	74/97	70/97	70/97	70/97	70/97
No of obs.	23	23	24	24	28	28	28	28
MV(F)	2.40	3.81	5.14	5.46	5.72	5.49	4.39	4.41
MV(R)	2.63	3.58	5.37	5.72	5.87	5.35	5.03	5.34
ME	-0.23	0.23	-0.22	-0.26	-0.15	0.14	-0.64	-0.93
STD(R)	2.26	1.92	3.73	4.18	4.01	4.42	5.89	9.39
Skewness(R)	-0.47	-0.39	-0.48	-0.39	-0.58	-0.38	1.39**	2.17**
Kurtosis(R)	0.17	-1.13	0.27	-0.64	1.03	-0.29	4.11**	8.38**

Table 20: Basic characteristics of the forecast errors - year ahead

	US	Japan	World		European Union			
			World	Rest	Volumes		Prices	
	GDP		Import volume	Export	Import	Export	Import	
MAV	3.07	3.58	5.76	6.16	6.26	6.01	5.58	6.68
MAE	1.13	1.18	2.57	2.96	2.67	3.19	2.73	4.56
RMSE	1.39	1.40	3.63	3.80	3.57	4.09	4.44	7.71
THEIL1	0.42	0.74	0.84	0.42	0.73	0.67	0.79	0.76
THEIL2	0.63	0.74	1.00	0.93	0.91	0.94	0.77	0.84

Table 21: Persistence in forecast errors - year ahead

	US	Japan	World		European Union			
			World	Rest	Volumes		Prices	
	GDP		Import volume	Export	Import	Export	Import	
Signif $\rho_1=0$	0.35	0.34	0.24	0.64	0.17	0.91	0.58	0.80
Signif $\rho_2=0$	0.32	0.56	0.48	0.65	0.21	0.10	0.85	0.97
Signif $\rho_3=0$	0.48	0.75	0.63	0.82	0.34	0.18	0.96	0.98

Table 22: Bias - year ahead

	US	Japan	World		European Union			
			World	Rest	Volumes		Prices	
	GDP		Import volume	Export	Import	Export	Import	
α	-0.23	0.23	-0.22	-0.26	-0.15	0.14	-0.64	-0.93
Signif $\alpha=0$	0.43	0.44	0.77	0.75	0.83	0.86	0.46	0.54
α_1	0.44	0.83	1.46	1.66	0.39	1.27	-2.63	-4.19
α_2	-0.59	-0.09	-1.23	-1.41	-0.61	-0.84	1.09	1.91
Signif $\alpha_1=\alpha_2$	0.09	0.14	0.08	0.06	0.48	0.19	0.03	0.04

Table 23: Efficiency - year ahead

	US	Japan	World		European Union			
			World	Rest	Volumes		Prices	
	GDP		Import volume	Export	Import	Export	Import	
α	-0.52	0.02	2.60	1.25	1.05	1.70	-0.37	-1.87
Signif $\alpha=0$	0.38	0.99	0.34	0.61	0.62	0.37	0.80	0.43
β	1.31	0.93	0.54	0.52	0.84	0.66	1.23	1.63
Signif $\beta=1$	0.15	0.77	0.36	0.67	0.65	0.29	0.41	0.14
Signif $\alpha=0, \beta=1$	0.26	0.71	0.63	0.86	0.88	0.55	0.53	0.28
R^2	0.64	0.44	0.01	0.11	0.16	0.12	0.42	0.32
DW	2.16	1.44	2.19	2.08	2.40	1.92	1.90	2.06

Table 24: Directional accuracy - year ahead

	US	Japan	World		European Union			
			World	Rest	Volumes		Prices	
	GDP		Import volume	Export	Import	Export	Import	
$\Delta F \geq 0$ and $\Delta R < 0$	0	3	3	1	4	3	4	2
$\Delta F < 0$ and $\Delta R \geq 0$	3	3	4	5	4	5	3	3
$\Delta F < 0$ and $\Delta R < 0$	10	8	8	10	10	10	10	11
$\Delta F \geq 0$ and $\Delta R \geq 0$	9	8	8	7	9	9	10	11
Success rate	0.86	0.73	0.70	0.74	0.70	0.70	0.74	0.81
Signif indep	0.00	0.03	0.06	0.01	0.03	0.03	0.01	0.00

XV. The interdependence of forecast errors

The type of relation which exists between forecast errors can reveal something on the source of the mistakes and on the mechanisms at work which propagate¹⁰ them. To that end correlation coefficients between forecast errors are calculated across countries and

¹⁰ Forecast errors may also appear more than once and be the source of the detected relation. This could be e.g. the case with GDP also showing up in the ratio calculations (current account as % of GDP, government deficit as % of GDP). The explanation of the correlation is then of a technical nature and not based on one or the other economic relationship.

across variables. It should be stressed that correlations do not say anything on the direction of causation. If in what follows some form of causality is suggested, this is based on other considerations. The period covered by the correlation coefficients can vary depending on the data availability. Hence, correlation coefficients involving Spain or Portugal cover a period starting only in the mid-80s, contrary to the earlier EU entrants for whom the period is longer.

1. Across countries

Positively correlated forecast errors for the same variable across Member States are an indication that the unexpected event which caused the prediction mistake has similar effects in each country. With other words, the dominant shock is symmetric and affects all countries in the same way. In an increasingly integrated EU errors should be positively correlated. Negative correlations can be rationalised, for example, by unexpected exchange rate movements or because forecasters used a wrong model. Correlations involving the EU give an idea how EU wide mistakes influence forecast errors at the country level and vice versa, being aware of the own country bias in the calculation. As the message does not change fundamentally, only the year ahead correlations are represented in table 25.

The large majority of positive error correlations in the domain of GDP, inflation and investment forecasting suggest a high degree of integration. There is a common mistake/unexpected shock or, if the mistake/unexpected shock is affecting first one country, its consequences are symmetric. Given the weight of Germany and France it is not surprising to find a leading role for them in the forecasting accuracy of the other Member States. Italy and the United Kingdom come next. Mistakes with investment forecasting have a somewhat smaller common ground. As far as countries are concerned, Denmark and Ireland stand out with GDP forecast errors which can be less well related to errors made elsewhere. The number of negative correlations among inflation forecast errors declines drastically between current year and year ahead predictions (Artis (1996) observes the same). This is puzzling and makes the explanation of the negative correlation among current year inflation prediction errors less robust in terms of unexpected exchange rate changes. The same negative correlations should be observed among year ahead forecast mistakes if unexpected exchange rate changes are an important explanatory factor.

Correlation coefficients for unemployment, deficit and current account are generally lower compared to the previous three variables and several entries bear a negative sign. The latter does not necessarily mean lack of integration, but reflects the prevailing strength of country-specific factors (labour market structure, budgetary procedures, direction of exports).

In the case of unemployment the negative numbers are basically left unexplained. Negative numbers would be compatible with unexpected migration, but cross border labour flows are slow and their size compared to the overall labour market are small so that an impact within the forecast horizon is hard to accept.

Table 25: Cross country error correlations - year ahead

GDP													
	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
B	1.00	0.50	0.73	0.43	0.83	0.80	0.39	0.49	0.71	0.62	0.75	0.65	0.84
DK		1.00	0.57	-0.06	-0.08	0.48	0.18	0.43	0.40	0.46	-0.26	0.27	0.53
D			1.00	0.43	0.36	0.78	0.44	0.62	0.61	0.83	0.22	0.45	0.91
EL				1.00	0.45	0.57	0.45	0.69	0.76	0.45	0.49	0.05	0.61
E					1.00	0.69	0.05	0.65	0.67	0.35	0.75	0.58	0.77
F						1.00	0.44	0.49	0.76	0.74	0.69	0.63	0.89
IRL							1.00	0.39	0.37	0.43	0.22	0.30	0.48
I								1.00	0.51	0.32	0.46	0.49	0.74
L									1.00	0.64	0.67	0.43	0.73
NL										1.00	0.50	0.41	0.76
P											1.00	0.37	0.61
UK												1.00	0.72
EU													1.00
Inflation													
	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
B	1.00	0.50	0.53	-0.03	0.41	0.58	0.83	0.67	0.77	0.39	0.56	0.46	0.67
DK		1.00	0.29	0.46	0.41	0.70	0.35	0.57	0.14	0.20	0.67	0.32	0.61
D			1.00	-0.46	0.41	0.42	0.57	0.25	0.56	0.61	0.41	0.21	0.53
EL				1.00	0.16	0.13	0.01	-0.05	-0.18	0.24	0.53	0.51	0.40
E					1.00	0.50	0.75	0.38	0.65	0.27	0.81	0.23	0.66
F						1.00	0.59	0.73	0.34	0.29	0.78	0.55	0.85
IRL							1.00	0.73	0.73	0.36	0.62	0.51	0.70
I								1.00	0.52	0.07	0.13	0.55	0.76
L									1.00	0.44	0.78	0.48	0.47
NL										1.00	0.48	0.52	0.52
P											1.00	0.51	0.80
UK												1.00	0.75
EU													1.00
Investment													
	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
B	1.00	0.23	0.21	0.22	0.60	0.47	-0.10	0.38	0.35	0.43	0.04	0.41	0.54
DK		1.00	0.20	-0.09	0.18	0.35	0.33	0.02	0.13	0.49	-0.37	0.23	0.40
D			1.00	0.01	0.10	0.49	0.26	0.01	0.13	0.48	-0.34	0.25	0.71
EL				1.00	0.16	0.03	0.46	0.33	0.05	0.34	0.08	-0.04	0.17
E					1.00	0.66	0.18	0.68	0.70	0.01	0.46	0.51	0.67
F						1.00	0.11	0.34	0.35	0.46	0.15	0.66	0.83
IRL							1.00	0.19	0.04	0.29	-0.19	-0.02	0.30
I								1.00	-0.06	0.12	-0.14	0.21	0.47
L									1.00	0.11	0.55	0.07	0.27
NL										1.00	0.16	0.43	0.64
P											1.00	0.51	0.17
UK												1.00	0.68
EU													1.00
Unemployment rate													
	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
B	1.00	0.48	0.56	-0.03	0.89	0.56	0.20	0.57	-0.32	0.41	0.54	0.52	0.82
DK		1.00	0.43	0.41	0.31	0.32	0.39	0.20	0.13	0.57	-0.09	0.34	0.56
D			1.00	0.13	0.27	0.55	0.10	0.45	-0.34	0.21	0.36	0.37	0.80
EL				1.00	-0.29	-0.26	0.07	-0.31	0.30	0.58	-0.02	-0.48	0.02
E					1.00	0.68	-0.09	0.72	0.04	0.25	0.62	0.26	0.74
F						1.00	-0.08	0.52	-0.37	0.18	0.44	0.44	0.79
IRL							1.00	0.19	-0.06	0.39	-0.75	0.13	0.16
I								1.00	-0.38	-0.13	0.29	0.18	0.67
L									1.00	0.17	-0.27	-0.35	-0.34
NL										1.00	-0.24	0.15	0.40
P											1.00	0.45	0.50
UK												1.00	0.54
EU													1.00

Table 25 (continued): Cross country error correlations - year ahead

Government balance as % of GDP													
	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
B	1.00	0.56	-0.11	0.07	0.30	0.01	0.31	-0.06	0.29	0.28	0.51	-0.12	0.04
DK		1.00	0.07	0.20	0.23	-0.05	0.37	-0.43	0.48	0.35	0.09	-0.21	-0.04
D			1.00	0.02	-0.11	0.11	0.66	-0.11	0.19	0.33	0.27	0.38	0.67
EL				1.00	-0.12	-0.20	-0.14	0.39	0.06	0.21	-0.04	-0.38	-0.03
E					1.00	0.77	0.50	0.09	0.18	-0.01	0.61	0.62	0.69
F						1.00	0.00	0.31	0.16	0.11	0.68	0.42	0.58
IRL							1.00	-0.19	0.20	0.49	0.34	0.42	0.51
I								1.00	-0.23	0.17	-0.23	0.25	0.41
L									1.00	0.25	-0.06	0.32	0.29
NL										1.00	-0.27	0.18	0.46
P											1.00	0.24	0.50
UK												1.00	0.80
EU													1.00
Current account as % of GDP													
	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
B	1.00	0.25	0.16	-0.09	0.34	0.16	0.24	0.38	0.47	0.07	0.05	0.23	0.64
DK		1.00	0.11	-0.13	-0.39	-0.05	0.39	0.11	0.07	-0.24	0.27	0.28	0.36
D			1.00	0.05	-0.55	0.22	0.02	-0.10	0.08	-0.12	-0.79	-0.29	0.38
EL				1.00	-0.13	0.17	-0.15	-0.08	-0.39	0.22	-0.32	-0.41	-0.16
E					1.00	0.45	-0.42	0.61	-0.14	0.45	0.19	0.22	0.36
F						1.00	-0.18	-0.02	-0.14	0.02	-0.16	-0.58	0.05
IRL							1.00	0.34	0.07	-0.43	-0.22	0.27	0.35
I								1.00	0.11	-0.42	0.04	0.41	0.73
L									1.00	-0.04	0.23	0.13	0.23
NL										1.00	0.63	-0.27	-0.33
P											1.00	0.01	-0.47
UK												1.00	0.54
EU													1.00

While jointly over- or underestimation of government deficits appear to be the rule suggesting that common shocks dominate, it is striking to observe that in 14 of the 19 cases where the coefficient is negative, one of the five large Member States is involved. The foreign leakage of fiscal policy actions would be a rationalisation of the phenomenon. To be concrete, an unexpected fiscal expansion in Italy, leading to an underestimation of the deficit, would partially leak abroad and stimulate activity there producing more government receipts and eventually an overestimation of the deficit. Admittedly, the negative correlations are low.

The large number of negative correlation coefficients in current account prediction errors should not come as a surprise. If international trade forecasts are consistent, then overestimation of, say, exports in one country is equivalent to overestimation of imports elsewhere. The ensuing current account forecast mistakes move in the opposite direction. Against this background the number of negative correlations and their size may even appear small. This is probably due to the absence of important trading partners like the US or Japan in the reported table on current account error mistakes.

2. Across variables

The appearance of a negative correlation between GDP and inflation forecast errors is usually explained in terms of supply shocks. Unexpected and favourable developments in productivity, real interest rates, business climate, etc. can boost GDP (producing underestimation) and at the same time reduce inflation (producing overestimation of this variable). With demand shocks, overestimation of GDP and inflation go hand in hand. Given that the correlation coefficients are relatively small it is not possible to arrive at firm

conclusions with respect to the dominance of one or the other type of shock for the period as a whole. The larger correlation coefficients are, however, negative pointing to a prevalence of supply shocks in those Member States.

The correlation between GDP and government deficit forecast errors can be rationalised in terms of the operation of the automatic stabilisers if one privileges a causality running from GDP to deficit or in a Keynesian framework where fiscal policy influences demand (Artis, 1999) The working of the automatic stabilisers, in case of an adverse shock producing overestimation of GDP, induces a deterioration of the fiscal account leading to underestimation of the government deficit¹¹. The correlation coefficient will be positive (government deficits are entered with a negative sign !). The Keynesian transmission mechanism would result in a negative correlation coefficient. Indeed, unexpected government spending (underestimation of the deficit) boosts demand (underestimation of GDP). Automatic stabilisers seem to govern the relation between GDP and deficit. Only in the United Kingdom unexpected shifts in the government account could have an impact on real GDP.

Table 26: Some cross error correlations between GDP, inflation, deficit and unemployment - current year

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP – inflation (6-/12)	0.04	0.29	-0.02	-0.06	-0.14	0.02	0.02	-0.38	-0.30	0.10	0.09	-0.44	0.06
GDP – deficit ratio (1-/12)	0.45	0.14	0.54	0.08	0.68	0.47	0.55	0.14	0.17	0.35	0.70	-0.29	0.66
Deficit ratio - inflation (1-/12)	0.33	0.47	0.52	-0.02	0.56	0.32	0.60	0.43	0.11	0.32	0.66	0.12	0.53
Unemployment rate - inflation (8-/12)	-0.20	-0.26	-0.08	-0.39	-0.16	0.12	-0.19	0.03	0.09	-0.07	-0.15	0.06	-0.18
Between brackets: number of negative correlations on total, EU excluded													

Table 27: Some cross error correlations between GDP, inflation, deficit and unemployment - year ahead

	B	DK	D	EL	E	F	IRL	I	L	NL	P	UK	EU
GDP – inflation (6-/12)	-0.40	0.01	-0.02	-0.04	0.16	0.02	-0.49	0.09	-0.24	0.10	0.49	-0.62	-0.14
GDP – deficit ratio (1-/12)	0.23	0.45	0.65	-0.01	0.70	0.62	0.67	0.28	0.22	0.56	0.68	0.57	0.84
Deficit ratio - inflation (1-/12)	0.00	0.22	0.50	-0.14	0.71	0.67	0.11	0.51	0.07	0.41	0.64	0.12	0.58
Unemployment rate - inflation (6-/12)	0.30	-0.16	0.09	-0.41	-0.45	-0.17	0.19	-0.01	0.03	0.05	-0.53	0.20	-0.11
Between brackets: number of negative correlations on total, EU excluded													

Automatic stabilisers versus the Keynesian transmission channel can again be used for the interpretation of the interdependence between inflation and deficit forecast errors (Artis, 1999). Unexpected inflation (underestimation of this variable) could increase government receipts if tax rates are not or only partially indexed leading to an overestimation of the deficit so that the operation of the automatic stabilisers would produce a positive correlation coefficient. The Keynesian transmission mechanism would again produce a negative correlation coefficient: unexpected government spending (underestimation of the deficit) would lead to unexpected inflation (underestimation of this variable). There appears to be more evidence for the existence of the working of the automatic stabilisers

¹¹ Also for technical reasons a negative correlation can be expected as GDP enters the deficit ratio in the numerator. A lower value for nominal GDP will increase the deficit ratio.

than the Keynesian transmission mechanism, confirming the result obtained in the previous paragraph..

The Philips-curve with its trade-off between unemployment and inflation forms the obvious candidate for a rationalisation of the observed correlation coefficients between these two variables. The negative correlation in some countries suggests that there could exist in the short-term a weak, given the low value of the coefficient, trade-off between surprise inflation and unemployment. This observation would be compatible with an expectation-augmented Philips curve which states that unexpected inflation permits to lower real wages and reduce unemployment. Positive correlations indicate absence of a Philips-curve trade-off (or an upward shift of the curve): surprise inflation will increase the unemployment rate.

