Chapter 1

Euro Area Macroeconomic Outlook and Forecasts

Annex A

I. Inflation

In the previous EFN report, the inflation forecasts were constructed using information relating to the HICP up to February 2003 and they were characterised by a stable year-on-year core inflation rate of around 2% in 2003 and 2004. For total inflation, a peak was forecast for March 2003 (2.5%) followed by a slight reduction to a mean rate of 1.8% for 2004.

New figures are now available from March to August. The inflation peak occurred in March but one tenth of a percentage point lower than the forecast value (see figure 1). During the following five months inflation expectations maintained an improvement, which is difficult to evaluate properly, because on the one hand there have been HICP data revisions and, on the other, and still more important, it is now clear that service prices, as it is explained in box 1, registered changes in their seasonal behaviour in 2001 and 2002 which also affect the annual inflation rates of those years. With an econometric modelling which includes those changes the new forecasts are slightly lower than those published in the previous report. These updates as due to innovations in many components of the HICP in the observed values corresponding to July and also to the absence of atypical increments of the type occurred in the two previous years. Nevertheless, total inflation in August performed worse than our forecasts, registering a month-on-month rate of 0.2% instead of the null value expected. These upward innovations have been observed in the sectors with higher inflation, like services, unprocessed food and energy. This will increase the evolution of inflation in the EMU.

Figure 1 shows the path forecasts for total inflation made at different points in time. It can be seen that drops and increases in inflation during 2001-2003 have been forecast many months ahead and the observed path lies between the expectations estimated in April 2002 and those estimated in February 2003.

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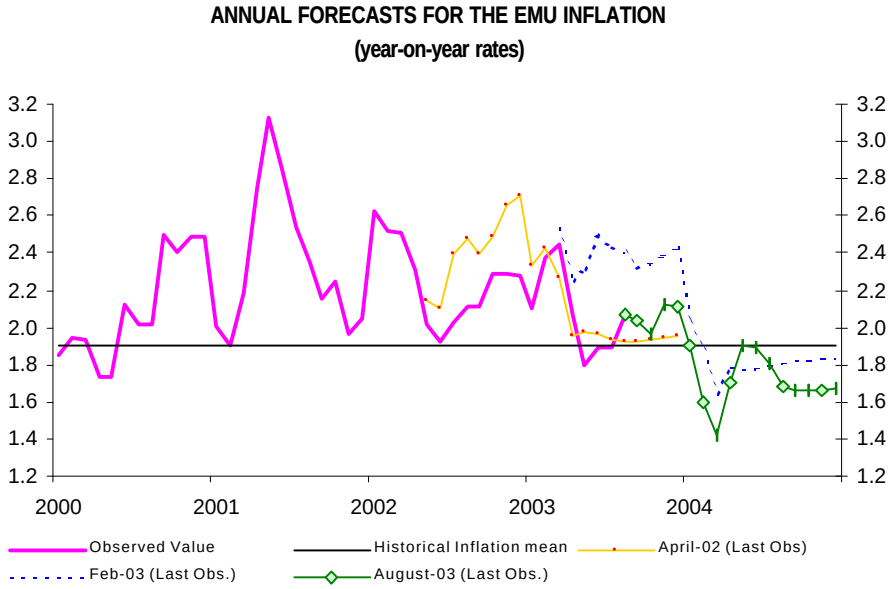
Figure 1.



Source: Eurostat & EFN
Date: September 18, 2003

BOX 1: CHANGES IN THE SEASONAL FLUCTUATIONS OF CERTAIN SERVICE PRICES IN GERMANY AND THEIR IMPACT ON THE EURO ZONE HICP.

