

# **EFN REPORT ON THE EURO AREA OUTLOOK**



**SPRING 2002**

## About the European Forecasting Network

The European Forecasting Network (EFN) is a research group of European institutions, founded in 2001 and co-financed by the European Commission. The objective of the EFN is to provide a critical analysis of the current economic situation in the Euro area, short-term forecasts of the main macroeconomic and financial variables, policy advice, and in-depth study of topics of particular relevance for the working of the European Monetary Union. The EFN publishes two semi-annual reports, in the spring and in the fall. Further information on the EFN can be obtained from our web site, [www.efn.uni-bocconi.it](http://www.efn.uni-bocconi.it) or by e-mail at [efn@uni-bocconi.it](mailto:efn@uni-bocconi.it).

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## Executive Summary

This Report analyses the current status of the Euro area economy, provides forecasts for key macroeconomic variables for 2002 and 2003, runs experiments designed to evaluate the effects of expansionary monetary and fiscal policy, and studies in details the consequences of monetary policy over different phases of the business cycle.

We use econometric and statistical tools to address these issues, but all results are reported and commented upon in a clear and non-technical manner. More technical details can be found in the extended version of the report, available from the EFN webpage, [www.efn.uni-bocconi.it](http://www.efn.uni-bocconi.it).

Forecasts are obtained either from a medium-scale structural econometric model, or from sophisticated time series models. The underpinning theoretical framework of the econometric model refers to an open economy, the Euro area as a whole, where markets are competitive. Agents are aggregated into the sectors of households, firms, government and foreign countries. Within each sector individuals are assumed to be homogeneous. The model includes the goods, labour and financial asset markets, and the latter consists of money and bonds. Private households and firms maximize individual utilities or profits, respectively. Because the model is not designed to evaluate fiscal policies, government is broadly treated as exogenous as well as the behaviour of foreign countries. From the econometric point of view, the model is specified in error correction form, where long run relationships among the main variables are estimated using cointegration techniques, lagged regressors capture the dynamics of the variables, and the statistical adequacy of the model is checked by a set of diagnostic tests on the residuals. A complete description of the model is provided in Annex 2 of the extended version of the Report.

Policy simulations are conducted with an annual macro-econometric model for 17 countries: the 14 members of the European Union (Luxembourg and Belgium are merged), the United States, Japan and Canada. Each country is modelled by the same system of about 50 equations, and there is a comprehensive description of linkages across countries, through trade and capital flows. Most behavioural equations are based on intertemporal optimisation, under the assumption of perfect foresight. The two most important features of the model are a vintage capital structure with a putty clay technology and consumption habit formation in an inter-temporal utility maximising framework. The stickiness that this induces in consumption is also complemented by some stickiness of nominal values, interest rate parities, monetary rules, etc. The model assumes inter-temporal equilibrium of the budget of each government and of the balance of payments of each country. Estimation of the model is conducted by panel GMM techniques. More details are provided in Annex 3 of the extended version of the Report.

As far as the current economic situation is concerned, many of the fears that the September 11<sup>th</sup> Terrorist Attack would drive the world economy deeper into a cyclical downturn have been dispelled. A prompt loosening of monetary policy by the Federal Reserve, the European Central Bank and the Bank of England has helped to stabilise business and consumer confidence. Industrial production has started to turn up as order books have improved. Nevertheless, such is the momentum of the downswing,

which we forecast the Euro area to grow in 2002 by only 1.2%. In 2003 growth will accelerate to 2.2%.

The world-wide upswing in the second half of the 1990s was characterised by a particularly strong increase in business investment relative to the growth in GDP. With the exception of Germany, this was also a feature of many countries in the Euro area. Some of this investment boom was fueled by unrealistic expectations about the possibilities of a new economy, and the pricking of the ICT boom in stock markets triggered a significant cutback in investment worldwide. This quickly translated into falls in US industrial production in the second half of 2000 and into 2001, and in turn this was propagated to the rest of the world. This has resulted in a greater degree of synchronisation of business cycles across the world than we have seen since the early 1980s.

Industrial production in the Euro area has been on a declining trend since the end of 2000. World trade in goods, which grew by 12 percent in 2000, hardly grew at all in 2001. Although the world economy is less sensitive to oil price rises than it was in the 1970s and 1980s, a rise from \$12 a barrel at the beginning of 1999 to almost \$30 by the end of 2000 added to the difficulties that industry was already facing, and depressed household incomes.

There are now signs that the worst is over. Though in the Euro area GDP dropped by 0.2% in the last quarter of 2001, industrial production grew by 0.3 % and retail trade by 0.4% in December of 2001. The Euro area unemployment rate has stabilised at 8.4%. Fourth quarter GDP grew at an annual rate of 1.4% in the US, after a fall of 1.3% in the third quarter. The sharp downturn in the world industrial sector has been offset in part by the resilience of households and some fiscal relaxation by public authorities as well as by a much more favourable monetary climate. The cyclical downswing will turn out to be relatively shallow. However, the overhang because of excessive investment in the upswing means that recovery is muted during 2002.

Unemployment declined during 2000, but this went into reverse in 2001, and levels of unemployment are likely to remain high in countries such as Spain, Greece and Italy. Nevertheless, the range of outcomes for member states in the Euro area has been diverse. Germany, specifically, has been particularly affected by the investment retrenchment. However, overall, we expect the Euro area unemployment rate to remain stable in 2002, at about 8.4%, and to decline slightly to 8.1% in 2003.

The central dilemma facing monetary policymakers is whether the signs that the bottom of the downswing may have been reached are enough to obviate the need for further monetary easing. Over the last three years inflation in the Euro area has been on a rising trend and this has prevented the ECB from responding as vigorously as the US Federal Reserve to the deterioration in economic circumstances. However, these inflationary pressures have now eased, as oil prices have weakened and the cyclical downturn has put pressure on the ability of companies to pass on costs. HICP inflation will fall in the middle of 2002 to below 1.5%, but core inflation in the price of services will bring HICP inflation back to the 2% ceiling at the end of 2002. The expected inflation rate is 2.2% in 2003, possibly lower in case of a decrease of indirect taxes and of a more stable evolution for non-processed food items. The scope for further monetary easing is therefore restricted, at least under the current strict

formulation of the target for price stability. Hence, we expect the short term interest rate to remain steady this year, and to increase slightly next year to around 3.8%.

Simulations conducted with the multinational Marmotte model indicate that a mildly expansionary ECB monetary policy would not be sufficient to absorb the asymmetric effects of the US recession on the different members of the Euro area. The expansionary monetary policy followed by the Federal Reserve, without a complementary fiscal policy, may also not totally offset the effects of the recession in the US.

The effectiveness of monetary policy is somewhat enhanced if the possibility of a different reaction of the economy during recessions and expansions is taken into consideration. There is evidence to suggest that at the aggregate level of the Euro area, interest rates have larger effects in recessions than in expansions. A monetary easing will have a stronger effect on economic activity when embarked on in a downturn compared with the effects of a monetary tightening in a boom.

Part of the inflationary pressures that recently affected the Euro area can be traced to the depreciation of the Euro against the dollar since the beginning of 1999. The rise in volatility in asset markets after September 11<sup>th</sup> has abated and the dollar to Euro exchange rate is more stable. However, the more important effective exchange rate for the Euro, which matters more for inflation and the external balance since it is a weighted average of the exchange rates with the main trading partners, has fluctuated about a stationary mean since the spring of last year. We expect only a mild depreciation for 2002, of 3%, and 1% in 2003, mainly as a consequence of the shrinking of the interest rate spread with the US and of the expected better performance of the US economy. Yet, there is substantial uncertainty around these forecasts.

As far as the efficacy of fiscal policy in the Euro area is concerned, simulations indicate that it is relevant for stabilising national economies and to compensate for the asymmetric impact of the US shocks, particularly for the case of a co-ordinated expansionary policy. To prevent the constraints in the SGP being breached, reduction in taxation is preferable to an increase in government expenditures.