**Table 28: International trade error correlations
- current year**

		EU		World	Rest of world
		ExV	ImV	ImV	ImV
		(ImP)			
EU	ExV (Exp)	1.00	0.74 (0.91)	0.82	0.75
	ImV		1.00	0.68	0.70
World	ImV			1.00	0.93
Rest of world	ImV				1.00

Ex/Im: exports/imports; V/P: volume/price

**Table 29: International trade error correlations
- year ahead**

		EU		World	Rest of world
		ExV	ImV	ImV	ImV
		(ImP)			
EU	ExV (Exp)	1.00	0.67 (0.98)	0.76	0.78
	ImV		1.00	0.41	0.49
World	ImV			1.00	0.90
Rest of world	ImV				1.00

Ex/Im: exports/imports; V/P: volume/price

In tables 28 and 29 the correlation coefficients among the trade variables is examined. A strong positive correlation for the forecast errors among the trade variables is observed, which suggests a common source to prediction mistakes. It is notably the case for the EU export volume forecast errors and those with the world import variables. While this is not a surprise, the high error correlation at the EU level between export and import volumes on the one hand, and, export and import prices on the other hand is more of a surprise. One may have expected a greater role for unanticipated exchange rate movements which would have pushed the associated forecast errors in the opposite direction. The general over-or underestimation of the buoyancy of international trade is more important as a source for prediction mistakes than unforeseen exchange rate movements or other country-specific events. Similar results are arrived at in Artis (1996). Deutsche Bundesbank (1989) and Donders & Kranendonk (1999) also stress the importance of a correct assessment of international economic developments to avoid forecast errors.

XVI. The sensitivity of forecast errors to an alternative set of realisation data

In order to have an idea about the sensitivity of the error statistics to the selection of the outturn data, some of the tests for examination of current year and year ahead forecast accuracy are replicated using the latest available data set at the moment of this study (June 1999). These data have been subject to numerous revisions at various points in time contrary to the outturn data collected in the year following the forecast year, which have been used elsewhere in this study. The latest major revision under way concerns the adaptation of the data to the new national accounts system (ESA95). The data set for Denmark and the United Kingdom is already in the new ESA95 system, but not for the other Member States in the sample.

Table 30: Deterioration of basic error statistics with latest available outturn data

	GDP			Inflation			Unemployment rate			Deficit ratio		
	worse on 13	pm: EU early	latest	worse on 13	pm: EU early	latest	worse on 13	pm: EU early	latest	worse on 13	pm: EU early	latest
Current year												
MAE	12	0.53	0.57	13	0.37	0.56	13	0.28	0.80	11	0.46	0.51
ME	11	0.08	-0.14	11	0.02	-0.53	12	-0.05	0.45	11	-0.02	-0.22
RMSE	11	0.77	0.71	13	0.49	0.77	13	0.41	1.03	9	0.56	0.63
THEIL1	8	0.36	0.37	9	0.31	0.45	13	0.46	1.46	13	0.54	0.64
Success rate	9	0.82	0.75	11	0.82	0.86	11	0.89	0.75	9	0.93	0.64
Year ahead												
MAE	11	0.94	0.92	11	0.93	1.08	12	0.52	0.94	7	0.69	0.71
ME	6	0.32	0.13	11	-0.31	-0.83	11	0.02	0.49	9	0.16	0.03
RMSE	10	1.33	1.23	8	1.51	1.81	13	0.80	1.25	8	0.87	0.92
THEIL1	9	0.67	0.63	9	0.76	1.03	9	0.73	1.01	7	0.76	0.77
Success rate	7	0.78	0.79	10	0.81	0.64	5	0.77	0.78	10	0.71	0.68

As an indication of how results may be influenced by the selection of an alternative data set for outturn data the impact on 4 variables was examined: GDP, inflation, deficit and unemployment. Table 30 indicates the number of worse error statistics with the latest data set compared to the early one. The counting is based on the 12 Member States covered by this study plus the EU. Hence, an entry 13 would mean that in all cases the error statistic deteriorated. Pro memoria, the error statistics for the EU are given for both data sets so that one can put the size of the change into perspective. For the first four error statistics (mean absolute error, mean error, root mean squared error and the naive no-change forecast) an increase¹² in the statistic means a deterioration in forecast accuracy, while in the case of the success rate of correct sign predictions, it is the decrease which is equivalent to a deterioration. In order to assure comparability, the EU aggregate in the latest set of outturn data is constructed in the same way as in the current year and year ahead forecasts: new Member States are taken on board when the Commission started to make forecasts for them.

In a majority of the cases the forecast accuracy deteriorates when the latest available outturn data are used but the change is small and does not alter the overall judgement on the quality of the forecasts. It must, however, be reported that the deterioration of the error statistics at the country level is somewhat larger than for the EU average.

The largest deteriorations are observed with the unemployment rate, which might be explained by a change in definitions. The latest available outturn data are based on harmonised unemployment rates, while certainly in the beginning of forecasting at the

¹² With respect to the mean error the sign is ignored. An increase in the bias is a deterioration of the forecast accuracy.

Commission national definitions were used. With respect to inflation the appearance of a significant underestimation is worth noting. The smallest changes are observed with GDP and deficit forecasts.

XVII. Comparison with outside forecasts

The quality of the Commission projections has already been checked against naïve alternative forecasts (section VI, tables 3 and 4). How does the Commission perform compared with the fully elaborated forecasts prepared by the IMF, the OECD or the national forecast institutes ?

1. IMF and OECD

The three international institutions follow a similar approach to forecasting, but some differences should be kept in mind when analysing the comparative results presented in tables 31 and 32. While all three institutions present forecasts in Spring and Autumn, there are some slight differences in timing. The OECD is typically somewhat later in the season (June and December), giving it an information advantage, compared to the IMF being the early bird (April/May and October). The Commission takes a middle position, but leans more towards the IMF calendar. Due to data limitations the sample periods in the quoted studies are not the same across the institutions. Comparative results could also be sensitive to this.

Table 31: Comparison of GDP and inflation forecasts between Commission and IMF

	Germany		France		Italy		Unit. Kingdom		United States		Japan	
	COM	IMF	COM	IMF	COM	IMF	COM	IMF	COM	IMF	COM	IMF
Current year												
GDP												
Sample	69/97	71/94	69/97	71/94	69/97	71/94	73/97	71/94	74/97	71/94	74/97	71/94
ME	0.04	0.18	-0.03	0.09	0.39	0.13	-0.01	0.15	-0.08	0.08	-0.11	0.10
MAE	0.96	0.99	0.56	0.77	0.94	1.03	0.77	0.93	0.74	0.77	0.86	1.14
THEIL1	0.45	0.46	0.35	0.72	0.45	0.59	0.45	0.47	0.36	0.29	0.60	0.43
Success rate	0.89	0.70	0.86	0.83	0.93	0.74	0.74	0.96	0.91	0.83	0.87	0.78
Inflation												
Sample	69/97	71/94	69/97	71/94	69/97	71/94	73/97	71/94	-	71/94	-	71/94
ME	0.08	0.04	-0.02	-0.26	-0.09	-0.54	0.12	-0.46	-	0.01	-	0.47
MAE	0.33	0.59	0.49	1.03	0.75	0.75	0.84	1.39	-	0.42	-	1.23
THEIL1	0.38	0.50	0.44	0.59	0.37	0.72	0.42	0.35	-	0.35	-	0.53
Success rate	0.96	0.83	0.82	0.74	0.96	0.91	0.88	0.91	-	1.00	-	0.78
Year ahead												
GDP												
Sample	70/97	73/94	70/97	73/94	70/97	73/94	74/97	73/94	75/97	73/94	75/97	73/94
ME	0.36	0.60	0.29	0.52	0.66	0.33	0.28	0.45	-0.23	0.27	0.23	0.76
MAE	1.31	1.54	0.94	1.18	1.36	1.58	1.25	1.47	1.13	1.24	1.18	1.73
THEIL1	0.68	0.60	0.61	0.74	0.65	0.61	0.73	0.50	0.42	0.36	0.74	0.46
Success rate	0.78	0.70	0.78	0.80	0.74	0.65	0.83	0.70	0.86	0.80	0.73	0.80
Inflation												
Sample	70/97	73/94	70/97	73/94	70/97	73/94	74/97	73/94	-	73/94	-	73/94
ME	-0.08	0.02	-0.48	-0.50	-1.32*	-0.81	-0.42	-1.01	-	-0.05	-	0.44
MAE	0.76	0.59	1.15	1.20	1.69	2.15	1.75	1.84	-	0.96	-	2.07
THEIL1	0.74	0.39	0.88	0.43	0.88	0.64	0.63	0.36	-	0.35	-	0.66
Success rate	0.78	0.95	0.74	0.80	0.63	0.75	0.83	0.80	-	0.85	-	0.70
Inflation: private consumption deflator (Commission), GDP deflator (IMF)												
IMF: results published in Artis (1996); COM: results obtained in this study												
*: indicates that the mean error is significantly different from zero at the 5 % level												

Current year forecast errors for GDP and inflation (see table 31) are similar for the Commission and the IMF. In general the results are slightly more favourable to the

Commission, but this cannot be considered significant. With respect to year ahead errors, the conclusion is similar for GDP forecasts. However, the comparative statistics suggest that the year ahead inflation forecasts for Germany, France and Italy made by the Commission fall short of the accuracy reached by the IMF. At least in the case for Germany and France a partial explanation could be offered by the large forecast errors concerning inflation in the years 70-72 (see figure 5 and 6), which are covered in the Commission comparative statistics, but not in those for the IMF. The slightly more favourable inflation errors for the UK in the Commission forecasts corroborates this view. As the UK joined the European Union later, forecasting for this country started also later, explaining the shorter sample period.

Table 32: Comparison of deficit ratio forecasts between Commission, IMF and OECD

	Current year					Year ahead				
	this study		Artis (1998)			this study		Artis (1998)		
	COM		COM	IMF	OECD	COM		COM	IMF	OECD
Germany										
Sample	69/97	83/97	81/94	76/95	75/95	70.69	83/97	85/94	76/95	77/95
ME	-0.15	-0.25	-0.24	-0.02	-	-0.06	-0.13	-0.05	0.05	-0.48
					0.42*					
MAE	0.80		0.55	0.60	0.80	1.07		0.91	0.79	0.97
THEIL1	0.62		-	1.11	-	0.68		-	1.46	-
France										
Sample	69/97	83/97	81/94	76/95	76/95	70/97	83/97	85/94	76/95	77/95
ME	-0.13	0.04	0.14	-0.22	-0.20	0.01	0.23	0.32	-0.09	0.09
MAE	0.68		0.64	0.63	0.55	0.75		0.98	0.42	1.02
THEIL1	0.83		-	0.79	-	0.82		-	1.24	-
Italy										
Sample	69/97	83/97	81/94	78/95	78/95	70/97	83/97	85/94	76/95	78/95
ME	0.19	-0.04	0.19	0.99	-0.49	0.55	0.29	0.10	0.80*	-0.17
MAE	1.09		0.76	1.67	0.98	1.51		0.48	1.62	1.36
THEIL1	0.76		-	1.42	-	0.90		-	1.51	-
United Kingdom										
Sample	73/97	83/97	81/94	76/95	75/95	74/97	83/97	85/94	76/95	77/95
ME	0.16	0.15	0.56*	0.44	0.03	0.43	0.45	0.41	0.75	0.26
MAE	0.72		0.97	1.72	1.04	1.36		1.13	1.22	1.32
THEIL1	0.60		-	0.90	-	0.86		-	1.29	-

*: indicates that the mean error is significantly different from zero at the 5 % level

Fiscal forecasting (see table 32) leads to similar types of errors across the three institutions for Germany and the United Kingdom. There is a tendency, though usually not significant, for the general government deficit to be overestimated in Germany and underestimated in the United Kingdom. For France and Italy the direction of the, again usually not significant, bias is less homogenous across the three institutions. At first sight, it is not evident to distil an institution which systematically outperforms the others. The forecasting record shifts across institution, country and time horizon.

2. The national forecast institutions

Öller and Barot (1999) compare the accuracy of real GDP growth rate forecasts made at the end of the year for the coming year by the OECD and the national forecast institutes. The latter are public bodies and some are involved to a varying degree in economic analysis and forecasting on which national governments base their economic policy decisions, notably in budgetary matters. The same reservations on the comparability of test statistics (unequal sample period and different finalisation dates of the forecasts) apply as in the OECD and IMF case. Furthermore, as outturn data Öller and Barot (1999) have taken the results published in the OECD Autumn Economic Outlook of the following year, also for the examination of the forecast accuracy of the national institutes.

Table 33 completes the picture with comparative information on the forecast accuracy of the European Commission obtained in this study. The differences cannot be considered significant¹³ and the results confirm the relative quality of the European Commission forecasts.

Table 33: Comparison of GDP forecasts between Commission, OECD and national institutes – year ahead

	Belgium			Denmark			Germany			France		
	this study	Öller and Barot (1999)	COM	this study	Öller and Barot (1999)	COM	this study	Öller and Barot (1999)	COM	this study	Öller and Barot (1999)	COM
Sample	70/97	71/95	85/95	74/97	71/95	80/95	70/97	71/95	71/95	70/97	71/95	71/95
MAE	1.19	1.20	1.16	1.03	1.13	0.89	1.31	1.29	1.11	0.94	0.95	1.14
Success rate	0.85	0.60	0.64	0.78	0.68	0.31	0.78	0.60	0.68	0.78	0.72	0.76
	Ireland			Italy			Netherlands			United Kingdom		
	this study	Öller and Barot (1999)	COM	this study	Öller and Barot (1999)	COM	this study	Öller and Barot (1999)	COM	this study	Öller and Barot (1999)	COM
Sample	74/97	71/95	80/95	70/97	71/95	85/95	70/97	71/95	71/95	74/97	71/95	71/95
MAE	2.36	2.19	1.94	1.36	1.53	0.50	1.08	1.09	1.22	1.25	1.25	1.41
Success rate	0.74	0.76	0.69	0.74	0.76	0.91	0.56	0.52	0.64	0.83	0.88	0.80

Ireland, ESRI: excluding 1977 for which no data were available
Success rate: rate of successful directional predictions; with respect to Öller and Barot (1999): own calculation based on data provided in their study

XVIII. Conclusion

The quality of the Commission forecasts has been assessed by examining the predictions for real GDP growth, inflation (measured by the private consumption deflator), real investment growth (total fixed capital formation), the unemployment rate, the government deficit/GDP ratio and the current account as a percentage of GDP. The focus was on the EU and its Member States, but also some variables out of the international context were analysed. Attention was paid to real GDP growth of the USA and Japan, world trade and with respect to the EU export and import volumes and prices.

The Commission projections generally stand up quite well to most of the classical tests on forecast accuracy. In particular, systematic errors are avoided: there is absence of bias, forecast errors do not persist in a regular way and predictions are efficiently made in the sense that the information included in past mistakes is taken on board. Furthermore, the Commission forecasts outperform naïve easily available alternative prediction techniques of the no-change or trend type.

There is no evidence of presenting an overly optimistic forecast. Especially from the eighties onward the contrary can be observed in several Member States. There was a tendency to underestimate real GDP growth, overestimate inflation and overestimate unemployment. The critique against the Commission forecasts as being too rosy is attributed to some evidence of denying the cycle: a slowdown is always moderate and an expansion is too easily extrapolated. The possibility of an optimistic bias for forecasts

¹³ This has not been formally tested. Öller and Barot (1999) applied formal tests and found no significant differences between OECD and national institutes. They are, however, in general critical towards the level of accuracy obtained as the MAE is large compared to the small variations in the real GDP growth rate. Furthermore, they find that the number of cases where OECD and national institutes do significantly better than naïve alternatives is too small.

beyond the coming year (not examined here), should not be transposed on the current year and year ahead predictions for which this study did in general not find such a bias.

The question whether the Commission forecasts improved over time is answered with mixed feelings. It indeed appears to be the case, but this coincides with greater stability of the economy. Hence, the predictability of the economy may have increased rather than the Commission's capacity to look into the future.

For real GDP growth, inflation and the government deficit ratio a comparison was made with the forecast accuracy of the IMF and OECD. Further comparisons are made with some national forecast institutes with respect to real GDP growth projections. It is found that the Commission forecasts have a similar record to these international and national institutions.

Forecast errors appear mostly related in a "logical" way. Cross country error correlations for the same variable point to common origins for prediction mistakes and/or a high degree of economic interdependence. Error correlations across the relevant variables can be rationalised to some extent by referring to the effects of demand and supply shocks, the working of the automatic stabilisers and the Philips-curve trade-off.

The accuracy declines with the time length of the forecasting horizon. To have an idea of the order of magnitude of the forecast errors involved, table 34 presents an overview. The mean absolute error and the success rate in directional accuracy is given for the European Union, a big country (France) and a small country (Belgium). The results are based on the full sample covering the seventies, eighties and nineties. In general, the forecasting performance for the European Union is the best, then come the bigger countries, while the smaller countries represent the worst record. This order is related to the volatility of the underlying economic variables partly explained by the degree of openness of countries. Small countries are more sensitive to international economic developments which are found to be an important source of forecast errors.

Table 34: Key figures about forecast accuracy for the EU, a big country and a small country

	Mean absolute error						Success rate in directional accuracy					
	Eur. Union		France		Belgium		Eur. Union		France		Belgium	
	Current year	Year ahead	Current year	Year ahead	Current year	Year ahead	Current year	Year ahead	Current year	Year ahead	Current year	Year ahead
GDP	0.53	0.94	0.56	0.94	0.72	1.19	0.82	0.78	0.86	0.78	0.83	0.85
Inflation	0.37	0.99	0.49	1.15	0.59	1.13	0.82	0.81	0.82	0.74	0.93	0.67
Investment	1.14	1.74	1.60	1.97	2.31	3.71	0.74	0.82	0.70	0.71	0.82	0.52
Unemployment	0.28	0.52	0.35	0.64	0.46	0.86	0.89	0.77	0.89	0.62	0.71	0.73
Deficit	0.46	0.69	0.68	0.75	0.45	1.19	0.93	0.71	0.64	0.54	0.92	0.54
Current account	0.31	0.49	0.48	0.77	0.90	1.41	0.88	0.81	0.77	0.62	0.65	0.65

Mean absolute error: As GDP, inflation and investment are expressed in growth rates, the corresponding errors have to be interpreted as percentage points. With respect to unemployment, expressed as a percentage of the labour force, the error is in terms of the labour force. The errors related to government deficit and current account are a percentage of GDP.

Finally, the following results can be of interest with respect to variables and countries.

With respect to variables:

While the GDP forecast errors could appear large, they will be hard to improve upon. The quality of the GDP forecasts for the US and Japan is similar to that for the EU. The GDP predictions by the Commission compare favourably with results obtained for IMF, OECD and national forecast institutions.