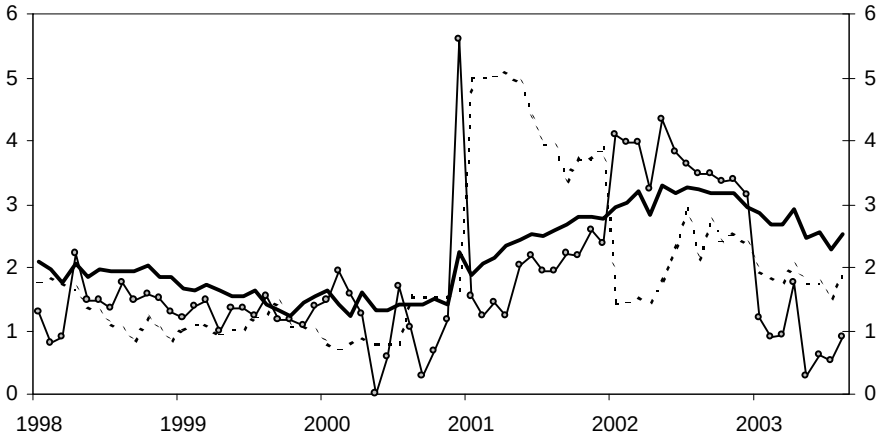
In the last few months, some forecasting errors outside the standard confidence bands in the price index for services in the EMU have been observed. A careful analysis of the different service prices by country and sector shows that these errors are mainly due to the behaviour of recreational and cultural service prices and restaurants and hotel prices in Germany. (see figure 2)

These two time series experienced seasonal changes in 2000, and have since shown a sharp peak in December. The results for German data have been used to improve the specifications of the models for EMU price indexes. The new estimations for these indexes have also provided more appropriate results for Easter and euro-rounding effects.

Comparing observed data with the forecasts with the new models, the following conclusion emerges. The moderation in the year-on-year inflation rate in the service sector of the EMU, which took place last May, is not mainly due to innovations in the month's observed values, but to the absence of atypical increments of the type occurred in previous years in two specific sectors of the German economy.

Figure 2

YEAR-ON-YEAR HARMONISED INFLATION RATES FOR CERTAIN SERVICES IN GERMANY AND FOR TOTAL SERVICES IN THE EMU



Source: Eurostat & IFL Date: September 17 / 2003

One important economic event occurring in recent months was the appreciation of the euro. An econometric analysis (see box 2), of the effects of nominal and real effective exchange rates on inflation shows that once international crude prices in euros are included in the model, the exchange rate has a small effect on harmonised inflation bordering on the usual significant levels and finally they are not included in our inflation forecasting models. The question is that an appreciation of the euro reduces import prices but it can favour a monetary policy with lower interest rates, as has been the case, generating a force for higher inflation. In our inflation models, the past performance of the system is incorporated in prices lags. Therefore the given inflation forecasts for 2003 and 2004 are implicitly assuming that the evolution of exchange rates and monetary policy variables in those years will be compatible with their performance in the past.

BOX 2: THE EFFECT OF CURRENT APPRECIATION OF THE EURO ON TOTAL INFLATION IN THE EMU.

In order to analyse the effect of current appreciation of the euro against the US dollar and other currencies on total inflation in the EMU, a study of the relationships between the nominal effective exchange rate or the real effective exchange rate and each of the seven components into which the HICP has been broken down is done.

Total HICP is broken down into the following components: processed food, tobacco, non-energy industrial goods, services, unprocessed food and energy. This last component is also disaggregated into fuel and elgas, which includes electricity and gas prices. For all these

components except fuel, we first consider linear univariate time series models, and for fuel non-linear models with leading indicators. We now add the effective exchange rate to all the above models as an explanatory variable.

The ECB publishes nominal and real effective exchange rates for the euro against the currencies of a narrow group of major trading partners: United States, Japan, Switzerland, United Kingdom, Sweden, Denmark, Norway, Canada, Australia, Hong-Kong, Korea and Singapore, and against a broad group, which includes 26 emerging economies in addition to the twelve countries covered in the narrow index. This last measure has the limitation that data on price deflators is not available for a number of emerging economies. Therefore, in this study, we have considered the nominal and real effective exchange rates for the euro against the currencies of the narrow group of major trading partners, analysing their effect on each component of total inflation in the EMU.