Although the worst may be over, it is clear that there still remain a number of imbalances in the world economy that will hinder a quick cyclical recovery. The fall in stock markets over the last two years will have helped to bring valuations of companies more into line with realistic expectations of dividend flows in the future. But over-investment in ICT may still dampen business investment in the medium term. Nevertheless, fiscal easing by the US in the second half of 2001 and the low level of short term interest rates will help to speed the US recovery in 2002. This, in turn, will re-invigorate world trade and provide a stimulus to the European economy.

The stimulus, though, could not be sufficient to bring the economy on a high and persistent growth path. More structural reforms, such as increased competition in the goods and services markets, easing on the movement of capital and labour, and incentives for trade unions and firms to agree on more adaptable labour markets would increase growth on a more permanent basis.

## Highlights for the Euro Area Economy

- The Euro area will grow by 1.2% in 2002 and 2.2% in 2003.
- Inflation in the harmonised consumer price index is forecast to abate during 2002 to 2.0% but to pick up again in 2003 to 2.2%.
- Private investment remains very weak, falling by 1.4% in 2002 and rising by only 0.2% in 2003.
- Private consumption, after growing by 2.0% in 2001, rises by 1.8% in 2002 and 2.1% in 2003.
- The Euro real effective exchange rate is forecasted to decline by 3.1% during 2002 and by 1.3% in 2003, but there is substantial uncertainty around these figures.
- World trade is expected to grow by 1.7% in 2002 and 10.3% in 2003.
- Exports will rise by 2.3% in 2002 and on the back of the strong recovery in world trade by 9.1% in 2003.
- Values for exogenous variables are taken from leading international institutions. In particular, oil price is assumed to be \$20 per barrel over the course of the forecast. US and Japan GDP growth rates are supposed to be 0.7% and -1.0% in 2002 and 2.7% and 0.2% in 2003, respectively. Corresponding values for inflation are 1.7% and 0.9% in 2002 and 2.1% and 1.6% in 2003; for short term interest rates 2.25% and 0.07% in 2002 and 3.25% and 0.07% in 2003, respectively.

### Forecast Error Bands

In addition to reporting point estimates for the forecasts we provide confidence intervals based on stochastic simulations of the EFN forecasting model. Specifically we show the range of outcomes within which there is an 80% chance that the forecasts will fall. For example, in 2002 we expect that there is a four in five chance that private consumption will lie between 1.5 and 2.1 %, while investment lies in a wider band between -3.0 and -0.1 %, and for the Euro real effective exchange rate, about which there is the greatest uncertainty, the interval ranges from minus 6.4% to plus 1.2%.

## Economic outlook for the Euro area

	1998	1999	2000	2001	2002:II		2002:IV		2003:IV	
					Point Forecast	Interval Forecast	Point Forecast	Interval Forecast	Point Forecast	Interval Forecast
GDP	2.8	2.6	3.3	1.6	0.9	0.6 1.2	1.2	0.8 1.6	2.2	1.2 2.9
Private Consumption	3.0	3.1	2.5	2.0	1.7	1.4 2.0	1.8	1.5 2.1	2.1	1.4 2.7
Government Consumption	1.2	2.1	1.9	2.0	1.8	1.6 2.0	1.5	1.3 1.8	0.9	0.5 1.4
Private Investment	5.1	5.3	4.3	-0.4	-1.2	-2.0 -0.5	-1.4	-3.0 -0.1	0.2	-3.0 2.2
Inventories / GDP	0.5	0.3	0.3	0.0	0.1	-0.2 0.1	0.2	-0.2 0.4	0.3	0.0 0.5
Exports	7.0	5.1	11.2	3.3	0.0	-1.1 1.0	2.3	-0.3 4.1	9.1	6.8 11.5
Imports	9.5	6.9	10.2	2.0	-0.3	-1.7 0.9	2.1	-0.6 4.0	8.3	5.4 10.9
Unemployment	10.5	9.5	8.6	8.3	8.4	8.1 8.7	8.4	7.9 9.1	8.1	7.5 9.2
World Trade	5.7	6.8	12.0	1.5	-0.8	-1.7 0.0	1.7	0.3 3.0	10.3	8.1 12.4
Euro Nominal Effective Exchange Rate	2.2	-5.9	-11.3	1.9	0.1	-3.2 3.0	-3.0	-6.0 1.0	-1.0	-7.0 4.0
Euro Real Effective Exchange Rate	1.9	-5.7	-10.4	2.8	0.5	-2.5 3.4	-3.1	-6.4 1.2	-1.3	-7.3 3.5
Short Term Interest Rate	3.9	3.0	4.4	4.4	3.5	NA NA	3.5	NA NA	3.8	NA NA
Long Term Interest Rate	4.7	4.7	5.4	5.1	4.8	4.2 5.1	4.8	3.8 5.3	5.2	4.5 6.2
Wages	1.7	2.3	3.3	2.7	2.7	2.4 3.0	2.9	2.3 3.4	2.7	2.0 3.3
Unit Labour Costs	1.7	2.3	3.3	2.7	2.4	2.1 2.8	2.5	1.7 3.0	2.3	1.5 3.1
GDP Deflator	1.2	1.7	1.3	2.1	1.6	1.1 1.9	1.6	0.6 2.2	1.8	0.6 2.7
Consumer Prices	0.8	1.7	2.5	2.1	1.4	0.9 1.9	2.0	1.0 3.0	2.2	1.0 3.4

Average percentage change compared with the same period a year earlier, except for unemployment rate and interest rates that are expressed in levels, and for consumer prices that are expressed as year-on-year growth rates. Forecasts from EFN forecasting models.



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## **PART I Euro Area Conjunctural Analysis**

The Euro area is at a turning point in the business cycle. Fears, in the aftermath of September 11<sup>th</sup> that the worldwide economic slowdown, which started in the second half of 2000, would accelerate as business and consumer confidence evaporated, have proved to be groundless. A sharp loosening of monetary policy, by 100 basis points by the ECB and by 150 basis points in the US, has helped to maintain liquidity in the world economy.

Retail sales compared to December 2000 rose by 0.4 % in the Euro area, pulled down by particularly weak figures in Germany. Seasonally adjusted industrial production increased by 0.3% in the Euro area in December 2001 compared to November 2001, but was still down by 4.7% compared to December 2000. The severe downturn in the world industrial sector has been offset in part by the resilience of households and some fiscal relaxation by public authorities so the cyclical downswing may turn out to be relatively shallow. However, the overhang because of excessive investment in the upswing, fueled by unrealistic expectations about the possibilities of a new economy, and the pricking of the ICT boom in stock markets, may mean that recovery is muted during 2002.

We are forecasting that GDP in the Euro area, after growing by 1.6% in 2001, will grow by 0.9%, at an annual rate, in the first 6 months of 2002; and achieve a growth rate of 1.2% for the year as a whole, similar to forecasts for the US economy. Growth is expected to be 2.2% in 2003. This rather faltering recovery reflects continuing weakness in investment, which falls by 1.4% in 2002 and manages only a small rise in 2003 of 0.2%.

Industrial production in the Euro area has been on a declining trend since the end of 2000. World trade in goods, which grew by 12 percent in 2000, hardly grew at all in 2001. Although the world economy is less sensitive to oil price rises than it was in the 1970s and 1980s, a rise from \$12 a barrel at the beginning of 1999 to almost \$30 by the end of 2000 added to the difficulties that industry was already facing, and depressed household incomes. The terrorist attack of September 11<sup>th</sup> came when the world economy was already well into a cyclical downturn.