Despite general absence of bias in inflation forecasting, meaning that on average one is correct, year ahead prediction is not entirely efficient at the EU level. This implies that there is scope to improve further forecasts, despite the great progress which has already been realised in reducing the year ahead forecast error between the seventies and now. It was mainly the result of reduction in inflation and its volatility.

The investment series displays among the largest forecast errors, but this appears related to the volatility of the series. There is also the presumption of an optimistic bias.

The forecast errors for the unemployment rate are among the smallest, but satisfaction is misplaced. One failed to learn from past prediction mistakes producing underestimation in the seventies and overestimation from the mid-eighties. Forecast errors tended also to increase over time.

Over- or underestimation of the government deficit ratio is in general not significant. Concentrating on the second sub period examined (1983-97) there was a tendency to make prudent deficit forecasts for Belgium, Denmark, Germany, Ireland, Luxembourg, the Netherlands and Portugal. The predictions were more ambitious, but they failed to materialise (deficits were underestimated) in the following Member States: Belgium, Greece, Spain, France, Italy and the United Kingdom. In general one can be reasonably satisfied with the forecasting record of this important policy variable. The comparison with the OECD and IMF is also favourable. Nevertheless, it has to be noted that the additional accuracy provided by the Commission's sophisticated approach to forecasting compared the naïve no-change forecast is smaller than with some other variables.

Though small the mean absolute forecast error for the current account appears large in comparison to the average value for the current account. This is not a surprise given the equilibrium nature of the current balance leading to an average value close to zero.

The variables related to international trade are the most difficult to forecast. Errors are very large and there appears a tendency to underestimate world trade and EU exports and imports in volumes from the eighties onwards, while EU export and import prices are overestimated. An incorrect assessment of international economic developments is considered to be an important source of prediction mistakes. Their effect on forecast accuracy seem to be larger than the consequences of unforeseen exchange rate movements.

With respect to countries:

From casual inspection of the error statistics and without attempting to make a correction for the volatility of the underlying series, France appears to present the best forecasting record, followed by Germany. The latter country has, however, a better inflation forecast record, but the GDP forecast is disappointing. The Netherlands appear to precede Belgium and Denmark, with the latter disposing of good GDP forecasts. Based on the error statistics related to investment and the equilibrium variables (unemployment, government deficit and current account) the

United Kingdom should come before the just mentioned group of three small countries, but the quality of the GDP and inflation forecasts is weaker, but note that the GDP forecast is better than the one for Germany. Forecasting the Italian economy looks difficult, but even more so the Greek, where larger errors are noted for the government deficit. GDP and investment forecasts in Ireland and Luxembourg represent among the highest errors. The unemployment rate is best forecast in Luxembourg.

Spain and Portugal have been left out of the above ranking as the period examined for these countries starts only in the mid-eighties so that the big forecast errors related to the two oil shocks of the seventies could not influence the test results. The Spanish performance in inflation forecasting appears worth mentioning and the prudence of the Portuguese deficit forecast.

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Annex A: Data sources

The table lists from 1969 all available comprehensive short-term macroeconomic projections made by the European Commission, classified by finalisation date of the forecast document and indicates where the data for the analysis of the forecast accuracy are taken from. When available the cut-off date for inclusion of information in the forecasts is also mentioned.

Finalisation date	Current year		Year ahead		Cut-off date	Title of forecast document ^a	Publication in Supplement A
	forecast	outturn	forecast	outturn			
1969 June December	1969			1970		Preliminary Economic Budgets for 1970 Complete Economic Budgets for 1970	
1970 June December	1970	1969		1971		Preliminary Economic Budgets for 1971 Complete Economic Budgets for 1971	
1971 June July	1971	1970		not used		Preliminary Economic Budgets for 1972 Revised Preliminary Economic Budgets for 1972	
1972 January June August	1972	1971		not used		Complete Economic Budgets for 1972 Preliminary Economic Budgets for 1973 Revised Preliminary Economic Budgets for 1973	
1973 January, 10 June, 27 August, 17 December	1973	1972		not used		Complete Economic Budgets for 1973 Preliminary Economic Budgets for 1974 Revised Preliminary Economic Budgets for 1974 Complete Economic Budgets for 1974	
1974 June, 20 August, 10 December, 19	1974	1973		not used		Preliminary Economic Budgets for 1975 Revised Preliminary Economic Budgets for 1975 Complete Economic Budgets for 1975	
1975 June, 23 September, 26	1975	1974		not used		Preliminary Economic Budgets for 1976 Revised Preliminary Economic Budgets for 1976	
1976 January, 23 June, 9 July, 29	1976	1975		not used		Complete Economic Budgets for 1976 Preliminary Economic Budgets for 1977 Revised Preliminary Economic Budgets for 1977	
1977 January, 12 June, 7 September, 23	1977	1976		not used		Complete Economic Budgets for 1977 Preliminary Economic Budgets for 1978 Revised Preliminary Economic Budgets for 1978	
1978 February, 20 June, 25 October, 20	1978	1977		not used		Complete Economic Budgets for 1978 Preliminary Economic Budgets for 1979 Revised Preliminary Economic Budgets for 1979	
1979 February, 20 June, 11 October, 10	1979	1978		not used		Summary of January 1979 Economic Forecasts Summary of June 1979 Economic Forecasts Summary of October 1979 Economic Forecasts	
1980 February, 12 June, 5 October, 16	1980	1979		not used		Economic forecasts, January 1980 Economic forecasts, May 1980 Economic forecasts, October 1980	
1981 February, 24 June, 25 September, 25	1981	1980		not used	early June not available	Economic forecasts, January 1980 Economic forecasts, May 1981 Economic forecasts, September/October 1981	No 7, July not published
1982 March, 4 June, 8 October, 6	1982	1981		not used	March, 2 not available October, 6	Economic forecasts 1982 Economic forecasts 1982-1983 Economic forecasts 1982-1983	No 4, April not published No 10, October
1983 February, 23 June, 13 October, 18	1983	1982		not used	not available June, 9 October, 9	Summary of January 1983 Economic Forecasts Economic forecasts 1983-1984 Economic forecasts 1983-1984	No 2, February No 6, June No 10, October
1984 February, 3 June, 5 October, 9	1984	1983		not used	February, 3 June, 5 October, 9	Economic forecasts 1983-1984 Economic forecasts 1984-1985 Economic forecasts 1984-1985	No 2, February No 6, June No 10, October

(table continued)

Finalisation date	Current year		Year ahead		Cut-off date	Title of forecast document ^a	Publication in Supplement A
	forecast	outturn	forecast	outturn			
1985 February, 5 June, 7 October, 8	1985	1984	1986	1984	January, 31 June, 7 October, 8	Economic forecasts 1984-1985 Economic forecasts 1985-1986 Economic forecasts 1985-1986	No 2, February No 6, June No 10, October
1986 March, 4 June, 22 October, 6	1986	1985	1987	1985	not available June, 22 October, 6	Economic forecasts 1985-1986 Economic forecasts 1986-1987 Economic forecasts 1986-1987	No 3, March No 6, June No 10, October
1987 January, 30 June, 4 September, 28	1987	1986	1988	1986	not available June, 4 September, 28	Economic forecasts 1986-1987 Economic forecasts 1987-1988 Economic forecasts 1987-1988	No 3, March No 5, May No 10, October
1988 February, 3 June, 14 October, 7	1988	1987	1989	1987	February, 3 June, 6 October, 4	Economic forecasts 1987-1988 Economic forecasts 1988-1989 Economic forecasts 1988-1989	No 2, February No 6, June No 8/9, Aug/Sept
1989 January, 27 June, 12 October, 12	1989	1988	1990	1988	January, 26 June, 25 September, 29	Economic forecasts 1989-1990 Economic forecasts 1989-1990 Economic forecasts 1989-1990	No 2, February No 5/6, May/June No 10, October
1990 June, 16 November, 21	1990	1989	1991	1989	June, 2 November, 19	Economic forecasts 1990-1991 Economic forecasts 1991-1992	No 4/5, April/May No 11/12, Nov/Dec
1991 June, 15 November, 18	1991	1990	1992	1990	June, 8 November, 12	Economic forecasts 1991-1992 Economic forecasts 1992-1993	No 5, May No 11/12, Nov/Dec
1992 June, 14	1992	1991			June, 6	Economic forecasts 1992-1993	No 5/6, May/June
1993 January, 15 June, 18 November, 10	1993	1992	1993	1991	January, 11 June, 14 November, 8	Economic forecasts 1993-1994 Economic forecasts 1993-1994 Economic forecasts 1993-1995	No 1/2, Jan/Feb No 6/7, June/July No 11/12, Nov/Dec
1994 June, 11 November, 22	1994	1993	1995	1993	June, 5 November, 17	Economic forecasts 1994-1995 Economic forecasts 1994-1996	No 5, May No 11/12, Nov/Dec
1995 June, 10 November, 15	1995	1994	1996	1994	June, 2 November, 15	Economic forecasts 1995-1996 Economic forecasts 1995-1997	No 4/5, April/May No 12, December
1996 June, 15 October, 30	1996	1995	1997	1995	June, 10 October, 23	Economic forecasts 1996-1997 Economic forecasts 1996-1998	No 5/6, May/June No 12, December
1997 April, 18 October, 14	1997	1996		1996	April, 15 October, 9	Economic forecasts 1997-1998 Economic forecasts 1997-1999	No 5, May No 10, October
1998 March, 18 October, 20		1997		1997	March, 16 October, 14	Economic forecasts 1998-1999 Economic forecasts 1998-2000	No 3/4, March/April No 10, October

^a: Until 1973 the preliminary, revised preliminary and complete budgets were bundled per year in "Rapport sur les budgets économiques pour (year)" and are only available in French. Afterwards, they are available in German, French and English.

In 1979 the title Economic Forecasts appeared, but in French it remained "Budgets économiques".

The main elements of the forecast were published in Supplement A of European Economy from July 1981 onwards.

Annex B: Data set

General notes to the tables.

The source for the forecast (F) and realisation (R) data is given in annex A, unless notes to the tables indicate otherwise. Holes in the series are filled following a 'severe' approach where possible. Hence, missing forecast data are selected from an earlier forecast, while missing outturn data are selected from a later publication.

The calculation of the EU aggregate has evolved over time. Initially exchange rates were used, but after the introduction of Purchasing Power Standards (PPS), Member States volume data were converted into PPS of a fixed base year, simply added and consequently the growth rate of the aggregate was calculated. In the early nineties this method to calculate the growth rate after aggregation was replaced by a procedure of aggregation of growth rates. The weights are the PPS values of the previous year.

Past publications often do not mention the EU average which had to be recalculated ex post (indicated with "CAL") using the appropriate weighting scheme. For the volume growth rates of GDP, total investment, exports and imports as well as for the annual changes of the private consumption deflator, export prices and import prices the respective PPS weights were used. Nominal ECU weights were used in the ratio calculation for the current account and the government balance as a percentage of GDP. The civilian labour force was the basis of the weighting scheme for the unemployment rate.

When new Member States joined the European Union the EU average did not comprise the same countries in the forecast data and in the outturn data. The new entrants are covered only from the accession year: Denmark, Ireland and the United Kingdom in 1973; Greece in 1981; Spain and Portugal in 1986; Austria, Finland and Sweden in 1995. Outturn data for the EU have been recalculated to eliminate the impact of the new Member States .

The year ahead forecast for the EU in 1995 is based on 16 countries as it includes Norway, which was thought to join at the same time as Austria, Finland and Sweden. It turned out differently and hence the corresponding realisation data for the EU aggregate are based on only 15 countries. This has not been corrected.

West-Germany until 1992; unified Germany from 1993.

Table B1: Real GDP growth rate - current year

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
1969	5.1	6.0			5.5	8.0					6.8	8.1			6.5	5.0	4.5	7.0	4.5	5.0					6.0	6.9
1970	5.0	5.5			5.8	4.9					5.2	6.0			7.5	5.1	4.0	3.5	5.0	5.9					6.0	5.4
1971	3.9	4.2			3.4	2.8					5.4	5.0			3.8	1.4	1.3	0.7	4.0	4.2					4.1	3.3
1972	3.6	4.5			1.8	2.9					5.1	5.4			4.0	3.2	1.7	3.5	3.6	4.0					3.3	3.8
1973	5.2	5.9	6.5	4.9	5.9	5.3					6.0	6.0	5.8	7.0	5.2	5.9	5.5	7.4	4.5	4.7			6.0	5.8	5.8	5.6
1974	3.3	4.0	2.0	1.5	2.0	0.6					4.4	3.8	4.0	0.4	5.0	3.4	3.3	4.9	2.5	1.7			-1.4	0.3	2.4	1.9
1975	0.6	-1.3	1.5	-1.1	0.5	-3.5					0.5	-2.0	1.5	-1.5	-1.6	-3.7	-2.5	-7.7	1.1	-0.7			0.9	-1.6	0.4	-2.5
1976	3.7	3.0	5.2	4.8	6.0	5.7					6.0	5.2	3.2	3.5	1.6	5.6	4.2	3.0	4.0	3.5			2.4	1.8	4.5	4.6
1977	3.5	2.0	1.5	1.2	4.0	2.6					3.1	3.0	3.7	5.6	3.0	1.7	2.0	1.1	4.0	2.5			0.8	0.6	3.0	2.2
1978	2.6	2.3	1.1	0.9	2.7	3.1					2.9	3.3	6.0	6.0	2.2	2.6	1.8	3.2	2.2	2.9			2.7	3.3	2.6	3.0
1979	2.5	2.5	2.3	3.5	4.0	4.4					3.4	3.2	3.8	3.2	4.9	5.0	2.3	2.7	2.1	2.2			2.0	0.6	3.4	3.3
1980	1.4	1.1	-0.9	-0.8	2.5	1.9					2.2	1.8	0.9	0.9	3.9	4.0	1.9	0.4	0.7	0.9			-2.6	-1.4	1.5	1.5
1981	-0.7	-1.5	0.1	-0.9	-0.7	0.2	1.5	-0.3			0.5	0.5	1.9	3.4	-0.3	0.2	-1.8	-1.0	-0.6	-0.7			-2.6	-1.2	-0.6	-0.2
1982	0.5	1.9	2.9	3.0	1.0	-0.6	0.8	-0.2			2.2	1.8	2.2	1.4	1.8	-0.5	0.6	1.5	0.5	-1.4			1.3	1.0	1.5	0.6
1983	-0.7	-0.3	1.4	2.0	0.6	1.5	0.9	0.4			-0.8	0.7	0.5	-1.9	0.1	-0.2	-1.4	3.2	-0.4	1.4			2.4	3.8	0.5	1.4
1984	1.3	1.7	2.7	3.4	3.0	2.7	1.7	2.8			1.1	1.5	2.4	4.2	2.4	2.8	0.3	5.5	2.1	2.4			2.7	2.1	2.2	2.2
1985	1.6	1.3	2.9	3.8	2.5	2.5	1.9	2.1			1.1	1.3	2.9	2.1	2.6	2.3	1.2	2.1	2.0	2.3			3.5	3.3	2.3	2.3
1986	2.0	2.2	2.5	3.4	3.5	2.5	-0.4	1.3	2.7	3.0	2.3	2.4	3.2	0.5	2.7	2.7	2.2	2.3	1.7	2.1	3.9	4.3	2.6	2.4	2.7	2.5
1987	1.2	1.8	-0.2	-1.0	1.5	1.8	-0.7	-0.6	2.8	5.2	1.5	2.2	1.1	4.8	3.2	3.1	2.0	2.0	1.7	2.2	3.4	4.6	3.1	3.6	2.2	2.7
1988	2.0	4.0	-0.1	-0.2	2.1	3.5	1.6	3.5	4.3	5.0	2.3	3.2	1.7	3.8	3.1	3.9	1.9	5.0	1.5	2.6	3.6	4.0	3.1	3.7	2.6	3.6
1989	3.6	4.5	1.1	1.1	3.0	3.4	3.0	2.9	4.5	4.9	3.1	3.5	4.1	5.7	3.4	3.2	3.2	4.6	3.4	4.0	4.2	5.4	2.4	2.3	3.2	3.4
1990	3.0	3.7	2.0	1.6	3.7	4.7	1.6	0.1	3.8	3.7	3.2	2.8	4.6	5.2	3.1	2.0	3.7	3.7	3.5	3.3	4.0	4.0	1.6	0.6	3.0	2.7
1991	2.3	1.4	1.4	1.0	2.7	3.4	0.8	1.8	3.0	2.4	1.6	1.2	1.7	1.9	1.7	1.4	3.1	2.9	2.6	2.2	2.8	1.8	-2.2	-2.2	1.4	1.3
1992	1.6	0.7	2.4	1.1	2.0	1.5	2.0	1.3	2.5	1.0	1.9	1.3	2.2	3.5	1.5	0.9	2.9	1.8	1.2	1.7	2.3	1.1	0.6	-0.6	1.7	0.9
1993	-1.2	-1.3	0.1	1.1	-2.0	-1.2	0.8	-0.2	-0.4	-1.0	-0.7	-0.7	2.1	2.5	0.0	-0.7	1.0	0.3	-0.6	0.3	0.5	-1.2	1.5	1.9	-0.4	-0.3
1994	1.3	2.3	3.8	4.4	1.3	2.9	0.7	1.2	1.1	2.0	1.6	2.7	4.2	6.3	1.5	2.2	1.6	3.0	1.3	2.5	1.1	1.1	2.5	3.8	1.6	2.8
1995	2.7	1.9	3.3	2.6	3.0	1.9	1.6	2.0	3.1	3.0	3.1	2.2	6.9	8.6	3.3	3.0	3.3	3.2	3.2	2.4	3.0	2.5	3.1	2.4	3.1	2.5
1996	1.1	1.4	1.3	2.4	0.5	1.4	2.0	2.6	2.0	2.2	1.0	1.3	5.6	8.4	1.8	0.7	2.6	3.6	1.8	2.8	2.3	3.0	2.4	2.1	1.5	1.6
1997	2.3	2.7	3.0	2.9	2.3	2.2	3.1	3.5	2.8	3.4	2.3	2.4	7.2	10.0	1.2	1.5	3.7	4.1	3.1	3.3	3.2	3.7	2.8	3.5	2.4	2.7