The results show that both the nominal and real effective exchange rates have a small effect on harmonised inflation bordering on the usual significant levels. Note that the model for domestic fuel prices already includes international crude prices in euros as an explanatory variable. Therefore, in our models, exchanges rates do not play a significant role in forecasting. This means that the effect of the effective exchange rate is more complex and difficult to analyse. Thus, exchange rates can lower interest rates, as has been the case, generating a force for higher inflation. The fact that in our time series models we do not find a direct effect of the exchange rate means that in forecasting inflation in 2003 and 2004 our models rely on the past performance of the system that is finally incorporated in price lags. Therefore our inflation forecasts for 2003 and 2004 are implicitly assuming that the evolution of exchange rates and monetary policy variables in those years will be compatible with their performance in the past.

The inflation forecasts for the euro area conceal a different inflation situation through countries in observed values and in expectations. Thus the expectations for 2004 go from 0.9% in Germany (including the increase in tobacco taxes) to 3.8% in Ireland. Consequently (see table 1), the actual interest rates calculated by forecasting at the proper horizon of annual inflation rates show a large discrepancy, with one-year actual interest rates going from a negative 1.7% rate in Ireland to a positive 1.5% in Germany. This differential of around three percentage points shows that countries in the euro area are facing different investment situations.

Table 1.

	INFLATION EXPECTATIONS		ACTUAL INTEREST RATES	
	Three Months	One Year	Three Months	One Year
Italy	2.23	2.23	-0.07	0.08
France	2.00	2.01	0.16	0.29
Germany	0.87	0.85	1.29	1.45
Belgium	2.27	2.25	-0.12	0.05
Netherlands	2.72	2.75	-0.56	-0.45
Portugal	3.05	3.10	-0.90	-0.80
Austria	1.19	1.20	0.96	1.10
Finland	1.11	1.12	1.04	1.18
Ireland	3.98	3.99	-1.82	-1.69
Luxembourg	2.22	2.20	-0.07	0.10
Spain	3.32	3.30	-1.17	-1.00
Greece	2.85	2.83	-0.70	-0.52

Source: ECB, Eurostat and EFN
Date: September 19, 2003

Comparing inflation between the US and the EMU, using a similar index in both cases[1], we can observe that in 2002 US inflation was 0.9%, but a positive differential is expected in 2003 and a practically null differential is forecast for 2004 (see table 2).

[1] This implies the exclusion form CPI for US the owner´s equivalent rent of primary residence.

Table 2: Inflation Rates in the EMU and US

(year on year)*

	1998	1999	2000	2001	2002	Forecasts 2003	Forecasts 2004
TOTAL INFLATION							
Euro-zone (100%).	1.1	1.1	2.1	2.3	2.3	2.1	1.7
USA (81.5%). (1)	1.1	2.1	3.5	2.6	0.9	2.2	1.5
A HOMOGENEOUS MEASURE OF CORE INFLATION (2)							
Services and Non-energy industrial goods excluding food and tobacco.							
Euro-zone (72.46%).	1.4	1.0	1.0	1.9	2.4	1.8	1.8
USA (55.6%).(1)	1.8	1.4	2.1	2.1	1.6	1.1	1.5
DIFFERENT COMPONENTS OF THE HOMOGENEOUS MEASURE OF CORE INFLATION							
(1) Services.							
Euro-zone (40.91%).	1.9	1.5	1.5	2.5	3.1	2.6	2.6
USA (27.4%).(1)	2.9	2.7	3.5	3.6	3.6	3.2	3.2
(2) Non-energy industrial goods excluding food and tobacco.							
Euro-zone (31.55%).	0.9	0.7	0.4	0.9	1.5	0.7	0.8
USA (29.0%).	-0.1	-0.5	-0.1	-0.2	-1.5	-2.0	-1.1

(1)less owner's equivalent rent of primary residence.
(2) This homogeneous measure of underlying inflation does not coincide with the usual measure of core inflation for the EMU nor for the USA. It has been constructed in order to compare the data in the EMU and in the USA.