Monetary policy which generally leant against the cyclical upswing during 1999 and 2000, swung quickly to offset a downswing, once evidence of the pricking of the investment boom became clear. The Federal Funds rate fell from 6.5 percent to 1.75 percent during the course of 2001, in part to offset the shock to business and household confidence after September 11<sup>th</sup>. Inflationary pressures in the Euro area led to a more moderate easing of monetary policy.

Unemployment declined during 2000, but this went into reverse in 2001, and levels of unemployment are likely to remain high in countries such as Spain, Greece and Italy. Nevertheless, the range of outcomes for member states in the Euro area has been diverse. Germany, specifically, has been particularly affected by the investment retrenchment. Overall, we expect the Euro area unemployment rate to remain stable in 2002, at about 8.4%.

The central dilemma facing monetary policymakers is whether the signs that the bottom of the downswing may have been reached are enough to obviate the need for further monetary easing. Over the last three years inflation in the Euro area has been on a rising trend and this has prevented the ECB in responding as vigorously as the US Federal Reserve to the deterioration in economic circumstances. However, these inflationary pressures have now eased, as oil prices have weakened and the cyclical downturn has put pressure on the ability of companies to pass on costs. Nevertheless, inflation in the harmonized index of consumer prices is still close to the 2 percent ceiling that the ECB targets, our forecast for 2002 is 2.0%, so the scope for further monetary easing is restricted, at least under the current strict formulation of the target. Hence, we expect the short term interest rate to remain rather stable this year, and a slightly increasing pattern next year to values around 3.8%.

Part of the inflationary pressures can be traced to the depreciation of the Euro against the dollar since the beginning of 1999. The rise in volatility in asset markets after September 11<sup>th</sup> seems to have abated and the dollar to Euro exchange rate is more stable. However, the more important effective exchange rate for the Euro, which matters more for inflation and the external balance, has fluctuated about a stationary mean since the spring of last year. We expect only a mild depreciation for this year, of 3%.

On the fiscal front, the cyclical deterioration should be seen against a background of steady improvements in fiscal positions across most of the Euro area since 1996. Those countries that now find their room to manoeuvre restricted by the SGP have generally been less successful in achieving structural surpluses in the last few years. The requirement to be close to balance or in surplus in normal years should provide a sufficient cushion to allow the automatic stabilisers to function in all but exceptional circumstances.

Although the worst may be over, it is clear that there still remain a number of imbalances in the world economy that will hinder a quick cyclical recovery. The fall in stock markets over the last two years will have helped to bring valuations of companies more into line with realistic expectations of dividend flows in the future. But over-investment in ICT may still dampen business investment in the medium term. Nevertheless, fiscal easing by the US in the second half of 2001 and the low level of short term interest rates should help to bring the US economy out of recession in 2002. This, in turn, will re-invigorate world trade and provide a stimulus to the European economy.

We now discuss in more details recent and expected developments for output and internal demand (Section 1), labour market (Section 2), prices (Section 3), exchange rates and external demand (Section 4), and financial variables (Section 5). Finally, we evaluate the effects on the forecasts of alternative scenarios for the exogenous variables (Section 6).

# 1. Output and Internal Demand Developments

## 1.1 Current Economic Situation in the Euro area

The economic downturn in the Euro area and in the European Union as a whole continued in the third and fourth quarters of 2001. Seasonally adjusted GDP stagnated in the second half of 2001. In the EU as a whole, in the course of last year, the year-on-year growth rate decelerated from 3.1% in the first quarter to 1.6% in the fourth.

Among the larger Euro area economies, GDP growth remained relatively robust in France and Spain, whereas it was particularly weak in Germany.

The economic downturn started in the middle of 2000, well before the terrorist attacks of September 11, 2001 in the US. Among the factors which contributed to this slowdown in economic activity, were the oil price hike which significantly reduced purchasing power of households, and the bursting of the ICT bubble which reduced investment sharply.

The long upswing of the US economy in the 1990s had been driven by high productivity growth due to accelerating technical progress in high-tech industries and by corresponding investment.<sup>1</sup> As it turned out during 2000, the growth potential of the “New Economy” had been over-estimated, leading to over-investment in the high-technology sector. The bursting of this bubble was associated with a marked downturn in stock market prices. Besides affecting investment negatively, this exerted a negative wealth effect on private consumption. This in turn undermined consumer confidence.

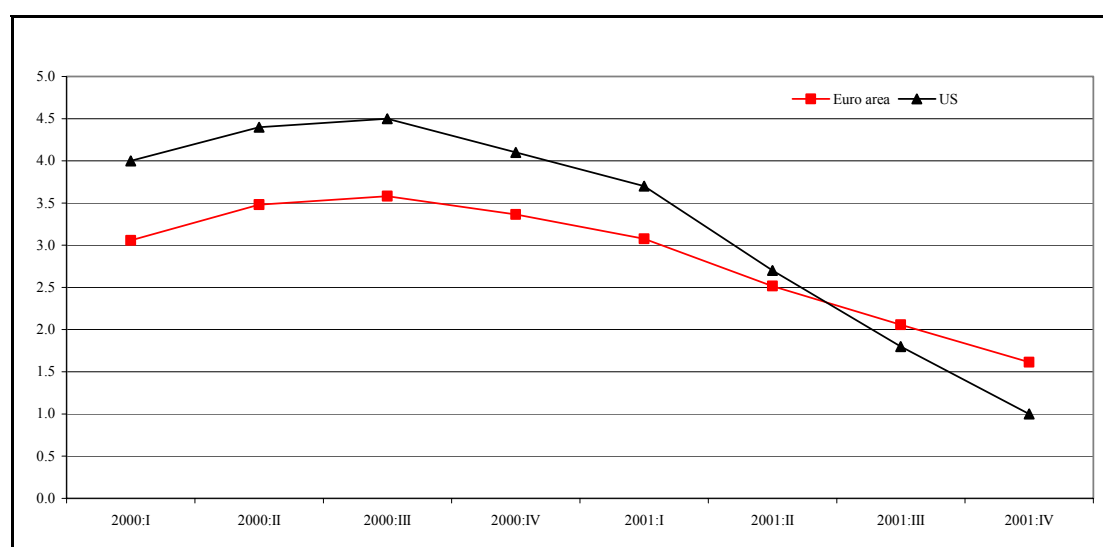
The negative stock market and confidence effects spilled over to Europe. The rapidity and strength of the transmission of the US investment downturn to Europe was not altogether expected. The Euro area is a relatively closed economy and standard multi-country models where the trade link is prominent do not lead one to expect such a close relationship as the recent downturn has exhibited.<sup>2</sup>

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<sup>1</sup> Stiroh, K. J. (2001), “What Drives Productivity Growth?”, Federal Reserve Bank of New York, Economic Policy Review, March.

<sup>2</sup> International Monetary Fund (2001), World Economic Outlook, Washington, October.

Figure 1: GDP growth rates in the Euro area and in the US



Data seasonally adjusted. Sources: European Commission, Euroindicators database; U.S. Department of Commerce; Euro-area fourth quarter of 2001: EFN forecast using a structural macroeconomic model.

#### *Domestic demand remains weak in the Euro area*

In the second half of 2001, seasonally adjusted domestic demand stagnated in the Euro area. The economic deterioration is also reflected in the smoothed growth rate which fell from a peak of 3.3% in the second quarter of 2000 to 1.1% in the fourth quarter of 2001. The average annual growth rate of domestic demand in the Euro area declined from 2.8% in 2000 to 1.1% in 2001. Whereas both private and public consumption remained comparatively robust with annual average growth rates of 2% each, gross fixed capital formation was exceptionally weak with an annual drop of 0.4% in 2001, compared to an increase of 4.4% in 2000 and 5.4% in 1999.