Since 1974-VI: GDP, before GNP

1969(R) B, F: 69-XII; EU: CAL

1970(F) B: 69-XII; EU: CAL

1972(R) EU: idem for EUR9

1980(R) EU: 1.4 for EUR10

1985(R) EU: idem for EUR12

1994(R) EU: 2.7 for EUR15

Table B2: Real GDP growth rate - year ahead

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
1969																										
1970	5.0	6.1			4.4	5.4					3.6	6.0			7.6	5.1	3.0	3.5	4.0	5.5					4.7	5.5
1971	4.1	3.7			3.7	2.8					5.3	5.0			6.1	1.4	2.4	0.7	4.2	4.0					4.7	3.3
1972	4.2	5.4			1.0	3.0					5.0	5.4			3.5	3.2	2.0	3.5	2.0	4.5					3.0	3.9
1973	4.5	5.6			5.0	5.3					5.4	6.0			5.5	5.9	4.0	7.5	4.5	4.0					5.2	5.6
1974	6.0	2.0	3.5	1.6	3.5	0.6					5.1	3.8	5.6	0.4	6.5	3.4	3.3	4.5	3.0	2.8			3.5	0.7	4.5	2.0
1975	2.5	-2.0	1.5	-1.0	2.5	-3.3					3.0	-1.3	2.0	-0.5	1.4	-3.7	1.5	-7.7	2.4	-0.9			2.5	-1.3	2.5	-2.3
1976	3.0	3.0	4.0	4.8	3.5	5.7					5.0	5.2	2.0	3.2	3.0	5.6	3.9	2.7	2.8	4.4			0.1	1.6	3.1	4.7
1977	3.0	1.3	2.0	1.9	3.9	2.8					3.0	3.0	2.0	5.5	0.5	1.7	3.0	1.3	3.6	2.4			1.4	1.0	2.7	2.3
1978	3.1	2.5	2.0	0.9	4.0	3.2					3.6	3.3	5.5	6.1	3.3	2.6	2.8	3.2	3.1	2.4			2.5	3.7	3.4	3.1
1979	2.5	2.4	1.6	3.5	3.5	4.6					3.7	3.2	4.0	1.9	4.1	5.0	2.9	2.7	2.5	2.2			2.4	0.9	3.3	3.4
1980	2.5	2.4	0.8	-0.2	2.9	1.9					2.2	1.3	3.0	0.9	2.2	4.0	2.0	0.4	2.2	0.5			-1.0	-1.4	1.9	1.4
1981	0.9	-1.7	0.6	-0.2	1.0	0.1					1.2	0.3	2.5	1.1	0.2	-0.2	0.5	-2.4	0.3	-1.1			-0.6	-1.9	0.6	-0.4
1982	0.2	1.0	3.0	3.4	2.2	-1.0	2.1	0.0			3.0	1.8	3.6	1.2	1.8	-0.3	-0.3	-1.1	0.9	-1.6			1.2	1.5	2.0	0.4
1983	0.5	0.4	1.6	2.5	1.0	1.0	1.9	0.3			1.0	0.7	2.4	0.6	1.0	-1.2	1.0	-1.4	-0.3	0.6			1.7	3.3	1.1	0.9
1984	0.6	1.7	1.2	3.9	2.1	2.6	1.5	2.6			0.4	1.6	1.8	4.4	1.5	2.6	-1.0	3.2	0.0	1.7			2.2	1.8	1.5	2.2
1985	1.0	1.5	2.9	3.8	2.5	2.6	2.0	2.1			1.7	1.4	2.6	2.0	2.3	2.3	1.9	2.2	1.8	1.7			3.0	3.7	2.3	2.4
1986	1.7	2.3	3.2	3.4	3.5	2.6	1.0	1.3			1.9	2.0	2.3	-0.3	2.7	2.7	1.3	2.5	2.0	2.4			2.0	2.9	2.5	2.5
1987	1.3	1.8	1.8	-1.0	3.2	1.9	-0.2	-0.4	3.0	5.2	2.5	2.3	3.1	4.1	3.6	3.1	2.6	2.4	1.8	1.5	3.5	4.6	2.7	4.3	2.8	2.9
1988	1.8	4.0	0.9	-0.4	1.9	3.7	0.5	4.0	3.7	5.0	1.9	3.4	1.3	3.7	2.8	3.9	1.8	5.2	1.2	2.8	3.0	3.9	2.7	4.2	2.3	3.8
1989	2.2	4.0	1.7	1.3	2.5	3.3	2.1	2.6	3.9	4.9	2.8	3.6	3.2	5.9	3.2	3.2	2.4	6.1	2.3	4.0	3.6	5.4	2.6	2.2	2.8	3.3
1990	3.3	3.7	2.0	2.1	3.5	4.7	2.3	-0.3	4.0	3.7	3.2	2.8	4.6	5.7	3.0	2.0	3.3	0.9	3.0	3.9	4.6	4.0	2.1	0.8	3.1	2.8
1991	2.2	1.9	0.9	1.2	3.1	3.7	1.0	1.8	2.5	2.4	2.5	1.1	2.3	2.5	2.3	1.4	2.9	3.1	2.0	2.2	3.2	1.9	0.7	-2.2	2.2	1.4
1992	2.1	0.5	3.0	1.2	2.2	1.6	1.2	1.3	3.1	0.8	2.3	1.4	2.3	4.8	2.0	0.9	3.4	1.8	1.3	1.4	1.7	1.1	2.0	-0.5	2.2	1.0
1993	0.5	-1.7	1.8	1.4	0.0	-1.2	1.6	-0.5	1.0	-1.1	1.0	-1.0	2.1	4.0	0.8	-0.7	2.0	0.3	0.6	0.3	1.3	-1.2	1.4	2.0	0.8	-0.4
1994	0.5	2.2	2.6	4.4	0.5	2.9	0.9	1.5	1.1	2.0	1.0	2.7	3.3	6.7	1.6	2.2	2.0	4.4	0.9	2.7	1.4	1.1	2.5	3.8	1.3	2.8
1995	2.7	1.9	3.2	2.8	3.0	1.9	1.1	2.0	2.8	2.8	3.2	2.2	5.6	10.7	3.0	3.0	3.0	3.4	3.2	2.1	3.0	2.3	2.7	2.4	3.0	2.4
1996	2.2	1.5	2.6	2.7	2.4	1.4	1.9	2.6	2.9	2.3	2.4	1.5	5.6	8.6	3.0	0.7	3.3	3.0	2.5	3.3	3.1	3.3	2.7	2.3	2.6	1.8
1997	2.2	2.9	3.1	3.3	2.2	2.2	2.5	3.2	2.7	3.5	2.1	2.3	5.8	10.6	1.4	1.5	2.8	4.8	2.8	3.6	2.8	3.7	3.0	3.5	2.3	2.7

Since 1974-VI: GDP, before GNP

1970(R) EU: CAL

1972(F) EU: CAL

1972(R) DK, L: 73-VIII; EU: CAL

1974(F) DK, D, I: 73-VIII; EU: CAL

1972(R) EU: 3.7 for EUR9

1973(R) EU: 5.5 for EUR9

1980(R) EU: 1.5 for EUR10

1981(R) EU: -0.6 or EUR10

1985(R) EU: idem for EUR12

1986(R) EU: 2.6 for EUR12

1994(R) EU: idem for EUR15

1995(F) EU: in fact EUR16 (includes Norway)

Table B3: Inflation (private consumption deflator, annual change) - current year

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
1969	3.3	3.5			3.0	2.5					5.5	6.9			2.4	2.9	2.6	2.3	6.5	7.0					3.5	4.0
1970	4.5	3.5			3.8	3.8					5.1	5.2			5.2	4.8	4.8	4.6	4.0	3.5					4.5	4.4
1971	6.0	5.1			4.5	5.3					4.7	5.7			5.0	5.2	4.5	4.7	6.0	7.0					4.9	5.4
1972	4.7	5.4			5.0	5.8					5.5	5.6			5.5	5.9	4.3	5.2	7.0	8.0					5.3	5.9
1973	6.0	7.0	8.0	9.3	7.0	7.1					6.8	7.2	9.0	11.5	9.0	11.0	6.0	6.1	7.8	9.0			6.0	8.6	7.1	8.0
1974	11.3	12.5	14.0	15.3	8.5	7.3					13.3	12.8	15.0	17.3	18.0	19.6	9.0	9.5	12.0	10.3			14.5	14.6	12.8	12.1
1975	11.5	12.8	10.5	9.6	6.0	6.1					10.0	11.8	25.1	21.0	19.0	17.4	9.3	10.7	10.0	10.4			19.5	22.0	11.9	12.4
1976	10.3	8.8	9.1	8.5	5.0	4.4					10.5	9.8	17.0	18.0	20.5	17.5	9.5	9.8	9.5	9.3			15.5	15.2	11.0	9.9
1977	7.5	6.6	9.0	10.6	4.0	3.9					9.0	9.1	15.0	13.6	19.0	18.0	7.8	6.7	7.0	6.7			15.0	14.3	9.6	9.1
1978	5.0	4.0	9.0	9.4	3.3	2.6					9.0	8.8	7.0	8.0	13.0	12.7	3.5	3.1	4.8	4.6			8.2	8.6	7.2	7.1
1979	4.2	4.5	8.7	9.6	4.0	4.1					9.8	10.5	12.5	13.2	14.8	14.9	4.5	4.5	5.0	4.7			11.5	12.0	8.5	9.0
1980	7.0	6.3	12.5	11.0	5.5	5.4					13.2	13.5	19.5	18.2	19.6	20.3	6.7	6.3	6.5	6.9			20.3	15.5	12.3	12.4
1981	6.8	7.6	10.0	10.7	5.8	5.9	24.0	24.4			13.0	12.5	17.5	20.5	21.0	19.0	6.8	8.1	7.3	6.7			11.2	10.7	11.5	10.9
1982	10.2	8.8	10.1	9.8	4.7	5.3	24.0	21.1			13.3	10.9	18.5	17.1	15.0	16.8	12.0	10.0	5.8	5.7			9.5	8.1	10.2	8.8
1983	6.7	7.7	6.4	6.7	3.0	3.0	21.5	19.1			8.6	9.3	10.5	10.5	14.9	14.9	8.8	8.4	2.7	2.5			6.2	5.4	6.4	6.3
1984	6.6	6.3	5.3	6.6	2.9	2.6	19.0	18.1			7.5	7.3	9.0	8.3	11.3	11.1	7.7	6.7	3.0	3.0			5.2	5.1	6.6	6.3
1985	5.3	4.9	4.2	5.0	2.4	2.0	17.5	18.4			6.0	5.5	5.8	5.4	8.7	9.4	4.5	4.0	2.3	2.3			5.5	5.4	5.4	5.5
1986	1.2	1.3	2.4	3.6	0.0	-0.4	22.5	22.1	8.0	9.1	2.4	2.7	2.9	3.6	5.6	6.3	0.8	0.3	-0.1	0.0	12.0	11.7	3.9	3.7	3.5	3.4
1987	1.5	1.6	4.3	4.1	0.8	0.6	13.5	16.0	6.0	5.3	2.7	3.0	3.2	3.0	4.3	4.8	1.3	0.6	-0.9	-0.2	9.5	10.2	3.9	3.3	3.1	3.3
1988	1.4	1.2	4.8	5.1	1.0	1.3	14.1	13.5	4.3	5.1	2.7	2.7	2.5	2.2	4.8	4.9	1.7	1.4	0.8	0.8	7.8	9.6	3.4	5.0	3.2	3.6
1989	3.0	3.1	4.3	4.8	3.0	3.1	14.6	13.8	6.1	6.8	3.3	3.5	3.8	4.1	6.6	6.3	2.5	3.4	1.7	1.1	12.3	12.8	5.8	5.8	4.8	4.9
1990	3.2	3.5	2.5	2.6	2.8	2.5	17.0	20.5	6.6	6.4	2.9	3.0	3.0	2.6	5.5	6.2	3.5	3.8	2.3	2.6	11.7	13.6	6.6	7.2	4.7	5.0
1991	3.2	3.2	2.4	2.5	3.5	3.6	18.0	19.5	5.9	6.3	3.1	3.0	3.0	3.0	6.3	6.7	3.5	3.2	2.8	3.5	11.5	11.9	6.5	7.2	5.0	5.2
1992	3.1	2.4	2.2	1.9	3.9	4.1	16.0	14.9	6.3	6.2	3.0	2.4	3.8	2.6	5.2	5.4	2.8	2.8	3.5	3.3	9.0	9.7	5.3	4.8	4.6	4.5
1993	2.8	2.8	1.0	1.7	4.0	3.4	13.8	13.7	5.0	5.1	2.5	2.2	3.5	2.0	5.2	4.8	3.7	3.6	2.3	2.1	6.8	6.8	4.1	3.5	4.1	3.9
1994	2.6	2.4	2.0	1.7	3.0	2.7	10.2	10.9	4.8	5.1	1.8	1.8	2.8	3.0	3.9	4.7	2.9	2.2	2.3	2.2	5.6	5.1	3.5	2.5	3.3	3.2
1995	1.9	1.5	2.3	1.8	2.3	2.0	9.6	9.3	4.9	4.6	1.9	1.6	2.9	2.5	5.2	5.7	2.3	2.0	1.8	1.1	4.5	4.2	3.0	2.6	3.2	3.0
1996	2.0	2.0	1.8	2.1	1.6	1.9	8.3	8.3	3.6	3.6	1.8	1.8	2.3	1.7	4.1	4.4	1.7	1.9	1.9	2.0	3.1	3.1	2.7	2.8	2.6	2.7
1997	1.9	1.6	2.3	2.3	1.9	1.9	6.0	5.5	2.4	2.5	1.6	1.1	2.0	1.4	2.7	2.4	1.7	1.4	2.4	2.2	2.5	2.1	2.3	2.3	2.2	2.1

1969(F) EU: CAL

1969(R) B, F: 69-XII; EU: CAL

1970(F) B: 69-XII; EU: CAL

1972(R) EU: 5.8 or EUR9

1980(R) EU: 11.7 for EUR10

1984(F) EU: recalculated based on improved weighting scheme (originally 5.1)

1985(R) EU: 5.5 for EUR12

1994(R) EU: idem for EUR15

Table B4: Inflation (private consumption deflator, annual change) - year ahead

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union		
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	
1969																											
1970	4.5	2.8			2.8	3.9					5.8	5.2			5.5	4.8	6.0	4.6	5.0	4.0					4.6	4.4	
1971	5.8	5.6			3.4	5.1					4.2	5.7			5.0	5.2	4.5	4.7	6.0	8.0					3.9	5.4	
1972	4.7	5.0			4.5	5.8					4.3	5.6			6.7	5.9	3.5	6.1	6.5	8.5					5.2	5.9	
1973	4.6	7.0			5.5	7.0					5.6	7.2			8.5	11.0	4.3	6.1	8.5	9.0					6.3	8.2	
1974	6.1	12.3	7.5	15.0	6.5	7.3					7.2	12.8	8.0	17.3	9.5	19.6	5.5	9.5	9.5	10.0			7.0	15.2	7.4	12.5	
1975	11.7	12.1	14.0	8.8	6.5	6.1					13.0	11.8	17.0	21.3	16.0	17.4	7.5	10.7	10.5	10.5			17.5	23.1	12.5	12.6	
1976	9.0	9.0	8.0	8.5	5.5	4.4					9.0	9.8	16.0	17.0	12.0	17.5	7.8	9.8	10.5	9.2			15.5	15.3	9.6	9.9	
1977	8.0	6.6	8.5	10.1	4.0	3.8					8.3	9.1	15.0	13.9	20.0	18.0	8.0	6.7	7.5	6.8			14.0	14.2	9.8	9.0	
1978	6.8	4.5	10.5	9.4	4.0	2.6					8.4	8.8	10.0	7.9	12.0	12.7	5.7	3.1	7.0	4.4			11.4	8.5	8.0	6.8	
1979	4.1	3.5	7.0	9.7	3.0	3.9					8.5	10.5	14.5	12.2	11.5	14.9	4.3	4.5	4.8	4.6			9.5	12.1	7.0	8.6	
1980	7.1	6.4	9.8	11.9	4.5	5.4					9.6	13.5	13.0	18.2	14.5	20.3	6.5	6.3	6.8	6.9			12.7	15.5	9.1	12.4	
1981	5.5	9.1	10.0	10.7	4.0	6.0					10.7	12.5	12.8	19.6	15.3	19.0	5.6	8.1	6.8	6.5			14.0	10.9	10.4	11.3	
1982	7.0	7.4	9.5	9.8	4.5	5.3	22.0	21.1			13.9	10.9	16.0	17.1	16.4	16.7	7.0	10.0	6.0	5.7			10.7	8.0	10.7	8.7	
1983	8.5	6.8	7.0	6.7	3.6	2.9	21.0	19.0			8.9	9.3	13.0	9.7	15.0	15.1	9.0	8.4	4.5	2.9			6.9	5.1	8.8	6.2	
1984	6.5	6.2	5.4	6.6	3.2	2.5	18.5	18.1			7.2	7.3	8.8	8.5	11.5	11.1	7.7	6.7	3.6	2.6			5.8	5.1	6.8	6.2	
1985	5.5	4.8	4.3	5.0	2.2	2.1	18.0	18.4			5.7	5.5	7.0	4.2	7.1	9.4	5.5	4.0	2.3	2.6			5.6	5.3	5.2	5.5	
1986	3.2	1.3	1.7	3.6	1.5	-0.5	16.0	22.1			4.0	2.7	5.3	3.6	6.5	6.3	3.5	0.3	1.1	0.1			4.3	3.6	3.9	3.0	
1987	1.5	1.6	2.8	4.1	1.1	0.5	12.5	15.8	5.3	5.3	2.3	3.0	3.2	3.1	4.0	4.8	1.3	0.6	-1.0	-0.4	9.0	10.2	3.9	3.8	3.0	3.3	
1988	2.5	1.2	4.0	4.9	1.8	1.1	12.0	13.9	4.2	5.1	2.6	2.7	3.2	2.5	4.9	4.9	2.3	1.5	1.0	0.8	6.5	9.6	3.9	5.0	3.4	3.6	
1989	2.4	3.4	3.7	5.0	2.5	3.2	12.8	14.4	4.3	6.6	2.7	3.5	2.8	3.9	4.6	6.0	2.2	4.0	1.3	2.1	7.0	12.8	4.7	6.1	3.7	4.9	
1990	3.5	3.5	3.0	2.5	2.7	2.6	15.0	20.2	6.3	6.4	2.7	3.0	4.0	2.6	6.0	6.2	3.1	4.2	2.3	2.5	11.3	13.6	5.5	8.4	4.5	5.2	
1991	4.5	2.9	3.3	2.4	3.9	3.9	18.5	18.4	6.6	6.3	3.6	3.0	3.5	3.2	6.3	6.8	4.0	2.9	2.8	3.3	12.6	11.9	6.3	7.2	5.3	5.3	
1992	3.4	2.4	2.2	1.9	4.2	4.0	14.3	14.9	5.6	6.4	2.9	2.4	3.0	2.6	5.2	5.4	3.7	2.8	3.5	3.0	9.5	9.7	4.6	4.7	4.5	4.4	
1993	2.8	2.6	1.6	1.7	3.6	3.3	13.5	13.6	5.5	5.6	2.7	2.2	2.2	1.6	5.8	5.1	4.7	3.6	2.7	2.1	6.8	7.9	5.1	3.5	4.4	3.9	
1994	3.2	3.0	2.6	1.0	3.2	2.7	11.1	10.8	4.4	5.1	2.2	1.8	3.5	2.7	4.0	4.8	3.2	2.6	2.5	2.4	5.6	5.5	3.6	2.4	3.5	3.3	
1995	2.5	1.6	2.1	2.1	2.2	1.9	9.5	9.3	4.5	4.7	1.9	1.6	2.7	2.0	3.5	5.8	2.5	2.0	2.4	0.9	4.6	4.2	2.9	2.6	2.9	3.0	
1996	2.4	2.3	2.4	2.1	2.1	1.8	7.9	8.5	3.9	3.4	2.1	1.8	2.3	1.1	4.3	4.3	2.2	1.4	1.8	1.3	3.6	3.3	3.0	2.6	3.0	2.6	
1997	2.1	1.6	2.4	2.2	1.7	1.8	6.9	5.5	2.9	2.5	1.4	1.1	2.2	0.9	2.9	2.5	2.1	1.1	2.0	2.0	3.0	2.5	2.4	2.6	2.2	2.1	