Source: EUROSTAT & BLS & IFL.
Date: September 18 / 2003.

It is now of interest to evaluate the risk of deflation in the euro zone. We do so using the Bank of England charting procedure. Box 3 indicates how this chart has been constructed in this report and it is plotted in figure 3. It can be seen that at a 95% confidence level the risk of deflation in the euro zone is practically null. A similar chart for the US would show that non-recession in the US is highly probable but with a greater risk of deflation than in Europe.

The inflation forecasts for 2003 and 2004 are 2.1% and 1.7%, respectively. They are obtained by disaggregating time series models. Relating them with the results of the global econometric model following the procedure described in the previous report, see box 4, it can be observed that the inflation pressure exerted by monetary policy continues to be compensated by an opposite effect derived from the output gap and the deviations of prices from unit labour costs and the changes in import prices. Consequently a looser monetary policy would still be possible during 2003.

BOX 3: THE EVALUATION AND REPRESENTATION OF UNCERTAINTY IN FORECASTING. THE FAN CHART.

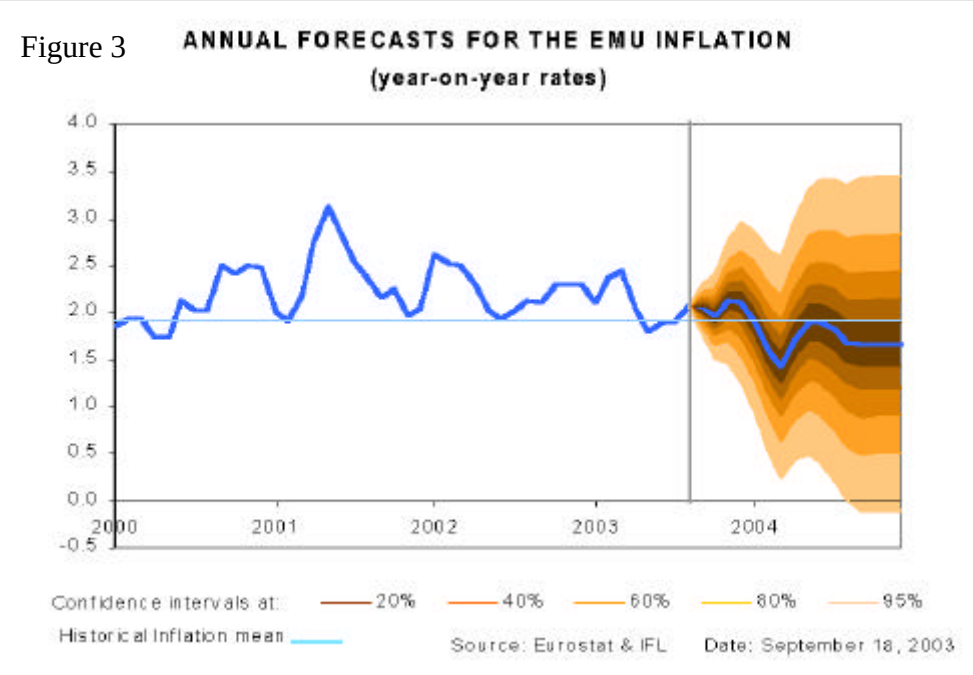
Forecasts of future economic outcomes are subject to uncertainty. Therefore, forecasters should accompany their point forecasts with an indication of associated uncertainty. How this can be assessed is discussed in Wallis (2003).