The gloomy economic situation produced by the oil price hike and the bursting of the ICT bubble negatively affected company profit prospects and consequently consumer and industry confidence. Private consumption was supported by stable employment and by high real estate prices (that partly mitigated the negative wealth effect of the bad performance of the stock market). For several months, the unemployment rate remained almost constant at about 8.4%. As the labour market lags behind the development of the real economy,<sup>3</sup> labour market conditions can worsen in the coming months. This may result in additional precautionary savings by private households, exerting a negative effect on private consumption.

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<sup>3</sup> Agresti, A. M. and Mojon, B. (2001), "Some Stylised Facts on the Euro Area Business Cycle", European Central Bank Working Paper, n.95, December.

### *Private consumption*

Oil prices rose from about \$13 a barrel at the end of 1998 to a peak of \$32 a barrel by the end of 1999. Since then they have moderated somewhat but combined with a fall in the Euro, the effects on inflation were aggravated by increasing prices for meat and other food, caused by the outbreak of animal diseases and unfavourable weather conditions in some Euro area countries at the beginning of 2001, resulting in comparatively high inflation rates. The peak was reached in May 2001 with a Euro area wide HICP increase of 3.4%, which had an adverse effect on real disposable income. This offset the positive impact of tax cuts initiated in some member countries. Since data on Euro area disposable income is not available, the exact impact of these effects on disposable income is difficult to quantify.

Although second half of 2001 saw a fall in inflation, reaching 2.0% in December, the year-on-year growth rate of private consumption expenditures declined from 3.0% in the first and second quarters of 2000 to 2.0% in the fourth quarter of 2001. Among the larger Euro area countries, private consumption remained robust in France, while it was particularly weak in Germany. This contrast can be explained by differences in fiscal policy measures and in labour market conditions between these two countries. Tax cuts were higher in France than in Germany. In addition, the French government tried to compensate private households for the purchasing power losses due to the oil price increase in winter 2000/2001. Furthermore, in France, labour market developments were more favourable compared to Germany.

For 2001, private consumption is expected to have grown by 2.0%, down from 2.5% in 2000.

### *Gross fixed capital formation*

The economic downturn in the Euro area is particularly reflected in the dramatic slump in investment. While the growth rate of gross fixed capital formation amounted to about 5.5 % in the first and second quarters of 2000, a drastic downturn in investment activity occurred in the course of 2001. For the fourth quarter, a further deterioration can be expected, resulting in an average annual drop in investment by 0.4% in the year 2001.

Medium-term prospects for gross fixed capital formation remain weak. In the fourth quarter, according to European Commission surveys among companies, industrial capacity utilization in the Euro area continued the decline that began in the middle of 2001. In addition, confidence in industry, retail sales and construction is still very low. Although at the end of last year some of these sentiment indicators stopped declining, the indices remain at low levels. At the moment, it is quite uncertain whether the reversal in trend has taken place.

The bursting of the ICT bubble with a marked drop in stock market prices has seen a deterioration in the financial state of companies. While financing of investment projects by issuing new equity is less common in continental Europe than other means of financing, it was particularly important for New Economy firms. Companies of



traditional branches relied more on bank loans.<sup>4</sup> It can be expected that investment activity will remain weak until profit prospects improve significantly.

## **1.2 Expected Developments**

Our expectations for growth in 2002 are on the low side, at 1.2%, with a better performance from the last quarter of the year. A disaggregated demand analysis indicates that the sources of this poor economic performance are a negative growth in investment of -1.4%, but also weak growth in both private (1.8%) and public (1.5%) consumption expenditures. A positive but limited contribution comes from external demand. As discussed in section 4, the growth of net exports is expected to be about 0.2%.

Growth is more sustained in 2003, with growth in GDP forecast to be 2.2%. Increased private consumption (growth of 2.1%), plus an improved investment outlook, some inventory accumulation, and higher net export growth all help to bring output growth closer to its underlying potential.

## **2. Labour Market Developments**

### **2.1 Labour Market Conditions in the Euro Area**

After a gentle decline during 2000, unemployment in the Euro area as a whole began to rise through 2001. But it has now been flat at 8.4% from November 2001 to January 2002. This is a further indication that the cyclical downswing is relatively mild and has not resulted in a general shedding of labour as in previous business cycles. This increase set in even before the events of September 11<sup>th</sup> and reflects the coincident downturn in economic activity in the Euro area and the US from the beginning of the year. This general slowdown has been characterised by weak domestic demand, low consumer confidence and unexpected rise in inflation in the middle of 2001 partially as a consequence of the increase in the oil prices. While inflation slowed down in the last part of the year, allowing the ECB to ease its monetary policy stance, the slowdown in growth could not be completely dealt with by fiscal policy because of the constraints imposed by the SGP. A decline in dispersion characterises the tendency for unemployment first to fall and partially reversed itself as unemployment rose again. Since it is misleading to think yet of a Euro area labour market, it is still essential to understand developments within national boundaries. Unemployment experiences vary considerably both in terms of the underlying level and in the speed of change over the present cycle.

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<sup>4</sup> Edison, H. and Slok, T. (2001), "New Economy Stock Valuations and Investment in the 1990s", IMF Working Paper, n. 01/78, June.

## 2.2 Expected Developments

As a consequence of the modest GDP growth forecast for 2002, unemployment is expected to remain rather stable, at values around 8.4%. The unit labour cost is expected to be 2.5%, while wage growth is expected to be 2.9%, which is about one percentage point higher than inflation, notwithstanding the unemployment conditions. This is due to a higher average labour productivity.

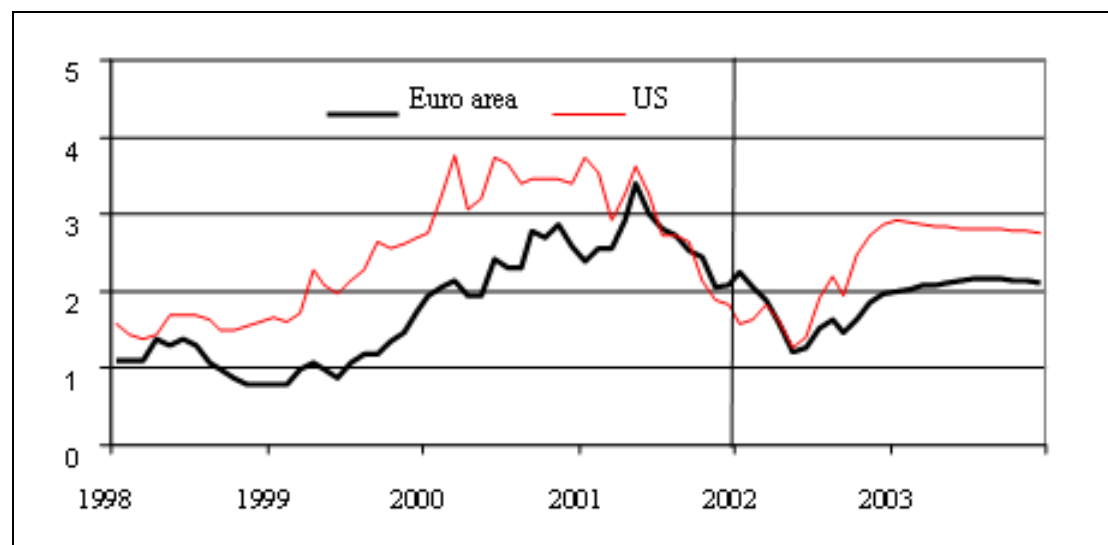
The higher GDP growth in 2003 helps to reduce unemployment slightly; firms are still cautious about the strength of the recovery and prefer to postpone new hirings. Higher output combined with a stable employment foster a decline in unit labour costs, while the wage growth is also declining but still higher than inflation.

## 3. Price Developments

### 3.1 Recent Evolution in the Euro area

During the last three years inflation in the Euro area has shown a systematic increase (Figure 2). The annual rate has passed from an average value of 1.1% in 1998 to a peak of 3.4% in May of 2001, declining thereafter to 2.1% in December.