1970(R) EU: CAL

1972(F) EU: CAL

1972(R) DK, D, I: 73-VIII; EU: CAL

1974(F) DK, D, I: 73-VIII; EU: CAL

1984(F) EU: recalculated based on improved weighting scheme (originally 5.6)

1985(F) EU: recalculated based on improved weighting scheme (originally 4.2)

1972(R) EU: 6.1 for EUR9

1973(R) EU: idem for EUR9

1980(R) EU: 11.9 for EUR10

1981(R) EU: 11.8 for EUR10

1985(R) EU: 5.8 for EUR12

1986(R) EU: 3.7 for EUR12

1994(R) EU: 3.2 for EUR15

1995(F) EU: in fact EUR16 (includes Norway)

Table B5: Investment (total gross fixed capital formation, real annual change) - current year

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
1969	7.0	9.5			12.5	12.8					7.4	9.9			11.7	8.2	15.0	16.0	5.5	0.5					9.7	9.6
1970	8.5	5.5			8.5	10.7					7.1	6.6			11.3	3.8	17.3	17.5	4.5	7.0					8.5	7.9
1971	5.0	1.2			2.8	4.0					6.1	6.0			1.3	-4.9	2.5	8.0	6.0	2.0					3.9	2.9
1972	2.0	2.3			-2.4	1.9					5.8	7.0			0.0	-0.2	-1.0	4.0	-4.0	-3.8					0.6	2.4
1973	3.0	8.2	12.0	12.5	6.9	0.5					7.5	8.7	8.7	12.8	5.7	9.9	-3.5	4.0	5.4	4.8			6.5	4.3	6.8	5.2
1974	3.3	7.1	2.1	-6.0	-0.5	-7.9					5.6	2.1	4.0	-3.4	8.4	4.2	-4.2	1.8	0.0	-7.3			-4.2	-2.6	1.9	-2.6
1975	-2.3	-3.2	-9.0	-12.8	-2.0	-4.8					-1.1	-5.8	0.0	-5.0	-8.2	-12.7	-2.8	-7.2	-0.1	-3.7			-1.1	-0.5	-2.5	-5.6
1976	-0.3	-0.2	11.0	13.7	5.5	5.1					1.0	4.5	1.0	3.0	-7.8	2.3	-2.5	-4.5	-3.5	-1.5			-2.1	-4.3	0.7	2.8
1977	2.7	0.4	0.5	-2.3	3.0	2.7					0.4	-0.6	8.0	8.0	2.0	0.1	4.3	3.2	4.5	11.3			-3.4	-3.9	1.3	1.1
1978	1.6	0.9	0.0	-1.8	4.4	6.3					1.3	0.7	10.0	12.0	-1.3	-0.4	1.1	5.4	2.0	3.4			4.1	2.8	2.5	2.8
1979	1.0	1.7	0.5	-3.0	6.3	8.5					2.3	2.5	10.5	14.3	4.9	4.5	1.9	4.9	-1.0	0.1			2.5	-3.0	3.7	3.7
1980	0.7	2.2	-8.5	-15.2	6.6	3.7					2.6	2.2	0.0	-9.8	5.5	10.0	2.8	2.0	-0.2	-1.6			-3.3	-2.2	2.9	2.8
1981	-2.5	-8.5	-7.4	-16.3	-3.8	-3.3	3.0	-10.1			-4.4	-2.0	8.0	5.0	-0.7	-0.2	0.4	-3.6	-5.4	-11.3			-9.0	-7.6	-4.2	-4.2
1982	-3.4	-5.1	3.5	3.7	-4.2	-5.6	-2.3	-1.0			-0.9	-0.4	1.7	-4.2	0.2	-5.3	1.2	-3.4	-2.0	-3.0			2.3	3.6	-1.3	-2.5
1983	-1.8	-5.5	0.3	2.3	2.4	2.9	3.4	-1.4			-1.7	-1.4	-9.0	-8.7	-3.0	-5.5	-4.1	-5.4	0.7	1.3			2.4	4.7	0.0	0.0
1984	0.7	4.6	5.0	12.8	5.4	1.3	2.6	-4.7			0.5	-2.4	-2.1	-1.1	2.3	4.1	-2.5	-1.4	1.7	4.2			5.1	7.7	3.1	2.3
1985	4.1	3.3	10.5	14.6	2.0	-0.3	-1.1	3.4			0.3	3.0	0.3	1.6	3.9	4.1	1.1	1.7	1.6	2.4			2.7	1.0	2.2	2.3
1986	5.3	5.3	10.8	16.8	5.8	3.3	-2.5	-4.8	6.6	12.0	3.9	3.7	2.5	-3.4	5.9	1.2	2.7	4.1	3.7	8.1	8.6	9.5	3.6	0.6	4.9	3.6
1987	4.9	5.2	-4.1	-9.0	2.6	1.8	-3.1	-2.2	10.0	13.8	4.0	3.6	-0.1	0.2	4.3	5.2	2.3	4.3	3.3	3.3	9.9	19.5	3.8	3.5	4.1	4.3
1988	4.3	12.9	-2.9	-6.9	2.3	5.8	5.3	10.1	11.3	14.0	4.2	6.1	-0.9	0.7	4.0	4.9	1.6	4.6	1.3	7.9	11.5	15.8	7.6	11.8	4.8	7.8
1989	10.5	14.4	-3.1	-0.5	6.0	7.2	9.6	8.8	13.6	13.6	5.6	5.1	6.6	11.4	5.2	5.1	4.0	4.5	6.2	4.5	12.0	8.3	6.3	4.8	6.8	6.7
1990	6.6	7.6	-0.8	-1.0	6.4	8.8	6.1	5.2	9.6	6.7	4.6	4.0	9.9	7.5	4.5	3.0	5.9	5.8	3.2	4.1	8.5	7.5	-1.0	-1.9	4.6	4.3
1991	1.0	-0.2	-2.1	-2.1	5.9	6.7	2.9	-1.9	4.9	1.6	1.1	-1.5	2.7	-4.9	1.1	0.9	5.8	6.3	1.2	-0.7	5.8	2.8	-10.4	-10.3	0.8	-0.1
1992	1.4	0.0	0.9	-10.4	2.8	1.5	3.0	1.1	1.6	-3.0	0.2	-2.3	3.5	-1.4	1.3	-1.4	4.7	-2.1	-0.7	1.6	3.1	4.5	-4.4	-0.6	0.7	-0.8
1993	-5.3	-7.0	-4.4	-1.8	-0.8	-3.2	2.8	-3.4	-5.4	-10.3	-2.7	-5.0	-0.1	0.3	-3.6	-11.1	5.8	4.0	-2.2	-3.8	2.9	-3.9	1.3	0.8	-1.9	-5.0
1994	1.4	-0.3	7.3	3.6	2.2	4.3	1.9	-0.1	-1.3	1.0	1.5	1.1	5.7	7.2	0.6	-0.1	-1.8	1.5	-0.4	2.4	1.1	3.5	3.6	3.2	1.6	2.3
1995	7.1	2.7	5.9	11.0	6.7	1.5	5.1	6.3	6.2	8.4	5.4	2.8	9.2	12.2	5.0	5.9	4.3	6.0	6.9	5.0	7.1	4.0	5.5	-0.7	6.3	3.5
1996	3.8	2.4	3.8	7.7	-1.7	-0.8	7.8	11.8	4.7	0.7	1.5	-0.6	8.3	10.1	4.2	1.2	6.5	0.0	2.4	4.9	4.8	7.4	4.2	1.0	2.2	1.1
1997	4.4	4.8	5.6	7.0	1.4	0.2	10.8	10.6	1.9	4.7	2.2	0.2	8.8	16.0	1.9	1.0	3.4	12.3	4.6	6.1	6.7	11.9	5.6	2.7	3.0	2.3

1969(R) B: 69-XII; EU: CAL

1970(F) B: 69-XII; EU: CAL

1972(R) EU: 5.8 or EUR9

1980(R) EU: 2.0 for EUR10

1985(R) EU: idem for EUR12

1994(R) EU: 2.3 for EUR15

Table B6: Investment (total gross fixed capital formation, real annual change) - year ahead

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union		
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	
1969																											
1970	8.5	5.7			8.3	11.9					4.5	7.4			10.9	3.8	3.0	11.3	3.5	7.0					7.5	7.9	
1971	5.0	-2.8			4.8	4.5					6.1	5.0			5.1	-4.9	-5.0	8.0	4.8	2.0					5.3	2.6	
1972	3.5	4.9			-3.0	1.9					5.4	7.0			2.5	-0.2	-5.0	4.0	-5.0	-1.5					0.8	2.7	
1973	2.2	7.3			5.5	1.1					6.0	6.5			6.0	9.9	-7.0	5.1	5.0	6.2					5.5	5.4	
1974	5.2	6.1	6.0	-9.7	2.5	-8.1					6.2	2.1	5.8	-3.4	8.0	4.2	2.7	1.0	2.5	-5.2			3.5	-2.0	4.8	-2.4	
1975	0.6	-3.3	-6.5	-10.7	-1.2	-4.1					3.0	-4.3	1.0	-5.5	-3.3	-12.7	-1.3	-10.1	1.0	-3.9			1.0	-1.2	0.0	-5.0	
1976	2.8	-0.1	8.0	16.3	3.5	2.7					5.0	4.5	1.0	4.4	0.6	2.3	3.2	-4.6	-1.1	-1.9			-3.0	-4.4	2.4	2.8	
1977	1.5	-0.7	2.5	-1.8	3.5	4.1					1.6	-0.6	3.0	8.4	-2.0	0.1	4.7	-2.4	2.8	11.1			-3.6	-3.8	1.0	1.5	
1978	3.2	2.1	1.5	0.5	6.0	6.3					2.0	0.7	9.0	15.0	2.1	-0.4	2.0	5.4	1.3	3.1			2.8	2.5	2.9	2.9	
1979	2.8	-0.5	-1.1	-3.0	4.3	8.7					3.0	2.5	8.0	15.6	5.5	4.5	1.5	4.9	1.8	0.0			2.5	-1.9	3.5	3.8	
1980	2.4	5.6	-1.5	-13.7	5.5	3.7					1.8	2.2	5.3	-9.8	3.4	10.0	2.4	2.0	1.7	-2.6			-0.9	-2.0	2.9	2.9	
1981	1.2	-16.2	-3.7	-16.3	-0.2	-3.8					0.2	-2.8	-4.1	5.2	-2.0	-0.2	1.5	-3.6	-3.3	-10.8			-3.3	-7.9	-1.0	-4.4	
1982	-1.6	-2.6	3.7	3.7	-2.1	-5.4	1.4	-1.0			0.9	1.1	3.7	-8.4	-3.3	-5.3	0.2	-2.2	-1.5	-5.0			1.0	5.1	-0.8	-1.8	
1983	0.5	-6.4	4.3	2.3	0.9	3.1	3.4	-1.4			-1.5	-1.4	1.2	-7.7	-0.7	-5.2	1.2	-5.4	-0.5	0.4			2.5	4.2	0.6	-0.1	
1984	0.4	2.3	1.0	12.8	4.7	0.8	2.8	-4.7			-2.6	-2.3	-1.2	-1.8	3.7	4.1	-2.3	-1.4	0.5	4.3			3.1	8.2	2.0	2.3	
1985	2.0	1.2	9.6	14.6	4.1	-0.3	2.2	3.4			3.3	3.1	-0.8	-0.3	3.3	4.1	1.1	1.7	2.6	3.7			3.8	1.8	3.6	2.4	
1986	3.0	4.8	8.6	16.8	4.9	3.1	1.1	-4.8			1.9	3.0	2.3	-2.3	5.6	1.2	0.8	4.8	2.5	7.2			2.5	0.3	3.7	2.5	
1987	5.0	5.2	-0.9	-9.0	5.5	1.8	0.5	-3.2	7.0	13.8	5.1	3.4	2.9	-1.0	7.2	5.2	1.9	16.4	2.8	1.6	8.5	19.6	3.5	5.5	5.1	4.6	
1988	4.4	12.9	-3.2	-6.5	1.4	5.9	3.7	9.0	9.0	14.0	2.7	7.3	1.0	-1.7	2.8	4.9	1.7	4.5	0.7	9.7	10.5	15.8	3.9	13.1	3.3	8.4	
1989	2.7	13.6	0.1	-0.1	3.7	7.1	8.0	8.6	10.0	13.6	5.4	5.9	3.6	12.1	3.8	5.1	1.7	11.5	2.9	3.9	11.0	8.3	6.3	4.8	5.2	6.8	
1990	5.8	8.3	2.2	-1.9	5.1	8.8	6.4	4.8	9.9	6.7	5.5	3.8	10.0	7.5	4.0	3.0	4.0	3.3	1.4	4.2	10.0	7.5	1.7	-2.4	4.8	4.1	
1991	3.5	0.3	0.0	-2.8	4.4	6.5	2.9	-1.9	5.2	1.6	3.3	-1.3	6.5	-7.2	3.3	0.9	5.6	9.8	0.8	0.1	6.3	2.8	-1.6	-9.9	2.9	0.0	
1992	3.0	0.0	2.0	-10.3	3.8	1.1	3.5	1.1	3.6	-3.9	1.8	-2.1	3.8	-1.9	2.4	-1.4	4.7	-2.1	-1.1	1.1	3.0	4.5	-0.9	-1.1	2.2	-1.0	
1993	-3.3	0.5	1.9	6.7	0.3	5.1	4.5	0.8	-1.9	-0.8	-0.7	0.8	2.2	8.8	-1.2	0.7	2.3	0.2	-0.7	1.0	3.3	-0.7	-0.8	3.9	-0.5	2.4	
1994	1.2	0.5	3.1	3.1	2.9	4.3	2.2	0.4	-0.1	1.0	0.4	1.1	3.4	7.3	1.8	-0.1	-3.6	-7.3	0.4	3.0	2.7	2.2	4.4	3.7	2.0	2.3	
1995	4.6	3.0	5.3	10.2	6.9	1.5	2.7	6.3	5.5	8.2	5.3	2.8	8.1	10.1	5.3	5.9	1.1	3.5	5.9	6.7	5.1	2.8	5.2	-0.1	5.8	3.6	
1996	5.2	0.6	4.7	7.5	1.7	-0.8	6.3	10.2	6.8	0.9	3.6	-0.5	7.1	15.9	5.4	1.2	3.4	-1.7	2.1	6.1	8.9	7.4	6.0	1.8	4.4	1.3	
1997	5.0	5.5	5.3	10.4	1.2	0.2	8.6	9.6	4.8	5.1	2.2	0.2	7.7	10.9	2.5	0.6	4.0	14.1	3.0	6.8	5.2	11.3	5.6	6.1	3.1	2.8	

1970(R) F: 71-VII; EU: CAL

1972(F) EU: CAL

1972(R) DK, L: 73-VIII; EU: CAL

1974(F) DK, D, L: 73-VIII; EU: CAL

1974(R) F: 75-VI

1972(R) EU: 2.4 for EUR9

1973(R) EU: idem for EUR9

1980(R) EU: 2.2 for EUR10

1981(R) EU: -5.6 for EUR10

1985(R) EU: idem for EUR12

1986(R) EU: 3.4 for EUR12

1994(R) EU: 2.5 for EUR15

1995(F) EU: in fact EUR16 (includes Norway)