A forecast interval is the simplest way of reporting uncertainty. Probabilities can be attached to these intervals if an underlying probability distribution is assumed. A density forecast is implicit in all these calculations and it is an estimate of the complete probability distribution of the possible future values of the variable in question, and so provides a full description of the uncertainty associated with a forecast. It is increasingly common to publish it explicitly. Examples are found in the forecasts published by central banks, including the Bank of England and the Sveriges Riksbank, other agencies such as the US Congressional Budget Office, and independent groups such as the National Institute of Economic and Social Research. Once complete density is available, users can calculate the forecast probabilities for any interval or combination of outcomes of interest Tay and Wallis (2000, 2002) present a survey of the use of density forecasts in macroeconomics and finance. A density forecast of inflation has been published in the Bank of England's quarterly Inflation Report since February 1996. It became the responsibility of the Monetary Policy Committee (MPC) when the Bank was given operational independence in 1997 and the MPC was established.

In these examples, the density forecast is based on a probability distribution of known functional form which is assumed constant over time, although the parameters describing its location, scale, skewedness, and so forth, vary over time. Algebraic formulae are not usually helpful in conveying the main features of a forecast, however, and graphical presentations can be more informative. One way of presenting a density forecast is in terms of selected quantiles, which is equivalent to reporting several forecast intervals, corresponding to selected probabilities. These can be reported in a table, or as yet further lines on a time series figure of forecasts for several periods into the future, generalising the figure of an interval forecast. With selective shading of quantiles "to draw attention away from point forecasts and toward the uncertainty in forecasts" this was first proposed by Thompson and Miller (1986). Since the dispersion of the distribution increases and the intervals "fan out" as the forecast horizon increases, such figures have subsequently become known as "fan charts".

Different institutions are currently considering a possible, although low, risk of deflation in the EMU. Therefore, this deflation risk in the current and following years should be evaluated by the construction of confidence intervals at different levels of significance for our forecasts. The confidence intervals have been constructed taking the forecast errors derived from our models for one to twelve periods ahead during January 2000 – August 2003 into consideration.

Figure 3



In order to show these confidence intervals we have constructed the corresponding fan chart. As figure 3 shows, at a 95% confidence level a deflation risk in the EMU is practically null.

References

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Thompson, P.A. and Miller, R.B. (1986). Sampling the future: a Bayesian approach to forecasting from univariate time series models. Journal of Business and Economic Statistics, 4, 427-436.

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Box 4: Casual Interpretation of Inflation forecasts and monetary policy

The inflation forecasts in this report are obtained by breaking down the HICP into several components, for which time series models are estimated. These models include additional explanatory variables contemplating the effects of sales and price rounding due to the introduction of the euro. When forecasting consumer energy prices, international crude oil prices are the leading indicator in a non-linear model. With respect to direct aggregate forecast procedures, the approach followed in this report makes use of relevant information about different price trends along markets. The procedure employed also uses all the monthly information available on inflation. The disaggregated forecasts identify market differences and provide some clues about the main factors causing inflation, as it has been seen in the main when comparing the forecasts for the EMU and the US. But this procedure does not currently include causal economic variables to explain inflation. In order to obtain a causal explanation for inflation forecasts we perform a simple regression between these forecasts, y_t, and the forecasts that would result from the macroeconomic model used in this report, x_t, we denote them congruent econometric forecasts. In the macroeconomic model used in this report, inflation is explained by deviations from two long run restrictions, one linking prices with unit labour cost and another with money. Other explanatory variables are changes in import prices, the output gap and lagged inflation values. The estimated regression is:

$$y_t = \underset{(0.07)}{0.95}\, x_t + r_t \qquad s(r_t) = 0.001, \quad R^2 = 0.99.$$

Where y_t are the disaggregated forecasts and x_t the congruent econometric forecasts.

This regression shows that the mean values in both forecasts are not significantly different, but specific forecasts could differ considerably, with a 95% confidence interval given by ±0.2 percentage points.

If we replace the x_t forecasts in the above regression with their composition in terms of the explanatory variables used to calculate them, we obtain a causal explanation for the inflation forecasts included in this report (y_t). The component r_t (the part of the disaggregated forecasts which is not explained by the econometric forecasts) can be interpreted as the impact on total inflation of the heterogeneous inflation situation of different markets or the bias in the econometric model's causal explanation derived from not contemplating specific market effects.