Figure 2: Year-on-year inflation rates in the Euro area and in the US

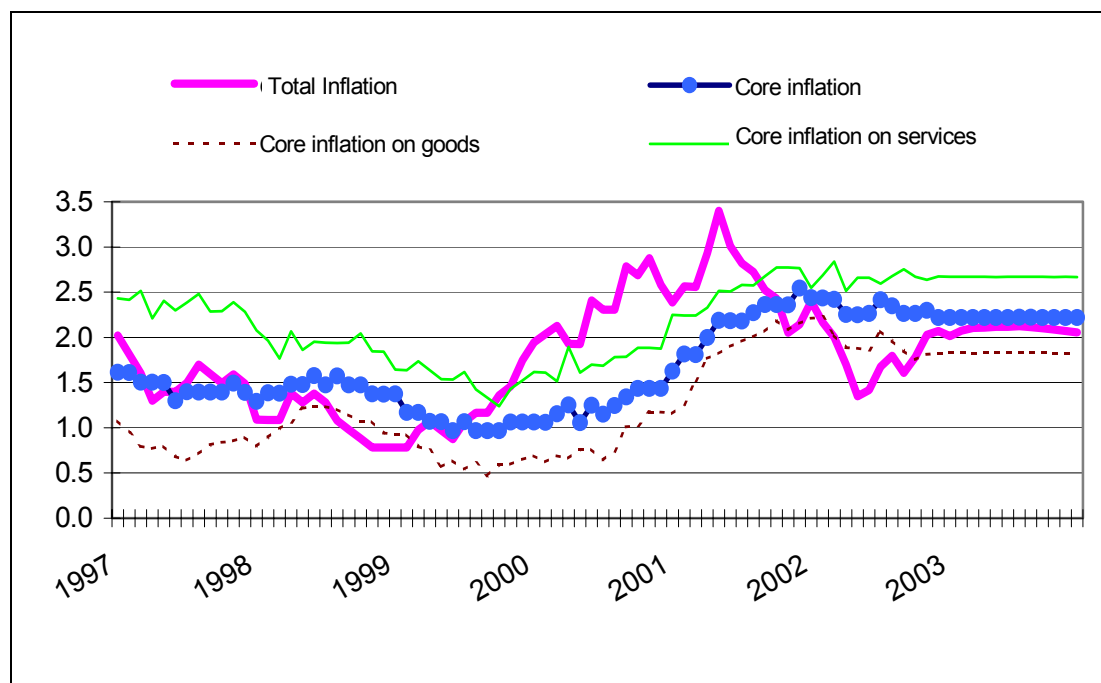


From January 2002 the values are forecasted.

The rise in inflation between 1999 and 2001 was partly due to the rise in energy prices. However, the main factor behind these higher inflation rates has been core inflation. Core inflation is defined as inflation after excluding energy and non-processed food prices from the HICP. Our results and conclusions are practically the same if the core measure also excludes processed food prices. Core inflation in the Euro area has gone from an average annual rate of 1.1% in 1999 to a year-on-year rate of 2.5% in December 2001 (Figure 3). The corresponding rates for core inflation in

the US are 2.1% and 2.7%. Therefore, the increase in prices during these years in the Euro area has been general, and in the core part of them the increment has been higher than in the US.

Figure 3: Year-on-year rates of core and total inflation in the Euro area



From January 2002 the values are forecasted.

Core inflation can be broken down into inflation in goods markets and in services. Core inflation in services in the Euro area increased from 1.5%, the annual average rate in 1999, to 2.5% the year-on-year rate in December 2001. A similar profile has been seen in the US, but from a higher level, going from 2.7% to 4.0%. In spite of the depreciation of the Euro with respect to the dollar of about 25% during these three years, the inflation differential with respect to the US in the service sector in the Euro area has increased slightly from 1.2 to 1.5 percentage points. This has been so because the service sector is relatively closed to international trade.

Looking at core inflation in goods, a completely different story emerges. In the Euro area, core good inflation has jumped from an annual average rate of 0.7% in 1999 to a year-on-year rate of 1.6% in December 2001. The corresponding rates in the US have been 0.7% and a negative one of 0.3%, with a positive average rate of 0.3% in 2001. The competitive advantage obtained in the Euro area from the depreciation has been undermined by the adverse inflation differential in the sector most widely open to international trade.

### 3.2 Expected Developments

The prospects for 2002 and 2003 are that core inflation decreases by a few tenths of percentage point. The forecasted year-on-year rates at the end of 2002 and 2003 are

2.2% in both years. This minor reduction in the core inflation rate will come from prices on processed food and services, since core inflation in commodities excluding food will increase by 1.8% in 2002 and will grow at the same rate in 2003.

For total inflation the expectation is for a minor reduction at the end of 2002 to a value of 2.0%, from the 2.1% observed in 2001, to increase again to a level of 2.2% in 2003. In contrast with the relatively stable evolution forecasted for core inflation, total inflation will oscillate - increasing in January 2002, decreasing to around 1.4% in May-June 2002 and jumping again to 2.0% at end of the year, and to 2.2% at the end of 2003.

## **4. Exchange rates and External Demand**

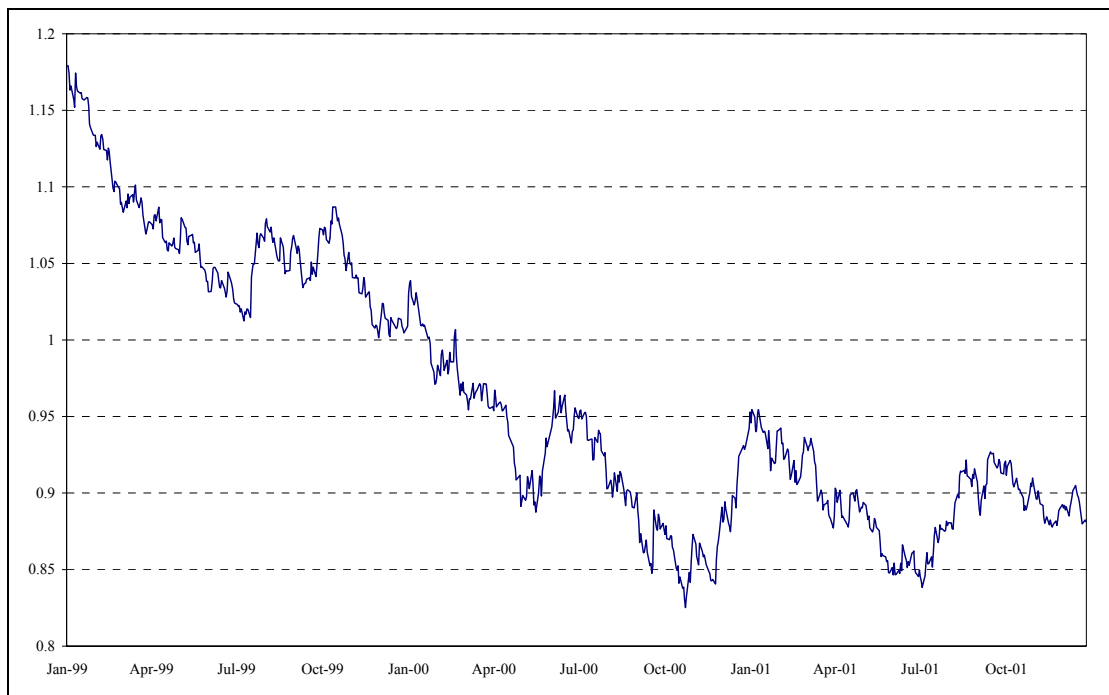
### **4.1 Recent Evolution**

From January 1999 until the end of 2001, the Euro has depreciated by around 25% against the US dollar. Although this depreciation has been continuous over time, some differences in the time profile of the exchange rate against the dollar can be observed.