Table B7: Unemployment rate (% of labour force) - current year

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
1969	2.4	2.3			0.7	0.7									3.0	3.4			1.2	1.3					1.7	1.8
1970	2.0	2.0			0.5	0.5					1.8	1.7			2.9	3.1			1.1	1.2					1.6	1.6
1971	2.0	2.0			0.6	0.7					1.7	1.8			3.1	3.1			1.4	1.5					1.7	1.8
1972	2.3	2.4			0.8	0.9					1.9	2.4			3.2	3.7			2.4	2.4					1.9	2.2
1973	2.3	2.5	0.8	0.8	0.8	1.0					2.2	2.3	6.3	5.9	3.5	3.5			2.3	2.4			2.3	2.5	2.1	2.3
1974	2.6	2.6	1.4	1.8	1.7	2.2					2.7	2.3	6.3	5.7	3.5	2.9			2.8	3.0			2.8	2.5	2.6	2.5
1975	4.1	4.4	2.8	5.2	3.2	4.1					3.8	3.8	8.6	8.0	3.6	3.3	0.5	0.8	4.1	4.3			3.4	3.8	3.6	3.9
1976	5.3	6.1	4.9	5.1	3.8	4.1					4.1	4.4	10.2	9.4	3.8	3.7	0.9	0.4	4.7	4.6			5.0	5.2	4.4	4.5
1977	5.8	7.3	6.0	5.9	3.8	4.0					4.8	5.1	9.6	9.4	3.9	7.2	0.3	0.8	4.4	4.2			5.9	5.7	4.7	5.5
1978	7.1	8.3	7.1	6.7	4.0	3.9					5.6	5.0	8.9	8.9	7.6	7.0	1.4	0.8	4.4	4.2			6.0	5.7	5.8	5.5
1979	8.5	8.6	6.6	5.3	3.5	3.4					5.7	6.1	7.8	7.9	6.8	7.6	0.9	0.7	4.3	4.3			5.7	5.4	5.5	5.6
1980	9.0	9.3	5.8	6.2	3.3	3.4					6.5	6.5	7.6	8.2	8.2	8.1	0.8	0.7	4.5	5.0			6.5	6.9	6.0	6.2
1981	11.0	11.5	8.2	8.5	4.6	4.8	3.2	3.1			7.7	7.6	9.7	8.7	8.4	8.8	0.9	1.0	7.2	7.5			10.5	10.6	7.7	7.9
1982	13.4	12.7	8.9	9.2	6.7	6.8	3.6	6.1			8.7	8.7	10.8	12.4	9.6	12.0	1.3	1.2	9.9	13.1			11.7	11.2	9.2	9.8
1983	14.4	13.4	10.5	10.5	8.7	8.4	7.3	7.8			9.1	9.1	15.3	14.2	12.6	9.7	1.8	1.6	16.0	15.4			12.2	11.7	10.9	10.5
1984	13.7	14.5	10.3	10.0	8.4	8.4	8.5	8.1			10.3	9.9	16.2	16.4	10.6	11.9	1.9	1.7	16.5	14.2			11.6	11.8	11.1	10.9
1985	14.5	13.7	9.1	9.0	8.6	8.4	8.6	8.5			10.7	10.3	17.0	17.1	12.5	13.0	1.7	1.6	13.5	13.1			12.0	11.8	11.2	10.9
1986	13.2	12.7	7.7	7.6	7.7	8.1	9.4	7.4	22.1	21.5	10.6	11.5	17.2	18.3	12.9	13.0	1.4	1.4	12.0	12.1	10.3	8.6	11.8	12.1	10.8	12.0
1987	12.8	12.3	8.0	7.6	7.9	8.1	8.0	7.4	21.3	20.5	11.6	10.9	18.7	19.2	13.0	14.2	1.3	1.6	11.4	11.5	8.5	7.2	11.3	10.8	11.8	11.7
1988	11.6	11.2	7.9	8.4	8.2	8.1	7.6	7.3	20.0	19.5	11.1	10.6	18.7	18.6	14.3	15.0	1.4	1.6	11.1	7.3	6.7	5.8	9.0	8.7	11.3	11.0
1989	10.3	9.5	9.1	6.7	7.2	5.5	7.2	7.6	18.3	16.9	10.5	9.5	18.0	17.0	14.5	11.0	1.4	1.8	6.9	9.3	5.6	5.0	6.8	6.7	10.2	9.0
1990	8.9	8.1	6.7	8.6	6.0	5.1	8.0	7.5	16.3	16.1	8.8	9.0	16.3	15.1	11.0	9.8	1.7	1.7	8.9	8.1	4.9	4.6	6.1	5.7	8.5	8.2
1991	8.4	8.3	9.0	8.6	4.5	4.3	8.7	8.6	16.0	15.9	9.2	9.7	16.1	16.1	9.8	10.3	1.6	2.0	7.8	7.0	4.8	3.8	8.6	9.4	8.7	8.9
1992	9.2	8.2	9.2	9.5	4.4	4.5	9.5	7.7	16.3	18.0	10.2	10.0	17.6	17.8	10.4	10.2	1.9	1.9	7.4	6.7	4.0	4.8	11.0	10.8	9.5	9.5
1993	9.9	9.9	10.7	10.7	9.3	9.3	8.2	8.2	21.8	21.8	11.5	11.5	19.0	19.0	10.7	10.7	2.2	2.2	8.0	8.0	6.1	6.1	11.5	11.5	11.5	11.5
1994	10.3	10.0	9.9	10.2	9.3	8.4	10.1	9.6	23.3	24.1	11.5	12.5	17.8	15.1	12.0	11.4	3.0	3.5	10.2	7.7	6.5	6.9	9.9	9.5	11.6	11.4
1995	9.6	9.9	8.6	6.8	7.8	8.3	9.6	9.1	23.7	22.9	12.1	11.5	14.1	14.4	11.4	11.8	3.6	2.9	7.6	7.3	6.7	7.2	8.3	8.8	10.7	10.9
1996	10.1	9.8	6.1	6.0	9.3	9.0	9.1	9.0	22.5	22.2	11.7	12.3	13.4	12.3	11.8	12.0	3.0	3.1	7.2	6.6	7.4	7.3	8.4	8.2	10.9	11.0
1997	9.5	9.5	5.1	6.1	9.7	9.7	8.9	9.5	21.3	20.9	12.5	12.5	11.7	10.2	12.0	12.1	3.3	3.7	6.0	5.3	7.0	6.4	6.8	7.1	10.6	10.7

1969(F) EU: CAL

1970(F) B: 70-XII EU: CAL

1973(F) DK: 73-VIII EU: CAL

1972(R) EU: 2.5 for EUR9

1980(R) EU: 6.1 for EUR10

From 80-VI: harmonised eurostat definition, before national definition; for EL from 82-VI

1985(R) EU: 11.1 for EUR12

1994(R) EU: 11.2 for EUR15

Table B8: Unemployment rate (% of labour force) - year ahead

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
1969																										
1970																										
1971	2.1	2.0			0.6	0.7					1.9	2.1			2.9	3.1			1.1	1.4					1.7	1.8
1972	2.3	2.4			1.1	0.9					1.9	2.4			3.1	3.7			2.4	2.4					2.0	2.2
1973	2.2	2.5			0.8	1.0					2.5	2.1			3.4	3.5			2.3	2.4					2.1	2.1
1974	2.5	2.7	0.8	2.4	0.8	2.2					2.0	2.3	5.4	5.7	3.2	2.9			2.2	3.0			1.7	2.5	2.0	2.5
1975	3.1	4.5	1.8	5.0	1.5	4.1					2.8	4.1	7.1	8.0	3.5	3.3			3.5	4.3			2.9	3.9	2.7	4.0
1976	5.5	6.1	3.3	5.1	4.4	4.1					4.0	4.4	10.1	9.4	3.9	5.9	0.5	0.4	5.2	4.3			5.7	5.2	4.6	4.9
1977	6.6	6.9	5.6	5.9	3.7	4.0					5.1	5.1	9.5	9.4	4.3	7.2	0.3	0.5	4.4	4.2			5.9	5.6	4.9	5.4
1978	6.6	5.7	6.5	6.6	4.1	3.9					5.4	5.0	9.5	8.7	6.5	7.1	0.5	0.8	4.8	4.2			6.9	5.7	5.8	5.5
1979	7.6	8.6	7.6	5.3	3.7	3.4					5.6	6.1	8.0	7.9	7.0	7.6	1.5	0.7	4.5	4.2			5.7	5.4	5.5	5.6
1980	8.8	9.3	6.1	6.2	3.4	3.4					6.8	6.5	7.8	8.2	8.4	7.4	0.9	0.7	4.3	4.9			6.6	6.9	6.2	6.0
1981	9.8	11.7	6.5	8.4	4.1	4.8					7.0	7.3	10.1	10.3	7.7	8.5	0.8	1.0	5.6	7.5			8.2	10.6	6.8	7.9
1982	11.7	12.6	8.7	9.7	5.5	6.8	3.5	6.1			8.1	8.7	10.9	11.7	8.7	8.7	1.2	1.2	8.7	12.7			11.0	11.1	8.3	9.5
1983	14.8	13.4	9.2	10.5	8.3	8.4	4.0	7.9			9.3	8.4	14.0	14.8	10.5	9.7	1.3	1.6	13.1	15.6			12.5	11.7	10.3	10.4
1984	15.3	14.5	11.8	10.0	8.7	8.4	8.7	8.1			9.7	9.9	16.6	16.1	9.4	12.0	2.4	1.7	17.6	14.2			11.9	11.8	10.9	10.9
1985	13.8	13.7	9.8	8.8	8.5	8.4	8.8	7.8			11.6	10.3	16.3	18.0	10.5	12.9	1.8	1.6	15.9	13.1			11.8	12.0	11.4	10.9
1986	14.5	12.6	8.6	7.6	8.0	8.1	9.0	7.4			10.0	11.1	17.4	18.4	13.1	13.0	1.6	1.4	13.0	12.1			11.7	12.1	11.1	11.0
1987	13.4	12.3	7.7	7.6	7.7	8.1	8.3	7.4	21.5	20.5	10.7	10.8	18.0	19.2	12.8	14.0	1.2	1.6	11.1	11.5	11.1	7.2	12.0	10.6	11.7	11.6
1988	12.1	10.4	8.6	6.4	8.3	6.4	7.5	8.5	20.3	19.6	11.7	10.2	18.2	17.8	14.3	10.6	1.4	2.2	10.9	10.3	6.8	5.6	10.4	8.7	11.7	10.0
1989	11.0	7.3	9.0	8.2	8.2	6.0	7.6	8.1	19.6	15.8	10.8	8.9	18.2	16.5	14.5	10.2	1.3	1.7	10.9	7.4	6.4	4.4	7.2	6.4	10.9	8.5
1990	9.9	8.1	9.3	7.9	7.1	5.1	7.3	7.5	17.5	16.1	10.3	9.0	17.5	15.6	14.1	9.8	1.4	1.6	6.6	8.1	5.6	4.6	6.5	6.4	9.9	8.4
1991	7.6	7.5	8.7	8.9	6.5	4.2	9.6	7.7	15.0	16.3	8.5	9.5	16.6	16.2	10.2	10.2	1.6	1.6	6.9	7.0	5.0	4.1	8.0	9.1	8.8	8.8
1992	8.6	8.2	9.0	9.5	5.0	4.5	9.3	7.7	15.5	18.0	10.1	10.0	18.1	17.8	9.5	10.3	1.6	1.9	7.7	6.7	4.2	4.7	9.8	10.0	9.1	9.3
1993	9.3	9.4	9.5	10.3	8.5	7.0	8.5	9.7	19.5	21.8	10.8	10.8	19.2	18.4	10.6	11.1	2.0	2.6	7.6	8.8	5.4	5.1	12.3	10.4	11.0	10.6
1994	10.7	10.0	10.1	8.2	8.0	8.4	8.3	8.9	22.4	24.1	11.6	12.3	18.7	15.1	11.3	11.4	2.6	3.5	9.1	7.0	6.2	7.0	9.9	9.6	11.2	11.3
1995	9.8	9.9	9.0	7.1	7.0	8.2	10.6	9.1	21.9	22.9	11.0	11.5	16.8	12.4	11.1	11.9	3.2	2.9	9.8	7.3	6.0	7.3	8.5	8.8	10.4	10.9
1996	10.1	9.8	6.2	6.9	8.1	8.9	8.9	9.6	21.7	22.1	11.0	12.4	14.5	11.8	11.3	12.0	3.7	3.3	6.4	6.3	6.8	7.3	8.2	8.2	10.3	10.9
1997	9.9	9.2	6.0	5.5	9.1	10.0	9.0	9.6	21.5	20.8	12.4	12.4	12.0	10.1	12.3	12.1	3.0	2.6	6.3	5.2	7.1	6.8	7.8	7.0	10.8	10.7

1970(R) B: 71-VII; EU: CAL

1972(F) EU: CAL

1972(R) DK: 73-VIII; EU: CAL

1973(F) EU: CAL

1974(F) D, F, I, NL, UK: 73-VIII; EU: CAL

1975(F) D: 74-VIII; EU: CAL

1972(R) EU: 2.4 for EUR9

1973(R) EU: 2.2 idem for EUR9

1980(R) EU: idem for EUR10

1981(R) EU: 7.8 EUR10

1985(R) EU 12.0 for EUR12

1986(R) EU: 11.9 for EUR12

1994(R) EU: idem for EUR15

1995(F) EU: in fact EUR16 (includes Norway)

From 80-VI: harmonised eurostat definition, before national definition; for EL from 82-VI

Table B9: General government balance as % of GDP - current year

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
1969					0.3	1.5					-1.1	0.8			-3.4	-3.4			-1.3	-3.9					-1.1	-0.3
1970					2.3	1.3					-0.8	0.5			-2.7	-3.0			-3.0	-0.5					-0.3	-0.1
1971	-1.9	-2.4			0.9	0.4					0.3	0.0			-2.8	-3.6			-0.3	-0.3					-0.4	-0.9
1972	-4.2	-4.0			-1.4	-0.4					-0.2	0.5			-4.4	-5.6			-0.3	1.1					-1.9	-1.3
1973	-3.6	-3.5			1.3	1.4					-0.2	0.5			-5.9	-7.9			0.7	2.1			-2.0	-2.8	-1.4	-1.7
1974	-2.7	-3.0			0.3	-0.9					0.6	0.5	-6.6	-8.8	-7.9	-5.0	3.1	1.5	0.4	0.9			-1.8	-4.4	-1.8	-2.2
1975	-2.2	-3.3			-4.7	-6.1					0.0	-2.3	-9.4	-13.3	-6.5	-11.0	0.9	0.0	-2.1	-2.3			-6.2	-5.2	-4.1	-5.8
1976	-4.8	-5.3			-5.4	-3.7					-1.9	-0.8	-14.5	-10.0	-8.8	-8.7	-2.9	-0.5	-3.6	-1.8			-5.3	-4.8	-5.2	-4.2
1977	-5.4	-5.4	-1.0	-0.4	-3.1	-2.7					-0.9	-1.3	-10.2	-10.4	-7.6	-9.1	-1.0	-0.7	-1.9	-2.2			-3.8	-3.3	-3.7	-3.3
1978	-5.7	-6.3	-0.4	-0.5	-4.1	-2.7					-1.3	-2.3	-12.7	-10.9	-11.0	-10.6	-1.6	1.8	-3.7	-2.3			-4.2	-3.9	-4.3	-4.0
1979	-7.4	-6.8	-0.9	-1.2	-3.1	-2.9					-1.7	-0.8	-9.2	-12.5	-11.9	-9.4	0.7	1.3	-3.3	-3.3			-3.5	-2.9	-4.2	-3.5
1980	-7.9	-9.3	-1.3	-5.4	-2.8	-3.5					-1.5	0.4	-11.4	-13.2	-10.2	-7.8	0.4	-1.4	-2.8	-2.8			-2.4	-3.7	-3.8	-3.6
1981	-10.9	-13.1	-8.3	-7.2	-4.0	-4.5					-1.6	-1.9	-15.2	-15.1	-8.5	-11.9	-2.9	-1.8	-3.3	-4.6			-2.3	-2.4	-4.3	-5.1
1982	-12.4	-12.7	-8.8	-8.9	-3.9	-3.9	-9.2	-6.4			-2.9	-2.7	-14.4	-15.8	-11.1	-11.9	-1.9	-1.0	-4.2	-6.4			-1.9	-1.7	-5.0	-5.3
1983	-11.7	-11.7	-9.5	-8.0	-3.8	-2.7	-6.5	-9.7			-3.1	-3.3	-13.2	-12.9	-11.3	-11.8	-3.0	-2.2	-6.8	-6.4			-2.2	-3.3	-5.4	-5.5
1984	-10.9	-10.8	-6.5	-4.6	-1.6	-2.3	-10.1	-9.5			-3.3	-2.8	-11.7	-10.2	-12.6	-13.5	-0.7	1.5	-5.8	-5.7			-2.9	-3.7	-5.2	-5.5
1985	-9.6	-9.3	-3.1	-1.9	-1.7	-1.1	-10.7	-13.9			-3.3	-2.6	-11.6	-11.4	-12.9	-14.0	2.0	4.2	-5.3	-5.1			-3.3	-3.1	-5.2	-5.0
1986	-8.9	-8.7	2.4	3.4	-0.7	-1.2	-9.5	-10.3	-5.1	-6.0	-2.4	-2.9	-9.6	-10.7	-12.7	-11.3	3.7	3.9	-5.2	-6.0	-11.2	-8.5	-3.2	-3.2	-4.6	-5.0
1987	-6.5	-7.2	2.4	2.1	-1.7	-1.7	-9.4	-10.3	-5.4	-3.6	-2.8	-2.5	-9.0	-8.5	-10.4	-10.5	2.4	5.6	-6.6	-5.1	-9.0	-8.1	-2.4	-1.4	-4.7	-4.1
1988	-7.0	-6.5	1.3	0.4	-2.6	-2.0	-11.8	-14.3	-3.4	-3.2	-2.4	-1.6	-6.7	-3.4	-10.0	-10.6	6.0	2.6	-5.3	-5.0	-7.9	-6.6	-0.7	0.8	-4.1	-3.6
1989	-6.2	-6.1	0.5	-0.7	-0.3	0.2	-14.5	-17.7	-3.0	-2.1	-1.7	-1.3	-4.6	-3.1	-10.4	-10.2	2.5	3.3	-4.5	-5.1	-6.3	-5.0	1.7	1.6	-3.0	-2.8
1990	-5.9	-6.0	-0.5	-1.5	-0.8	-2.2	-17.7	-18.9	-2.0	-3.7	-1.2	-1.6	-2.8	-3.4	-10.3	-10.6	3.9	4.2	-5.3	-5.7	-7.4	-5.8	0.2	-0.5	-3.3	-4.1
1991	-6.4	-6.2	-1.3	-2.0	-4.7	-3.1	-15.4	-16.5	-2.7	-4.4	-1.6	-1.7	-3.8	-2.3	-10.0	-10.2	1.7	2.5	-4.8	-3.9	-5.5	-6.4	-2.2	-2.0	-4.6	-4.4
1992	-5.9	-6.9	-2.1	-2.4	-3.4	-2.4	-13.2	-13.8	-4.3	-4.5	-2.0	-3.9	-2.5	-2.4	-9.9	-9.5	2.6	-1.6	-4.0	-3.3	-5.4	-5.4	-4.9	-6.2	-4.9	-5.1
1993	-7.0	-7.0	-4.4	-4.6	-4.6	-3.3	-13.1	-16.3	-4.4	-7.3	-5.9	-5.7	-3.4	-2.3	-10.4	-9.5	-2.0	1.4	-3.8	-2.9	-5.7	-7.1	-7.7	-7.7	-6.3	-6.0
1994	-5.4	-5.3	-4.6	-4.0	-3.1	-2.5	-17.9	-12.5	-7.2	-6.6	-5.6	-6.0	-2.5	-2.3	-9.5	-9.0	-0.4	2.3	-3.6	-3.1	-6.2	-5.8	-6.0	-6.9	-5.6	-5.4
1995	-4.2	-4.5	-1.9	-1.4	-2.1	-3.5	-11.3	-9.2	-6.0	-6.2	-4.9	-5.0	-2.8	-2.4	-7.9	-7.1	1.4	0.3	-3.2	-3.4	-5.6	-5.4	-4.8	-6.0	-4.5	-5.0
1996	-3.2	-3.4	-0.9	-1.6	-3.9	-3.8	-8.1	-7.4	-4.8	-4.4	-4.2	-4.1	-2.0	-0.9	-6.3	-6.7	0.7	1.8	-3.5	-2.4	-4.4	-4.1	-4.4	-4.4	-4.4	-4.3
1997	-2.7	-2.1	0.3	0.7	-3.0	-2.7	-4.9	-4.0	-3.0	-2.6	-3.0	-3.0	-1.0	0.9	-3.2	-2.7	1.1	1.7	-2.3	-1.4	-3.0	-2.5	-2.9	-1.9	-2.9	-2.4

1969-72(R)/73(F): government balance only in value and the ratio was calculated, but for 1971(F) and 1969(R) the ratio was available.