Applying the above to the mean value of the quarter-on-quarter inflation rate forecasts, we obtain the break down presented in table 3. Table 3 shows that the amount of money in relation to output is pushing inflation up, that there three factors pushing in the opposite direction and that another two currently have a practically insignificant effect. The heterogeneous inflation situation on different markets is favouring lower inflation rates in 2003 because, although energy prices will grow faster in 2003 (in the yearly average) than in 2002, inflation in services and food will grow at a slower rate, mainly due to the absence of euro-rounding effects in 2003. The other, more relevant, two economic factor at present acting as forces reducing inflation are the unit labour costs and the output gap. This means that given the expected evolution of unit

labour costs and the output gap, a loose monetary policy can continue. If the output gap increases or the incorporation of more technology reduces the unit labour cost trend, there will be more scope for easing monetary policy, provided, as expected, that the short-term factors affecting inflation do not change in an adverse manner. We can conclude that, in the economic conditions described, the ECB will be in a position to maintain or even further reduce interest rates in the short term.

Figure1 shows that forecasts made at different times converge to a stable value of between 1.8 and 2.1%. This is also found with forecasts made in 1998 and 1999, and is due to the fact that inflation in the euro-area is a stationary variable.

The above results suggest that the 2% inflation target should not be considered as an upper limit value, but as a mid-value around a $\pm 2\sigma$ range, where σ could be taken as 0.5 percentage points, which is approximately the standard deviation when predicting the EMU year-on-year inflation rate one year ahead. This reinforces our previous consideration concerning monetary policy in the short term.

Table 3: Contributions to the average inflation rate

Average quarter-to-quarter inflation rate (seasonally adjusted)	Contributions to the average inflation rate						
	Constant Term	Changes in import prices	Lagged Inflation	Output Gap	Deviations from unit labour costs	Deviation of money from nominal output	Heterogeneous inflation situations through markets
2003(3Q)-2003(4Q)							
0.37	0.53	-0.03	0.02	-0.08	-0.04	0.17	-0.20
2004(1Q)-2004(4Q)							
0.41	0.53	0.01	-0.09	-0.13	-0.08	0.16	0.01

II. PRODUCTION INDICATORS.

The last observed figures corresponding to May and June have been important downwards innovations in all the sectors of the Industrial Production Index in EMU that are analysed in this publication except for Energy. In July, the annual rate was still in negative values but was a positive innovation. These innovations have resulted in a corresponding downwards revision of the forecasts for 2003 and 2004. (See table 4).

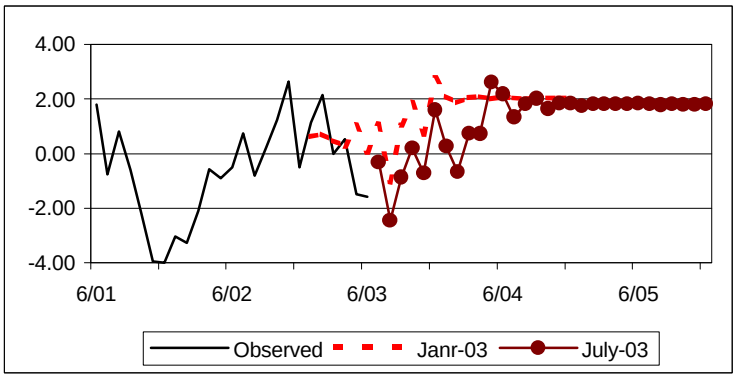
Table 4. Annual average rates for industrial production in EMU and US[(1).]