During the first seven months of 1999, the Euro declined against the dollar by around 12%. During the next three months, the Euro recovered but it ended the year with a 15% depreciation. The most important factors to explain this behaviour were the respective cyclical outlooks for the US and the Euro area and the better than expected performance of the US Economy after the global financial crisis in the second half of 1999.

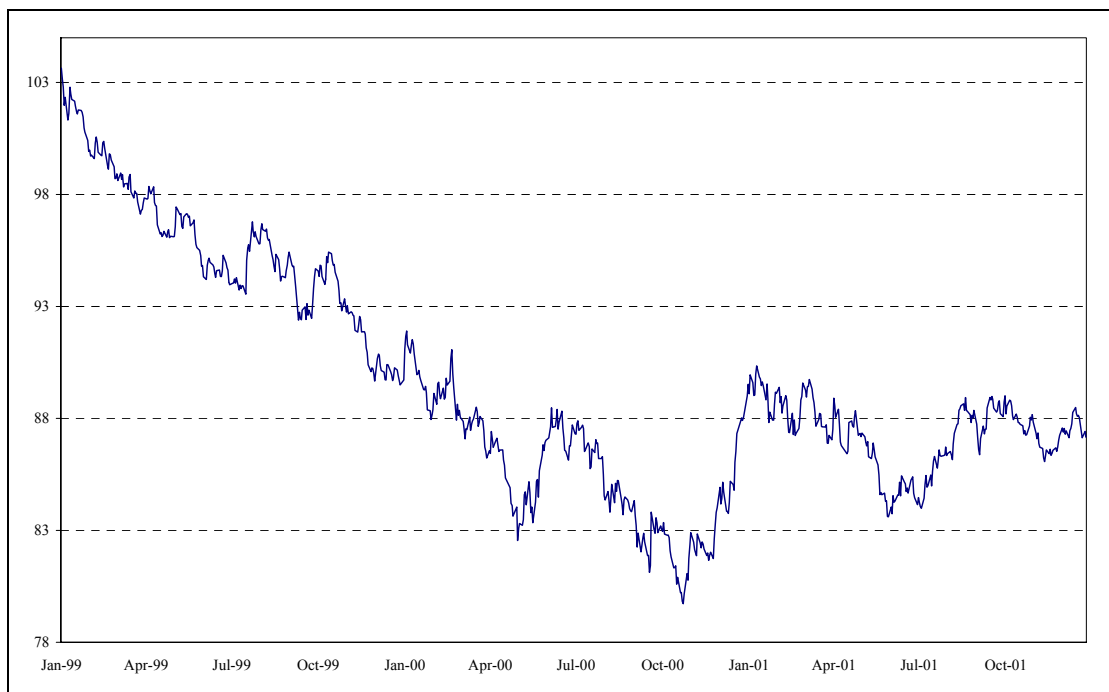
During most of 2000, the Euro continued to decline against the dollar although it rebounded strongly at the end of the year. This declining trend was also interrupted in May and June when the exchange rate achieved levels above 0.95. These levels were not achieved at the end of the year. In fact, on October 26 the Euro had its lowest value against the dollar since its existence, 0.8252. At the end of the year, however, the total depreciation was lower than the previous year at around 8%. The foreign exchange markets have identified the relative strengths of the US economy as driving the Euro down.

Figure 4: Nominal exchange rate of the Euro against the US dollar



Definition and source: Daily nominal exchange rates. ECB Monthly Bulletin, January 2002.

Figure 5: Nominal effective exchange rate of the Euro



Daily nominal effective exchange rate, 1999:I=100. Source: ECB Monthly Bulletin, January 2002.

## **4.2 Expected Developments**

In 2002, the Euro is expected to depreciate by about 3%, both in real and in nominal terms.

In 2003 there will be a mild depreciation of the Euro and a substantially higher growth in exports, as a consequence of global recovery. With a higher growth in GDP, imports will also rise.

Yet, there is substantial uncertainty around these forecasts. The consequence of the forecasts of higher or lower effective exchange rates are analysed in the extended version of the Report, and also in Section 6 below.

## **5. Financial Developments**

### **5.1 Recent Developments**

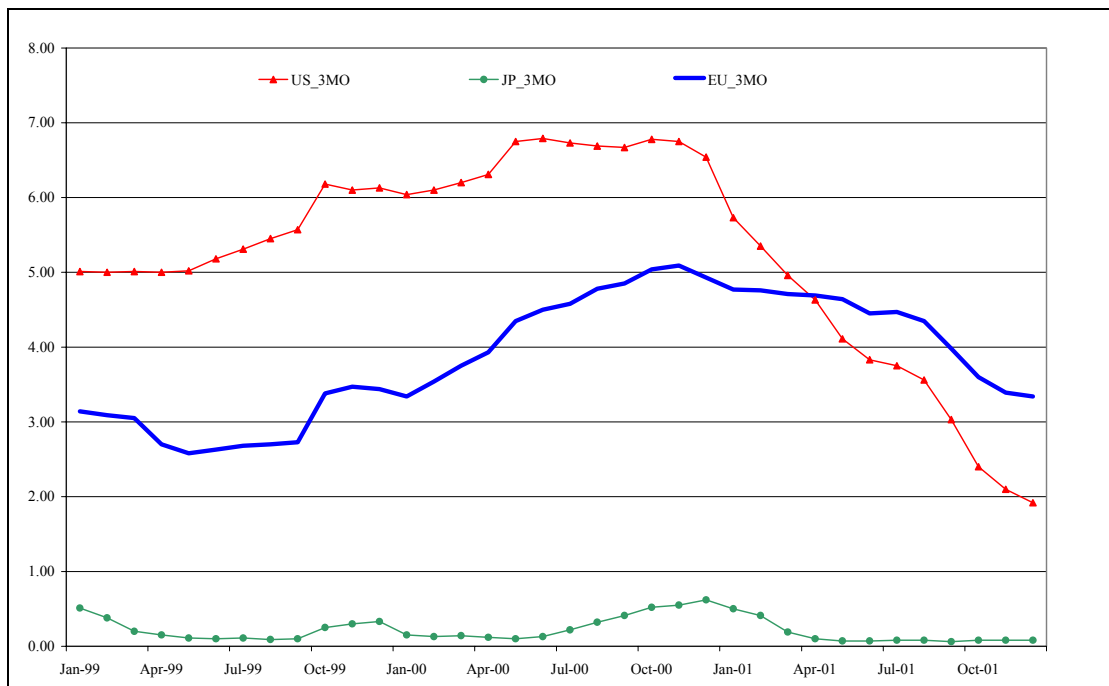
Stock prices should reflect market participants' expectations about future flows of dividends and more generally of future corporate earnings prospects. But at times speculative bubbles can drive stock market prices well away from their fundamental levels. Asset prices have shown a declining trend since 2000 all over the world reflecting a significant downturn revision in the earning expectations for high-technology firms. The over-estimation of the growth potentials of the New Economy has contributed to the bursting of the ICT bubble.

In 2001 a large swing in stock prices occurred following the terrorist attack in the US on September 11<sup>th</sup>. This episode had a dramatic negative impact on world stock markets. The Dow Jones Euro Stoxx registered a 16% drop, the US S&P 500 declined by 10%, the US Nasdaq Composite Index by 17%, and the Nikkei 225 went down by 14%. These drops are attributable to a substantial increase in uncertainty about future economic prospects for airline and insurance industries. Among the sectors included in the broad index for the Euro area, the consumer cyclical sector, which includes airlines, and the financial sector, which includes the insurance sector, were the most affected; they dropped by 22% and 18%, respectively. However, these marked declines in the stock indices were reversed in the following months as the effects of September 11<sup>th</sup> were becoming clearer.

In 2001 short-term interest rates in the Euro area declined steadily. During the course of 2000 money market rates had increased substantially, but the upward trend came to a halt at the end of that year.