1969-76(R)/77(F) EU: CAL

1970(R): 71-VII

1971(F): 71-VII

1972(R) EU: -1.4 for EUR9

1980(R) EU: idem for EUR10

Since 1994-VI: Maastricht definition

1985(R) EU: -5.2 for EUR12

1994(R) EU: -5.5 for EUR15

Table B10: General government balance as % of GDP - year ahead

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
1969																										
1970					0.0	0.7					-1.0	0.5			-2.7	-3.0			-1.0	0.2					-1.0	-0.3
1971	-1.9	-0.2			1.1	0.2					0.3	0.2			-2.2	-4.2			1.1	0.2					-0.1	-0.7
1972	-1.8	-3.7			-0.1	-0.1					-0.3	0.5			-4.8	-6.5			0.5	1.0					-1.2	-1.4
1973	-0.3	-2.8			-0.5	1.5					-0.1	0.5			-5.5	-7.9			0.7	2.4					-1.2	-0.8
1974	-3.2	-2.0			2.1	-1.2					0.4	0.5	-6.5	-9.3	-6.8	-5.0			0.5	1.8			-2.3	-4.5	-0.8	-2.2
1975	-1.9	-3.9			-3.2	-5.9					0.3	-2.3	-8.4	-13.9	-7.5	-11.0	1.8	0.2	0.5	-1.9			-2.1	-5.2	-2.5	-5.3
1976	-3.4	-4.9			-6.5	-3.7					-1.5	-0.8	-14.8	-10.0	-8.6	-8.9	-4.9	-0.5	-3.0	-2.9			-7.6	-5.0	-5.8	-4.4
1977	-5.2	-5.1	-1.3	-0.4	-3.6	-2.6					-1.2	-1.3	-12.4	-9.0	-6.5	-9.1	-2.1	0.6	-2.0	-1.6			-3.8	-3.4	-3.4	-3.2
1978	-5.3	-6.3	-0.3	-0.5	-3.9	-2.7					-1.1	-2.3	-10.2	-10.8	-7.4	-10.6	-1.8	2.8	-2.6	-2.0			-2.9	-3.9	-3.7	-4.0
1979	-5.6	-7.2	-0.8	-3.3	-3.8	-3.0					-1.8	-0.8	-9.0	-12.8	-12.6	-9.4	-0.6	1.0	-3.5	-3.0			-4.3	-3.2	-4.6	-3.6
1980	-7.4	-9.1	-1.6	-6.1	-2.8	-3.5					-1.7	0.4	-7.8	-13.1	-11.4	-7.8	1.0	-1.3	-2.0	-3.7			-2.4	-3.5	-3.9	-3.6
1981	-7.7	-13.4	-3.9	-7.1	-3.3	-4.0					-1.7	-1.5	-12.8	-15.4	-11.0	-11.9	-0.7	-0.8	-1.8	-4.5			-2.3	-2.1	-3.9	-4.9
1982	-12.0	-11.9	-10.8	-9.1	-3.0	-3.5	-3.8	-6.4			-2.8	-2.7	-13.7	-16.2	-9.1	-11.9	-3.6	-2.0	-3.2	-6.9			-1.6	-2.1	-4.4	-5.2
1983	-12.1	-12.2	-9.6	-7.6	-4.1	-2.7	-8.6	-9.2			-3.0	-3.3	-14.4	-12.3	-11.0	-11.8	-1.0	0.0	-5.5	-6.1			-0.5	-3.4	-4.9	-5.5
1984	-11.1	-9.9	-7.8	-4.6	-2.1	-1.9	-6.3	-9.9			-3.3	-2.8	-11.8	-10.1	-10.0	-13.5	-1.5	1.5	-7.1	-6.3			-2.1	-3.8	-4.7	-5.4
1985	-10.5	-8.4	-3.7	-1.9	-0.6	-1.1	-10.1	-13.9			-3.6	-2.6	-10.9	-11.6	-12.2	-14.0	0.9	4.1	-6.0	-5.1			-2.4	-2.8	-4.8	-4.9
1986	-7.4	-8.7	-0.7	3.3	-0.8	-1.2	-10.5	-10.7			-3.3	-3.0	-10.4	-11.2	-12.8	-11.3	1.9	3.9	-6.5	-4.6			-2.8	-2.7	-4.8	-4.3
1987	-6.2	-7.2	2.8	2.1	-0.7	-1.8	-7.1	-9.5	-4.4	-3.6	-2.6	-2.5	-9.9	-8.8	-11.0	-10.5	2.6	5.2	-6.6	-6.2	-7.5	-8.4	-2.5	-1.4	-4.1	-4.2
1988	-6.1	-6.5	1.7	0.2	-2.0	-2.1	-9.8	-14.9	-4.9	-3.2	-2.3	-1.4	-7.5	-3.7	-10.4	-10.6	3.1	2.5	-6.0	-4.9	-7.8	-6.5	-2.0	0.8	-4.5	-3.6
1989	-6.5	-6.6	1.4	-0.8	-1.3	0.2	-13.3	-18.4	-2.9	-2.7	-1.8	-1.5	-5.9	-3.2	-10.0	-10.2	6.1	3.4	-4.5	-5.3	-7.8	-3.8	-0.1	0.9	-3.5	-3.0
1990	-5.7	-5.6	0.7	-1.5	-0.4	-1.9	-20.0	-19.8	-2.4	-4.0	-1.1	-1.6	-1.5	-3.6	-9.8	-10.6	2.8	4.7	-4.2	-5.3	-6.1	-5.8	1.1	-0.7	-2.9	-4.1
1991	-5.9	-6.6	-1.6	-2.0	-4.8	-3.6	-17.1	-15.4	-1.8	-4.9	-1.1	-1.9	-3.5	-2.1	-9.4	-10.2	1.1	-0.8	-4.7	-2.5	-5.6	-6.4	-0.7	-2.8	-4.1	-4.7
1992	-6.2	-6.9	-1.5	-2.6	-3.4	-2.3	-14.0	-13.2	-3.6	-4.6	-1.7	-3.9	-4.1	-2.2	-9.3	-9.5	2.0	-2.5	-4.1	-3.5	-4.6	-5.2	-3.6	-5.9	-4.4	-5.0
1993	-6.0	-6.6	-2.7	-4.4	-3.6	-3.3	-9.8	-13.3	-4.2	-7.5	-3.2	-5.8	-3.0	-2.5	-10.2	-9.5	-1.0	1.1	-3.5	-3.3	-4.8	-7.2	-8.2	-7.8	-5.7	-6.0
1994	-6.4	-5.3	-4.9	-3.8	-4.0	-2.6	-15.4	-11.4	-7.2	-6.6	-5.9	-6.0	-3.2	-2.1	-8.9	-9.0	-2.2	2.2	-4.1	-3.2	-8.2	-5.8	-6.8	-6.8	-6.1	-5.4
1995	-4.7	-4.1	-3.0	-1.6	-2.4	-3.5	-13.3	-9.1	-6.0	-6.6	-4.9	-4.8	-2.0	-2.0	-8.6	-7.1	1.6	1.5	-3.5	-4.0	-5.8	-5.1	-4.6	-5.8	-4.8	-5.0
1996	-3.1	-3.2	-1.3	-0.8	-2.8	-3.4	-8.3	-7.6	-4.7	-4.7	-3.9	-4.1	-2.0	-0.4	-6.0	-6.8	0.6	2.6	-2.7	-2.3	-4.7	-3.2	-3.7	-4.9	-3.8	-4.3
1997	-2.9	-2.0	-0.3	0.5	-2.9	-2.7	-6.5	-4.0	-3.0	-2.6	-3.0	-3.0	-0.9	0.9	-3.3	-2.7	0.5	3.0	-2.5	-0.9	-2.9	-2.5	-3.5	-2.1	-3.0	-2.3

1970-76(R)/78(F) EU: CAL

1970(F) D, F, NL: 69-VI; I: 70-VI

1971(F) B: 71-VII

1971(R) I: 72-VIII

1972(F) B: 71-VII

Since 1994-VI: Maastricht definition

1973(F) I: 72-VIII

1973(R) B, F, IRL, I, L, UK: 74-VIII

1974(F) D: 73-VIII

1975(F) B, F, IRL, I, L, UK: 74-VIII; NL: 74-VI

1976(R) IRL: 77-VI

1977(F) IRL: 76-VII

1978(F) DK, IR: 77-VI

1972(R) EU: idem for EUR9

1973(R) EU: -1.2 idem for EUR9

1980(R) EU: idem for EUR10

1981(R) EU: -4.8 for EUR10

1985(R) EU: -5.1 for EUR12

1986(R) EU: -4.8 for EUR12

1994(R) EU: -5.5 for EUR15

1995(F) EU: in fact EUR16

Table B11: Current account as % of GDP - current year

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union		
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	
1969																											
1970																											
1971	0.4	2.3			1.5	1.4					0.3	0.5			0.0	1.6	-0.9	-2.7	-1.4	-0.3					0.5	1.1	
1972	1.7	3.8			1.7	1.6					0.3	0.9			1.5	0.9	-3.4	-0.9	1.0	2.6					1.1	1.4	
1973	3.7	2.8	-1.4	-1.6	1.6	2.8					0.7	0.7	-4.9	-5.8	-0.2	-1.7	5.9	5.9	2.0	3.0			-0.3	1.4	0.8	0.7	
1974	0.9	0.8	-3.6	-3.1	2.6	2.3					-1.4	-2.2	-8.8	-9.3	-3.6	-4.2	5.2	4.4	1.8	1.9			-3.7	-4.6	-0.5	-1.0	
1975	0.2	1.8	-1.1	-1.5	2.0	0.7					-0.6	-0.1	-6.3	-1.1	-0.7	-0.3	-7.3	-7.3	1.6	2.0			-3.0	-1.7	-0.1	0.1	
1976	1.3	-0.5	-4.4	-4.7	0.5	0.7					-1.1	-1.7	-6.9	-3.7	-0.5	-1.7	-2.6	-4.1	2.6	2.8			-1.5	-1.2	-0.4	-0.6	
1977	0.2	0.0	-3.7	-3.7	0.7	0.7					-0.9	-0.8	-5.3	-1.9	-0.4	0.9	-2.7	-0.8	2.7	0.4			0.2	0.0	0.0	0.0	
1978	0.3	-0.2	-2.3	-2.7	0.6	1.3					-0.6	0.8	-2.9	-2.2	1.0	2.1	18.0	17.9	0.9	-0.9			0.3	0.2	0.3	0.7	
1979	-0.5	-3.3	-2.9	-4.5	0.7	-0.6					0.7	0.3	-4.7	-8.9	1.0	1.4	15.2	19.1	-0.9	-1.3			0.3	-1.2	0.3	-0.4	
1980	-4.8	-5.6	-4.7	-3.8	-1.8	-1.8					-0.7	-1.3	-8.1	-7.4	-0.4	-2.2	16.6	19.9	-0.5	-1.4			-0.3	1.2	-1.0	-1.4	
1981	-7.5	-6.2	-3.8	-3.1	-1.9	-1.0					-1.4	-1.5	-11.9	-11.5	-1.8	-2.0	17.7	16.7	0.7	2.4			0.5	2.9	-1.3	-0.5	
1982	-4.9	-3.8	-3.6	-4.2	0.6	0.4	-1.7	-3.8			-2.0	-2.9	-9.5	-8.2	-1.4	-1.6	39.6	39.5	4.5	2.7			1.0	1.5	-0.4	-0.6	
1983	-2.9	-1.6	-2.7	-2.1	1.0	0.7	-3.3	-4.3			-2.0	-1.6	-3.4	-2.3	-0.6	0.1	38.6	39.0	3.2	2.7			0.2	0.7	-0.2	0.0	
1984	-0.6	-0.5	-2.2	-3.2	1.2	0.9	-4.7	-4.0			-1.0	-0.7	-0.9	-5.2	0.2	-0.9	37.7	38.1	3.5	4.0			0.7	0.0	0.4	0.1	
1985	0.5	0.6	-2.7	-4.4	1.6	2.2	-4.3	-8.7			-0.3	-0.8	-4.2	-3.2	-1.3	-1.1	36.1	29.4	4.4	4.6			0.7	0.8	0.4	0.4	
1986	1.9	2.5	-2.5	-4.7	2.4	3.9	-5.0	-5.4	4.0	1.9	0.6	-0.2	-1.3	-1.8	1.0	0.8	31.5	41.5	4.0	2.9	2.0	3.9	0.1	-0.3	1.1	1.1	
1987	3.5	2.0	-3.3	-3.0	2.8	3.9	-4.7	-2.1	0.7	0.1	-0.4	-0.3	-1.4	1.3	0.5	-0.1	39.7	39.9	1.6	1.6	1.0	1.8	-0.8	-0.4	0.7	1.0	
1988	2.1	1.0	-2.4	-1.7	3.3	4.1	-2.5	-1.9	-0.8	-1.1	-0.2	-0.3	2.1	2.1	-0.3	-0.6	38.3	31.6	1.6	2.4	0.9	-1.4	-1.2	-3.2	0.6	0.4	
1989	0.4	1.0	-1.7	-1.8	4.3	4.5	-2.1	-4.9	-2.5	-2.9	-0.5	-0.4	1.8	1.6	-1.0	-1.3	27.9	32.1	1.6	3.2	-3.9	-1.2	-3.3	-4.1	0.0	0.0	
1990	1.0	0.7	-1.3	0.8	4.3	3.0	-4.6	-5.7	-3.6	-3.5	-0.3	-1.0	1.2	2.7	-1.1	-1.4	30.0	29.3	3.0	4.0	-1.2	-0.1	-3.0	-2.3	0.2	-0.2	
1991	1.1	1.4	1.6	1.3	-0.1	0.8	-5.0	-5.1	-2.9	-3.5	-0.9	-0.6	2.2	4.9	-1.3	-1.8	26.4	25.9	4.0	3.8	-1.2	-1.0	-1.1	-0.8	-0.6	-0.4	
1992	1.4	1.8	1.7	2.9	0.3	0.3	-3.4	-4.4	-3.3	-3.9	-0.4	0.1	5.8	5.9	-2.0	-2.1	27.7	27.7	3.9	3.4	-1.0	-0.3	-0.9	-2.0	-0.5	-0.6	
1993	1.4	3.0	2.6	3.6	-1.6	-0.9	-3.7	-3.6	-3.3	-1.8	-0.1	0.9	4.7	5.8	-1.4	1.1	25.9	28.3	3.0	3.8	-2.9	-1.2	-2.5	-1.7	-1.1	0.1	
1994	5.1	5.1	1.9	1.9	-1.8	-1.8	-2.4	-2.4	-1.8	-1.8	1.0	1.0	7.0	7.0	1.5	1.5	27.4	27.4	4.6	4.6	-1.9	-1.9	0.0	0.0	0.2	0.2	
1995	5.8	5.0	1.4	0.4	-1.8	-1.0	-2.3	-2.7	-1.9	0.3	0.9	1.8	6.9	6.6	2.7	2.3	26.1	17.5	4.7	4.8	-0.2	-0.4	-0.2	-1.0	0.3	0.7	
1996	4.6	4.5	0.6	0.6	-0.9	-1.2	-2.8	-3.5	0.0	0.7	1.6	1.9	6.3	4.0	2.5	3.5	16.3	17.6	5.0	5.3	-1.1	-2.4	-1.1	0.0	0.7	1.0	
1997	4.6	4.9	0.8	0.1	-0.9	-0.6	-3.7	-2.3	1.0	0.6	2.1	2.9	4.2	3.9	4.1	3.1	18.3	14.4	4.8	5.8	-2.0	-2.8	-0.9	0.3	1.1	1.4	

1971-82(F,R): mostly in USD or national currency and the ratio had to be calculated

1978(F) L: obtained by imputing the bias of 0.1 (change in method; original: 1.6)

1972(R): 73-VIII

1973(F): 73-VIII 1974(R) L: 75-IX

1972(R) EU: 1.3 for EUR9

1980(R) EU: -1.2 for EUR10

1971(F, R): not current account but external balance in goods and services

1983(F) L: obtained by imputing the bias of 0.1 (change in method; original: 15.8)