	1998	1999	2000	2001	2002	2003	2004
TOTAL EMU	4.3	1.9	5.3	0.5	-0.6	**-0.1**	**1.4**
Capital goods	7.4	2.3	8.3	1.5	-2.1	**-0.7**	**2.4**
Durable Consumer Goods	4.6	1.5	6.6	-1.7	-5.5	**-4.8**	**-0.1**
Intermediate Goods	4.2	1.9	5.9	-0.5	0.4	**-0.2**	**1.2**
Non Durable Consumer Goods	2.6	1.5	1.2	1.0	0.5	**0.0**	**1.0**
Energy	1.3	0.9	2.1	1.4	0.9	**2.6**	**1.0**
TOTAL US	5.6	4.3	4.7	-3.5	-0.7	**0.4**	**3.6**

Bold figures are forecasts. Source: Eurostat and IFL. Date: September 17th, 2003

Figure 4 shows how the last innovations have changed the forecasting path since January 2003 and it is clear how recovery is slower than expected.

Figure 4: Updates in annual rate forecasts for EMU.



Date: September 17th, 2003. Source: Eurostat and IFL.

Table 5 shows the monthly rates of growth for industrial production trends in the EMU and the US. It can be seen that the recovery at the beginning of the year did not continue and the values are again negative for both economic areas but we have reached again positive values and they are expected to continue for the second half of the year.

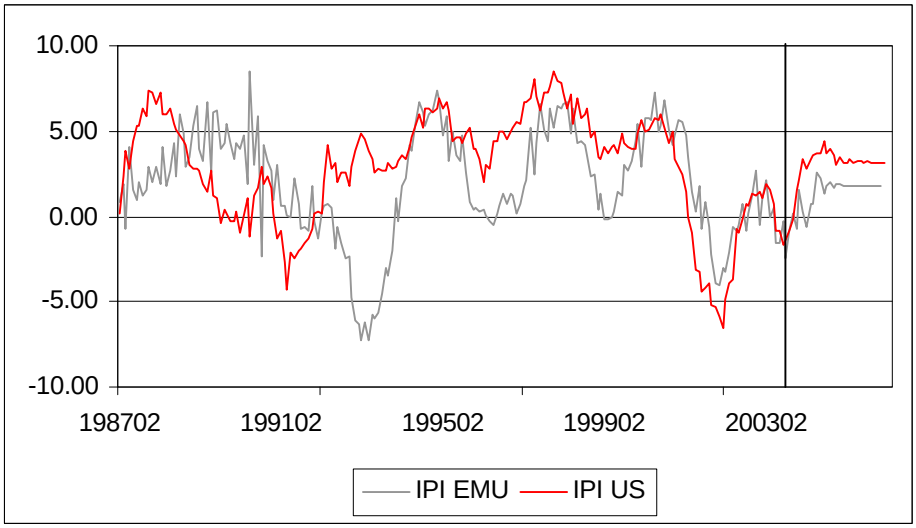
Table 5. Monthly trend* rates of growth for EMU and US IPI.

		1	2	3	4	5	6	7	8	9	10	11	12
02	EMU	0.13	0.20	0.30	0.27	0.25	0.22	0.13	0.04	-0.08	-0.12	-0.19	-0.21
	US	0.16	0.33	0.57	0.62	0.46	0.43	0.30	-0.02	-0.34	-0.49	-0.51	-0.16
03	EMU	0.12	0.17	-0.14	-0.33	-0.34	-0.05	0.15	**0.07**	**0.15**	**0.24**	**0.17**	**0.13**
	US	0.31	-0.01	-0.26	0.02	-0.07	-0.05	0.34	0.45	**0.56**	**0.64**	**0.44**	**0.44**
04	EMU	**0.11**	**0.12**	**0.19**	**0.23**	**0.19**	**0.11**	**0.03**	**0.08**	**0.22**	**0.24**	**0.16**	**0.11**
	US	**0.47**	**0.18**	**0.06**	**0.16**	**0.14**	**0.15**	**0.24**	**0.31**	**0.31**	**0.35**	**0.40**	**0.38**

* Trends have been obtained with TRAMO/SEATS applied to our forecasts for the original Industrial Production Index not seasonally adjusted. Date September 17th, 2003. Source: Eurostat & IFL.

Also, as stated in previous reports, the EMU and US economy seems to keep sharing the same cyclical pattern as shown in figure 5 and table 4. The last two observations in US have had innovations of opposite sign but in any case, the US recovery seems to be stronger than in the EMU.