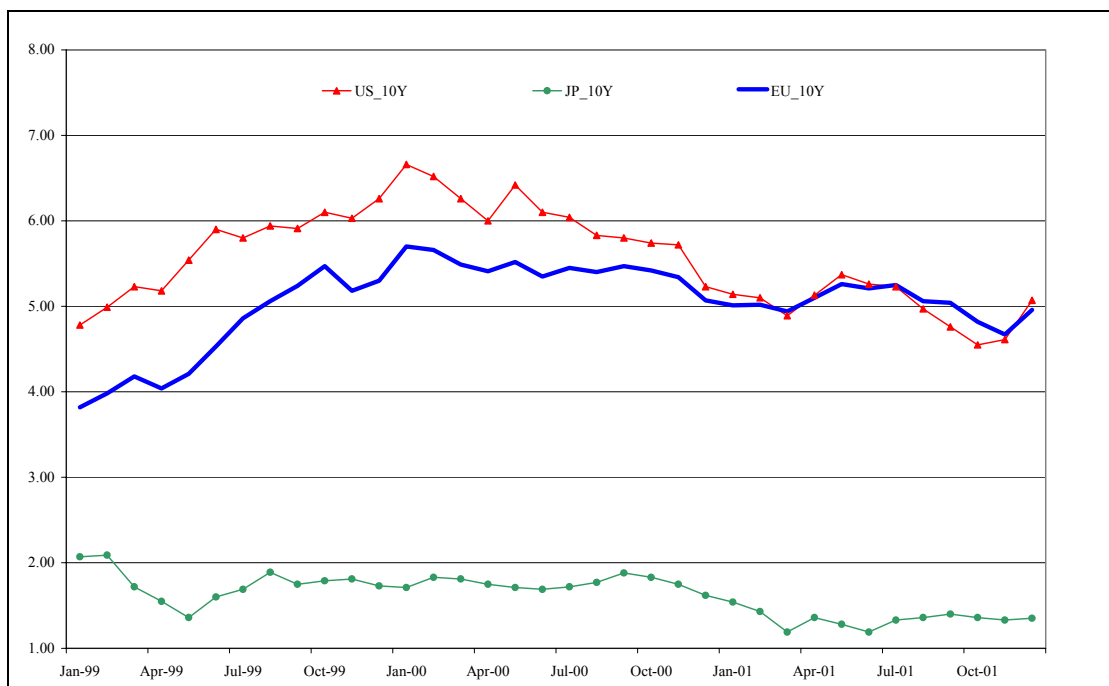
The downward movement in the rates in 2001 reflected market expectations of declining inflationary pressures in the Euro area associated with an anticipated looser monetary policy. Similar hump-shaped patterns have been observed also for short-term interest rates in the US and in Japan (Figure 6). Compared to the Euro area, the decline in US rates has occurred at a brisker pace. In fact, in April 2001 the differential between the US three-month rate and the Euro area three month rate from positive turned nil and since then it has been negative. This reflects the fact that lately the Federal Reserve has been more aggressive than the ECB in cutting interest rates.

Figure 6: Three-month interest rates for the Euro area, the US, and Japan



Long-term government bond rates in the Euro area remained broadly stable throughout of 2000 and mid 2001. In July 2001 the yields declined somewhat, but their trend sharply reversed in November. This latter increase is mainly attributable to a reversal of flight-to-safety portfolio flows from stocks into bonds caused by September 11<sup>th</sup> terrorist attacks.

Figure 7: Ten-year government bond interest rates for the Euro area, the US, and Japan



Flight-to-safety flows and their subsequent reversal have been observed also for the US bond market. It is interesting to notice how US and Euro area long-term rates have co-moved rather closely since 2001 (see Figure 7).

The yield curve can provide useful information on future developments in the economy. Comparing the yield curves constructed with data available as of August 2001 and the ones produced in February 2002 (Figures 8 and 9) it is clear that there has been a downward shift in the entire yield curve reflecting the declines observed in both short-term and long-term interest rates. The slope of the curve has also steepened since the declines were larger at the short end than at the long end of the maturity spectrum.

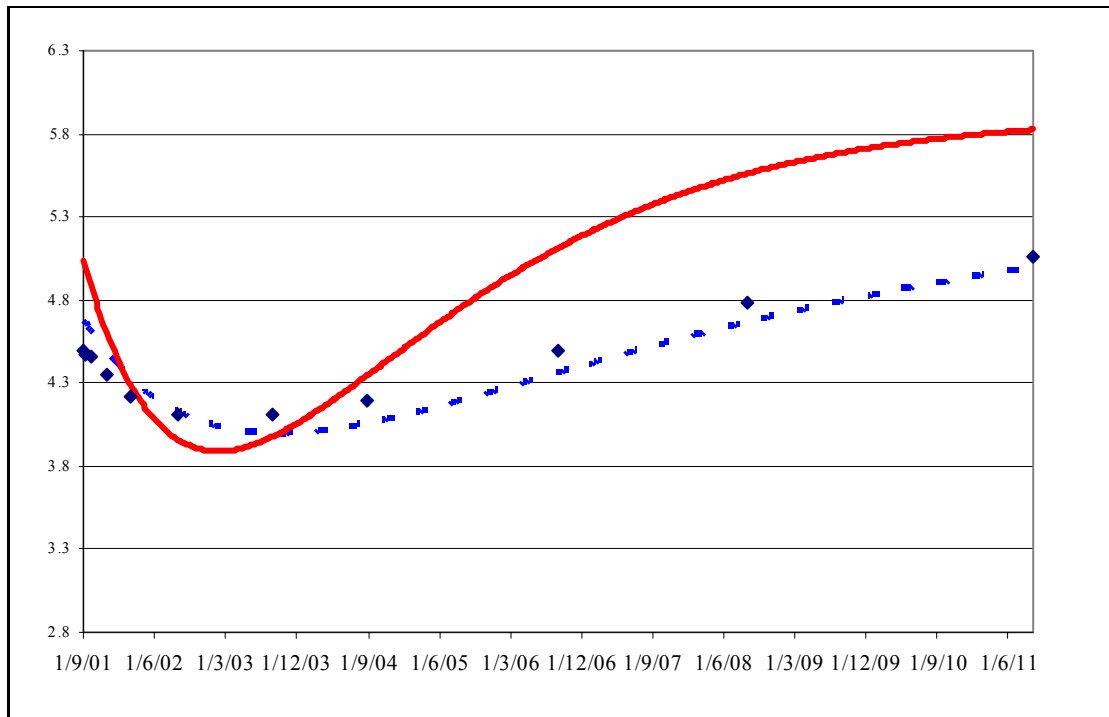
The instantaneous forward curve implied by the prevailing spot rates captures market expectations about the future level of the overnight rate. The EONIA is expected to decline moderately in 2002 and start to increase in 2003. The upward sloping yield curve signals that in the long run rates are expected to increase.

## **5.2 Expected Developments**

Three-month interest rates are forecasted to be 3.5% in 2002 and 3.8% in 2003. These forecasts are derived from the forward curve, which provides an efficient summary of market expectations. Ten-year government bond forecasts are higher, to compensate for expectations of increasing interest rates in the longer run. Interest rates are expected to increase in 2003 as a consequence of higher output and inflation. US short-term and long-term interest rates are assumed to be around 2% and 5%, respectively, in 2002 and to increase gradually to around 3% and 6%, respectively, in 2003.