1985(R) EU: 0.5 for EUR12

1994(R) EU: idem for EUR15

Table B12: Current account as % of GDP - year ahead

	Belgium		Denmark		Germany		Greece		Spain		France		Ireland		Italy		Luxembourg		Netherlands		Portugal		Un. Kingd.		Eur. Union		
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	
1969																											
1970																											
1971	0.2	3.1			0.2	1.3					-0.2	0.8			-0.6	1.6			-0.5	-0.2					-0.2	1.2	
1972	0.9	3.1			1.2	0.1					-0.7	-0.2			0.0	0.0			0.3	2.1					0.3	0.3	
1973	2.6	2.8			1.0	2.7					0.9	0.7			1.5	-1.7	1.5	6.4	1.6	2.9					1.2	1.3	
1974	2.6	1.5	-1.1	-3.5	1.5	2.4					-0.5	2.5	-5.4	-10.4	0.0	-5.3	5.3	4.4	-0.8	2.4			1.8	-4.6	0.7	-1.4	
1975	0.4	-0.4	-1.9	-4.6	3.5	0.7					-1.2	-1.9	-9.9	-4.5	-2.6	-1.6	4.6	-6.7	3.0	3.0			-3.1	-1.6	-0.1	-0.7	
1976	1.2	-0.4	-2.1	-5.1	0.8	0.7					-0.6	-1.6	-2.9	-3.4	-0.7	-1.6	-8.8	-4.7	1.9	2.8			-1.2	-1.2	-0.1	-0.6	
1977	0.0	-0.1	-3.3	3.8	0.7	0.8					-1.3	-0.8	-4.1	-2.0	0.4	0.9	0.0	-0.8	3.5	0.4			-0.7	0.2	0.0	0.3	
1978	0.4	-1.6	-2.7	-2.7	0.6	1.5					-0.5	0.8	-5.7	-2.2	0.3	2.1	14.7	15.4	1.8	-0.6			0.3	0.6	0.2	0.7	
1979	-0.2	-3.0	1.7	-4.6	0.9	-0.7					0.3	0.1	-2.4	-8.8	1.2	1.4	15.2	19.1	-0.3	-1.3			0.0	-1.2	0.6	-0.4	
1980	-2.2	-5.1	-4.1	-3.8	-0.5	-1.8					-0.2	-1.3	-6.9	-7.2	1.1	-2.2	16.0	13.1	0.0	-1.4			-0.1	1.2	-0.2	-1.4	
1981	-5.1	-5.3	-4.5	-3.1	-1.4	-1.1					-1.0	-2.0	-5.4	-11.5	-0.7	-2.0	13.7	16.7	-0.9	2.3			0.2	2.4	-1.0	-0.9	
1982	-7.3	-3.6	-3.3	-4.2	-0.5	0.5	-2.5	-3.8			-1.7	-2.9	-10.7	-8.3	-1.3	-1.6	14.0	38.8	2.5	2.7			0.2	1.5	-1.0	-0.6	
1983	-3.3	-0.9	-3.9	-2.1	0.3	0.7	-2.1	-4.5			-2.0	-1.5	-7.7	-5.9	-0.5	0.1	38.3	39.0	5.4	2.8			-0.3	1.0	-0.5	0.1	
1984	-1.5	-0.3	-1.3	-3.2	0.9	1.0	-5.5	-4.0			-1.2	-0.7	-0.6	-5.1	-0.2	-0.9	36.3	33.2	4.4	4.1			-0.2	0.3	0.0	0.1	
1985	0.5	0.4	-2.2	-4.4	1.1	2.2	-4.9	-8.4			-0.7	-0.8	-3.3	-3.2	0.0	-1.1	37.5	29.6	4.4	4.3			0.2	1.0	0.4	0.4	
1986	2.0	2.4	-2.7	-5.1	2.0	4.1	-4.1	-5.4			-0.3	0.6	-2.0	-1.8	-1.1	0.8	30.8	40.4	4.5	2.8			0.9	-0.3	0.6	1.4	
1987	2.8	1.9	-3.6	-3.0	2.1	4.0	-3.7	-3.4	3.7	0.1	0.4	-0.3	-1.3	1.3	0.9	-0.1	30.7	38.0	2.8	1.7	4.2	1.8	-0.6	-0.6	0.9	1.0	
1988	2.3	1.0	-2.2	-1.8	3.2	4.1	-4.1	-1.5	-0.4	-1.1	0.0	-0.4	-0.3	2.0	0.0	-0.6	37.8	16.4	1.8	2.4	-1.0	-1.4	-0.8	-3.2	0.8	0.3	
1989	1.9	1.0	-2.3	-1.3	4.2	4.7	-3.7	-4.8	-2.1	-2.9	0.1	-0.2	3.5	1.6	-0.6	-1.3	36.5	31.5	1.8	3.6	-1.7	-1.2	-3.4	-3.7	0.3	0.2	
1990	0.8	1.0	-1.1	0.8	5.8	3.2	-3.5	-6.1	-4.0	-3.5	-0.5	-1.0	1.8	3.4	-1.4	-1.4	14.5	31.2	2.1	3.8	-3.4	-0.3	-3.3	-2.6	0.2	-0.2	
1991	-0.3	1.7	0.3	1.3	0.7	1.2	-5.1	-5.1	-4.0	-3.5	-0.4	-0.5	0.4	6.0	-1.7	-1.9	24.1	27.9	3.4	3.9	-1.7	-3.5	-2.0	-1.8	-0.8	-0.5	
1992	1.1	1.8	2.2	3.0	1.2	1.6	-3.4	-4.4	-3.2	-3.7	-0.8	0.2	2.0	3.6	-1.5	-2.1	26.1	27.6	4.4	3.2	-1.5	-2.1	-1.4	-2.3	-0.5	-0.3	
1993	1.8	4.6	3.0	3.7	-1.1	-1.2	-3.0	-3.6	-3.4	-1.9	0.2	0.9	6.6	6.5	-1.8	1.1	18.7	28.9	3.8	3.7	-2.3	-4.0	-2.9	-2.5	-0.9	-0.1	
1994	1.1	4.3	2.7	2.0	-0.8	-1.3	-4.1	-2.5	-2.4	-1.8	0.3	1.1	5.4	5.1	0.9	1.8	25.0	30.0	3.5	4.4	-2.8	-1.4	-2.0	-2.2	-0.3	0.1	
1995	5.0	4.5	2.2	0.6	-1.1	-1.2	-2.6	-2.7	-1.6	0.9	0.5	1.5	6.0	4.3	2.6	2.5	28.5	18.0	4.2	5.2	1.1	-0.2	-0.4	-0.4	0.5	0.7	
1996	5.0	4.5	1.9	0.8	-1.0	-1.2	-2.9	-2.6	-1.4	0.3	1.3	1.6	6.1	3.8	2.5	3.5	28.6	16.0	4.8	5.7	-2.0	-2.5	-1.1	-0.1	0.6	0.9	
1997	4.5	5.0	1.1	0.3	-0.4	-0.6	-3.2	-2.6	1.2	0.4	1.7	3.1	3.4	4.1	5.1	3.2	15.9	14.1	5.1	5.8	-1.0	-2.0	-0.5	1.0	1.4	1.5	

1978(F) L: obtained by imputing the bias of -0.7 (change in method; original: -3.4)

1983(F) L: obtained by imputing the bias of -0.7 (change in method; original: 15.8)

1971-1983(F,R): mostly in USD or national currency and the ratio had to be calculated

1974(F) DK, D, IRL, L: 73-VIII

1977(F) B: B+L; L: 76-VII

1973(R) EU: 0.7 idem for EUR9

1985(R) EU: 0.5 for EUR12

1975(F) L: 74-VIII

1977(R) L: 78-VI

1980(R) EU: -1.2 for EUR10

1986(R) EU: 1.5 for EUR12

1975(R) B: B+L; L: 76-VII

1972(R) EU: idem for EUR9

1981(R) EU: -0.7 EUR10

1994(R) EU: idem for EUR15

1995(F) EU: in fact EUR16

Table B13: International context^a - current year

	US		Japan		World		Rest world		European Union								
	Real GDP				Import volume				Volumes				Prices				
	F		R		F		R		Export		Import		Export		Import		
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	
1969										10.5	13.7	13.6	16.0	1.4	2.4	1.1	3.0
1970										10.4	10.5	12.3	12.9	3.0	4.4	2.8	3.2
1971										7.6	7.9	7.6	6.6	2.1	2.6	2.6	3.0
1972										6.8	10.4	7.0	10.0	2.0	1.7	1.2	0.5
1973										12.1	12.4	12.5	12.1	4.6	8.8	6.4	13.3
1974	0.5	-2.2	2.0	-1.8	5.5	8.0	6.0	8.5	8.9	8.7	5.5	0.6	15.6	25.6	26.9	45.3	
1975	-5.0	-2.0	0.0	2.0	1.5	-8.5	1.5	-9.5	1.3	-5.1	0.0	-6.8	12.1	10.1	8.1	5.9	
1976	7.0	6.2	4.5	5.8	7.5	10.0	7.5	8.5	9.5	10.2	8.2	12.6	10.9	10.8	14.6	14.0	
1977	5.0	4.9	5.5	5.0	7.0	4.5	8.0	5.0	7.6	4.5	4.6	1.1	9.5	9.8	10.7	10.0	
1978	4.0	4.0	5.5	5.6	4.5	4.8	4.5	4.5	4.3	5.0	5.3	6.2	3.8	6.6	1.6	-0.4	
1979	2.5	2.3	5.3	5.9	4.8	6.7	4.0	4.7	5.4	6.5	6.4	10.7	4.7	9.2	5.0	10.6	
1980	-0.7	-0.2	4.3	4.2	3.0	2.0	3.4	1.7	4.0	1.8	2.5	2.4	12.5	12.0	17.0	15.6	
1981	1.6	2.0	3.5	2.9	-0.2	0.1	1.4	2.3	0.1	3.5	-3.0	-3.7	11.6	11.0	14.7	15.2	
1982	-1.7	-2.2	2.3	2.9	3.4	-0.9	3.0	-2.6	4.6	0.8	3.9	2.3	8.1	8.6	6.9	5.8	
1983	2.4	3.3	3.3	2.9	0.5	2.0	0.2	1.7	0.5	0.8	0.9	2.7	4.3	4.4	2.4	2.7	
1984	5.9	6.8	4.7	5.9	6.7	9.3	7.3	10.2	6.9	7.9	5.6	7.3	5.4	6.8	5.2	7.8	
1985	2.7	2.2	5.1	4.6	5.3	3.3	5.6	1.9	6.4	5.6	4.5	5.5	5.0	4.3	5.4	3.2	
1986	2.5	2.5	3.2	2.5	3.8	4.7	2.3	3.6	2.9	2.1	6.2	6.7	-6.0	-6.9	-12.6	-14.6	
1987	2.3	2.9	2.7	4.2	3.7	5.6	2.5	4.2	2.2	3.8	5.8	8.0	-2.0	-1.5	-3.7	-3.8	
1988	3.1	3.9	4.6	5.7	6.5	9.6	6.6	9.8	3.6	5.8	6.2	9.1	0.6	3.1	-0.2	1.9	
1989	2.6	3.0	4.3	4.8	6.8	7.9	6.5	7.4	6.3	8.3	7.2	8.7	6.3	5.4	6.6	6.2	
1990	2.1	1.0	4.2	5.6	6.1	4.6	5.8	4.1	7.1	4.4	6.7	5.5	1.5	-0.4	0.4	-1.1	
1991	0.1	-0.7	3.8	4.4	3.3	3.3	2.8	2.2	2.1	5.5	4.0	5.5	1.1	0.2	0.4	-0.6	
1992	1.9	2.1	1.7	1.3	4.4	4.8	4.7	6.1	4.5	4.3	4.3	3.3	0.9	-0.7	0.2	-2.4	
1993	2.6	3.0	0.6	0.1	3.8	3.5	6.0	9.0	1.0	-0.9	0.7	-4.6	2.2	2.2	3.1	-0.3	
1994	3.7	4.1	0.8	0.6	6.2	10.1	8.2	11.6	5.5	9.4	3.2	7.3	2.3	1.8	2.4	2.4	
1995	3.2	2.0	1.6	0.9	8.6	9.2	9.6	11.0	7.9	7.3	7.1	6.2	0.8	2.7	0.7	2.5	
1996	2.1	2.4	2.9	3.6	6.6	6.0	8.2	7.4	4.1	4.5	4.1	3.8	2.0	1.5	1.9	1.1	
1997	2.8	3.8	1.6	1.0	7.1	9.6	7.9	10.4	6.2	9.3	5.8	8.4	1.3	1.3	1.6	1.8	

Notes on EU export volumes:

1972(R) EU: 8.1 for EUR9

1980(R) EU: 2.3 for EUR10

1985(R) EU: 5.7 for EUR12

1994(R) EU: 9.6 for EUR15

Notes on EU import volumes:

1972(R) EU: 9.8 for EUR9

1980(R) EU: idem for EUR10

1985(R) EU: idem for EUR12

1994(R) EU: 7.7 for EUR15

Notes on EU export prices:

1972(R) EU: 2.4 for EUR9

1980(R) EU: 11.4 for EUR10

1985(R) EU: 3.8 for EUR12

1994(R) EU: 1.4 for EUR15

Notes on EU import prices:

1972(R) EU: 1.5 for EUR9

1980(R) EU: 13.9 for EUR10

1985(R) EU: 2.4 for EUR12

1994(R) EU: 1.9 for EUR15

^a: Annual percentage change; trade data: goods only, EU includes intra trade

Notes on all 1969-1973(F,R): occasionally goods and services when goods only were not available

trade variables: 1969-1977(F,R) EU: CAL

1981(R): 81-I

1974,1975(F) World: approximated

1982(F): 81-I

1974(R) World: approximated

Table B14: International context^a - year ahead

	US		Japan		World		Rest world		European Union								
	Real GDP				Import volume				Volumes				Prices				
	F	R	F	R	F	R	F	R	Export		Import		Export		Import		
										F	R	F	R	F	R	F	R
1969																	
1970										9.2	10.2	12.2	1.8	1.7	5.4	1.4	4.6
1971										8.7	8.4	10.3	8.1	3.3	2.8	1.1	2.9
1972										5.9	10.7	6.0	10.2	1.9	1.6	1.3	0.7
1973										9.9	13.9	10.6	12.8	2.8	6.7	3.4	10.6
1974					5.0	5.5	8.0	8.5		9.8	9.1	8.6	1.8	6.0	25.3	8.4	42.1
1975	0.5	-1.8	5.0	2.1	7.0	-4.0	7.0	-3.0		5.9	-5.3	4.2	-2.3	11.4	10.2	10.6	5.0
1976	5.0	6.3	6.0	6.0	5.0	11.0	4.5	9.0		5.4	10.6	6.1	12.7	8.5	10.7	8.9	13.9
1977	5.0	4.9	6.0	5.1	6.5	4.5	7.0	5.5		7.8	4.7	3.8	1.2	9.4	9.5	10.0	10.0
1978	4.5	4.0	6.0	5.6	7.0	5.1	7.0	4.6		6.5	5.1	6.0	6.2	5.8	2.6	5.6	-0.5
1979	2.8	2.3	5.3	6.0	4.8	6.6	4.5	4.5		4.6	6.6	5.3	10.8	4.7	9.2	4.1	10.5
1980	0.0	-0.2	4.5	4.1	3.7	1.9	3.3	1.9		4.2	1.9	3.3	1.9	8.2	11.8	9.4	15.8
1981	0.1	2.0	3.9	3.0	1.9	2.1	2.5	4.6		2.1	4.1	0.7	-2.8	8.5	11.4	8.2	15.3
1982	1.5	-1.7	4.8	2.9	4.3	-0.7	4.4	-2.3		5.9	0.8	4.3	2.5	9.3	8.6	9.8	5.8
1983	2.0	3.3	3.3	2.9	2.1	1.9	1.7	1.7		2.7	2.6	2.6	2.3	7.5	4.2	6.4	2.8
1984	4.3	6.8	3.6	5.7	3.7	9.3	4.6	10.4		3.5	7.7	2.1	7.1	5.1	6.7	6.0	7.5
1985	3.0	2.8	4.4	4.5	5.2	3.4	5.6	2.2		6.0	5.5	4.4	5.4	3.9	4.2	4.0	3.2
1986	2.5	2.9	4.2	2.4	4.8	4.9	4.5	3.8		4.8	1.9	6.1	5.7	-0.2	-6.0	-1.2	-12.6
1987	2.3	3.4	2.4	4.2	4.4	6.1	3.1	5.0		3.7	3.5	6.4	8.0	-1.6	-1.4	-2.8	-3.7
1988	2.7	4.4	3.5	5.8	3.9	9.5	3.5	9.8		3.3	6.2	4.6	9.1	1.5	2.5	1.6	1.6
1989	2.3	3.0	3.8	4.8	6.0	7.7	5.7	7.3		5.5	8.0	6.4	9.1	3.4	5.3	3.6	6.1
1990	2.0	0.9	4.2	5.6	6.1	3.5	6.1	1.6		6.7	6.0	6.2	5.9	3.7	0.3	3.8	-0.4
1991	0.3	-1.3	4.2	4.4	4.6	3.1	4.3	2.5		5.3	5.7	5.2	5.1	3.7	0.4	3.6	0.2
1992	2.1	2.6	3.5	1.4	5.1	5.0	5.1	6.5		5.4	4.2	5.1	3.4	2.7	-0.3	2.8	-1.6
1993	2.4	3.0	1.5	0.1	4.3	4.3	5.7	9.9		3.7	-0.2	2.3	-4.2	2.8	2.7	4.1	2.0
1994	2.6	4.1	1.3	0.5	5.5	10.4	7.5	11.5		3.7	9.6	3.0	8.0	2.5	1.2	2.9	2.4
1995	2.7	2.0	2.2	0.8	7.6	9.8	8.2	11.0		7.5	8.2	6.6	7.0	2.0	4.0	2.2	4.2
1996	2.3	2.8	2.3	3.5	8.0	7.7	9.2	9.9		6.6	4.8	6.0	4.0	2.6	0.6	2.7	0.2
1997	2.3	4.0	1.8	0.9	7.0	10.2	8.1	10.9		6.0	9.9	5.3	9.0	1.8	0.7	1.7	0.9

Notes on EU export volumes:

1972(R) EU: 8.5 for EUR9
 1973(R) EU: 13.4 idem for EUR9
 1980(R) EU: 2.4 for EUR10
 1981(R) EU: 4.0 EUR10
 1985(R) EU: 5.6 for EUR12
 1986(R) EU: 2.0 for EUR12
 1994(R) EU: 9.9 for EUR15

Notes on EU import volumes:

1972(R) EU: 10.3 for EUR9
 1973(R) EU: 13.1 idem for EUR9
 1980(R) EU: idem for EUR10
 1981(R) EU: -2.6 EUR10
 1985(R) EU: 5.5 for EUR12
 1986(R) EU: 6.7 for EUR12
 1994(R) EU: 8.4 for EUR15

Notes on EU export prices:

1972(R) EU: 2.3 for EUR9
 1973(R) EU: 8.0 for EUR9
 1980(R) EU: 11.2 for EUR10
 1981(R) EU: 11.0 EUR10
 1985(R) EU: 3.9 for EUR12
 1986(R) EU: -6.8 for EUR12
 1994(R) EU: 1.3 for EUR15

Notes on EU import prices:

1972(R) EU: 1.2 for EUR9
 1973(R) EU: 13.6 for EUR9
 1980(R) EU: 13.4 for EUR10
 1981(R) EU: 13.7 EUR10
 1985(R) EU: 2.3 for EUR12
 1986(R) EU: -14.5 for EUR12
 1994(R) EU: idem for EUR15

^a: Annual percentage change; trade data: goods only

Notes on all trade variables: 1970-1973(F,R): occasionally goods and services when goods only were not available
 1989-1997(R): The outturn data for the import volumes of the World and the Rest of the World and for the EU export and import prices are latest available data.
 From 90-XI onwards first settled estimates were dropped as t+2 forecasts were added in the published tabled.

1970-1977(F,R) EU: CAL

1995(F) EU: in fact EUR16

1975(F) World: 74-VIII