Figure 5: EMU and US annual rates



Date: September 17th, 2003. Source: Eurostat and IFL.

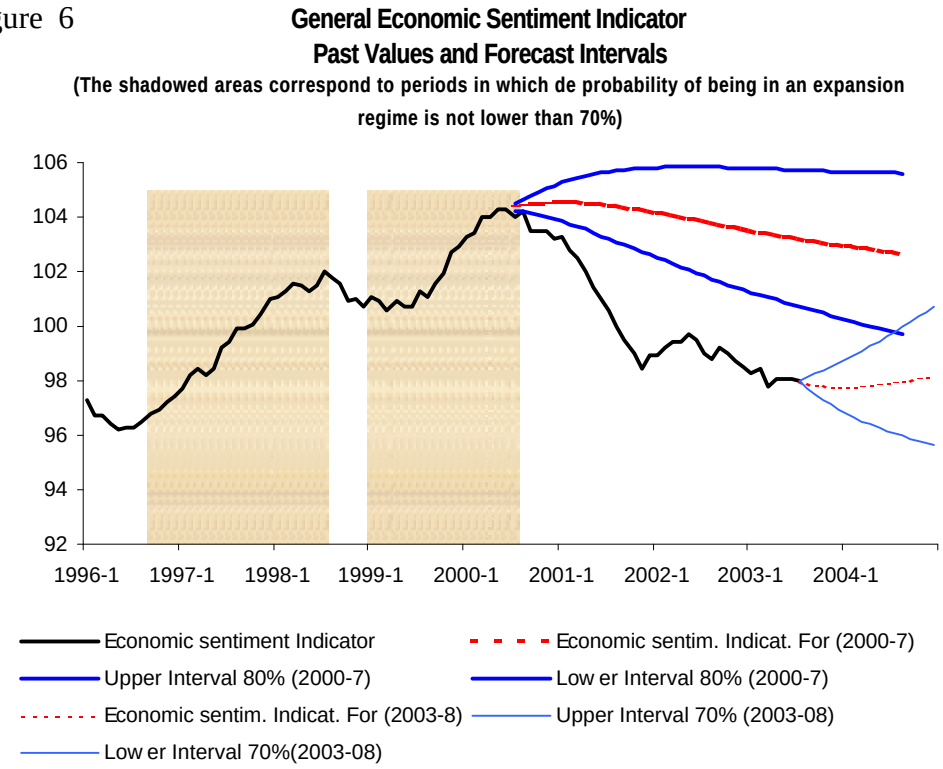
An econometric analysis of GDP by production sectors using a VEqCM model including as explanatory variables the expected rate of growth of GDP and specific leading indicators for each sector, generates GDP forecasts for 2003-2004 from which the contribution of the different production sectors to the GDP growth forecast can be obtained. They are shown in table 6.

Table 6: Contribution of the production sectors to GDP growth

		Contributions of production sectors				
Year	GDP growth	Agriculture	Industrial	Construction	Services	Net taxes
1999	2.82	0.08	0.23	0.12	2.10	0.29
2000	3.50	-0.02	0.88	0.12	2.56	-0.04
2001	1.59	-0.04	0.16	-0.03	1.61	-0.12
2002	0.85	-0.01	0.19	-0.05	0.93	-0.22
2003	0.48	0.02	-0.15	-0.12	0.79	-0.08
2004	1.51	0.02	0.17	-0.01	1.27	0.04

In this section the main macrofigures have been analysed and forecast. Then the monthly industrial production and the contributions of the production sector to GDP growth have been studied. Finally Looking at qualitative indicators by estimating nonlinear univariate models in figure 6 it can be observed the evolution of the economic sentiment indicator, where the expansion zones are in shadow. With information till mid-2000 a fall was already expected, but not as relevant as was finally observed. Recovery is not yet clear from the latest information available.

Figure 6



Source: Eurostat & EFN Date: September 17, 2003