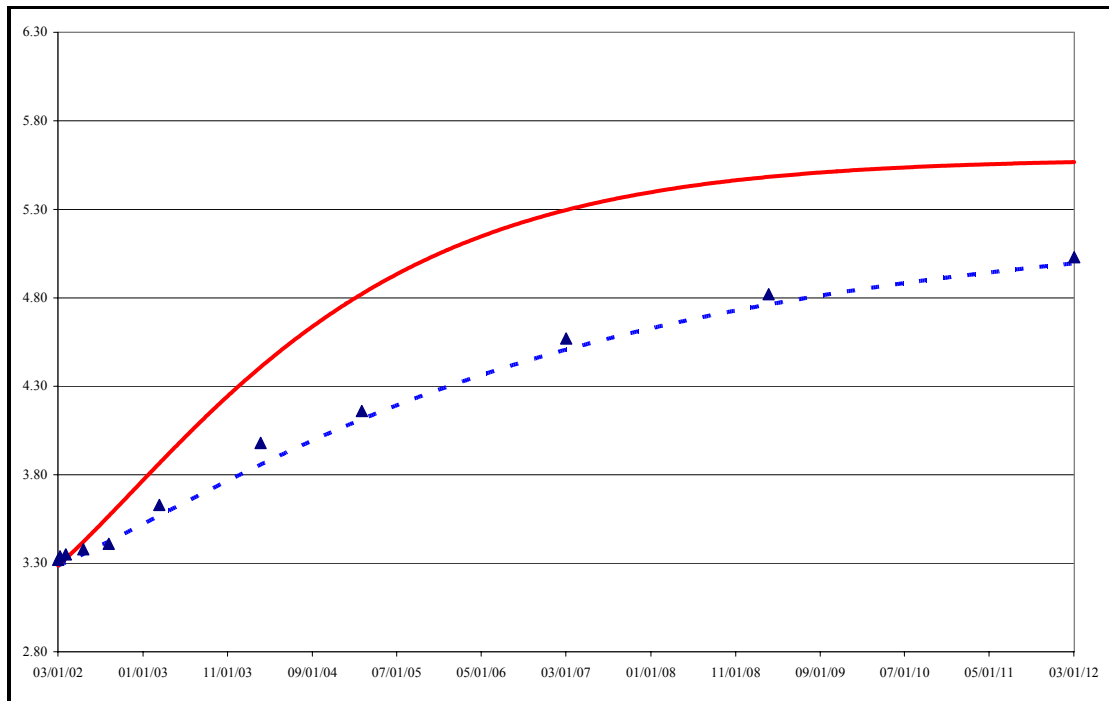


Figure 8: Euro area yield curve in August 2001



The solid and the dashed line are, respectively, the forward and the spot rate.

Figure 9: Euro area yield curve in February 2002



The solid and the dashed line are, respectively, the forward and the spot rate.

## 6. Alternative Scenarios for the Oil Price, US Growth, and the Exchange Rate

To conclude, we present some sensitivity analyses concerning the forecasts based on the macroeconomic model. Specifically, we focus on the role of the oil price, the dynamics of the US economy, and the behaviour of the Euro to dollar exchange rate for GDP growth in the Euro area and for the harmonized CPI inflation forecasts.

### 6.1 Oil Price Shock

As mentioned before, the price of oil is an important determinant of economic performance. Taking Germany as an example, each of the two oil crises in the 70s and 80s led to cumulative output losses in the range of 4 percentage points of GDP growth. This was accompanied by a significant rise in both the unemployment and inflation rates. Therefore, the short-run effects of an oil price shock on output and inflation deserve a more detailed investigation. In particular, in the baseline scenario, oil prices are constant at \$20 per barrel, while in the alternative, a 50% increase is assumed.

The results reported in table 1 indicate that the consequences of a rise in the oil price on the economic course in the Euro area seem to be very limited. In 2002 GDP growth declines about 0.1 percentage points, while inflation accelerates by 0.3 points. It seems that the dependence on oil prices is significantly lower when compared with the effects of the previous crises. Note though that these responses provide only a lower bound, because supply issues are not considered in the simulation. Moreover higher oil prices will also affect the other oil-importing countries outside the Euro area. Thus a reduction in foreign demand could also take place, and this in turn would have additional negative impacts on the economic course.

Table 1: The effects on GDP and inflation forecasts of alternative scenarios for oil price, US growth, and the Euro to dollar exchange rate

	2002		2003	
	GDP growth	HCPI inflation	GDP growth	HCPI inflation
Oil Price Increase <sup>a</sup>	-0.1	0.3	-0.1	0.2
US Growth Slowdown <sup>b</sup>	-0.2	0.0	-0.3	-0.1
Euro/US\$ Appreciation <sup>c</sup>	-0.2	-0.1	-0.2	-0.1

The table reports deviations with respect to the baseline scenario.

(a) Oil price increase: 50% increase, from \$20 to \$30 in 2002 and 2003.

(b) US growth slowdown: 0% (instead of 0.7%) in 2002 and 0.7% (instead of 3%) in 2003.

(c) Euro/US\$ appreciation: 5% in 2002 and 2003.

### 6.2 US Growth

A slower course of the US economy operates in the model through the foreign trade channel. According to the deterioration in US growth, exports of the Euro area are

reduced, generating a decline in the current account. The adverse demand effect leads to losses in production and employment, while inflation is expected to fall.

The growth rate of the US economy will be 0.7% in 2002, according to projections of the IMF (2001), slightly higher, about 1% according to more recent Consensus forecasts. In our baseline scenario growth is assumed to be 0.7% in 2002 and accelerate to an annual rate of approximately 3% percent from 2003 onwards. In the alternative scenario, a more pessimistic view is considered. Growth rates of 0.0% and 0.7% are assumed for 2002 and 2003, implying a deeper and longer lasting recession.

As a consequence of the adverse demand shock, Euro area GDP growth declines in the alternative scenario. In particular, there are negative deviations from 0.2 and 0.3 percentage points in 2002 and 2003, respectively. A decrease of 0.3 percentage points implies a decline of 10 billion Euro per quarter in real GDP, accompanied by about 0.9 million job losses in the Euro area. Since even in the alternative scenario a higher US growth is expected after 2003, a partial reversal of these effects can be expected. However, there is no full catch up with the baseline, and net losses remain even after several years.

The response of inflation approximately mirrors the course of demand, adjusted for some lag structure because of sticky prices in the short run. In particular, there would be no effects in 2002 and a minor decrease, about 0.1 percentage points, in 2003. Similar results are obtained when a higher US growth rate is assumed in the baseline scenario for 2002 and the values are correspondingly modified in the alternative scenario.

### **6.3 Euro/US\$ Exchange Rate Appreciation**

Finally, we consider the effects of a 5 % appreciation of the nominal Euro to US dollar exchange rate in 2002 and 2003. As in the oil price simulation, we concentrate on the short-run demand responses.

The Euro area growth perspectives are more pessimistic, growth forecasts decline by 0.2 points in 2002 and 2003, while there is only a minor reduction in inflation. However, this response may be overestimated since, due to data limitations, both exports and imports include the intra-area trade.

## **PART II Economic Policy in the Presence of a Euro Wide Shock**

The EFN Report in Part I provides an analysis of the current economic situation in the Euro area and prospects for the next two years. Further information on the driving forces behind the economic downturn of 2000 and 2001 and on the future expected developments can be gained by evaluating the effects of particular shocks hitting the economy. Thus, in Part II of this Report we provide some counter-factual exercises with the multinational model *Marmotte*.

*Marmotte* is an annual macro-econometric model for 17 countries: the 14 members of the European Union (Luxembourg and Belgium are merged), the United States, Japan and Canada. Each country is modelled by the same system of about 50 equations. The values of the parameters of these equations, and the exchange rate system, can differ between countries. Using the Armington assumption, each country produces a specific commodity, which is imperfectly substitutable with the commodities produced by other countries.

*Marmotte* is a dynamic model with a strong theoretical content and built under the assumption of perfect foresight. Most behavioural equations are based on intertemporal optimisation. It can be used to simulate the consequences of changes in economic policies or in economic environment, over the future, and around a baseline. The theoretical structure of the model allows a clear and precise interpretation of the simulation results in non-technical terms.

The two most important features of the *Marmotte* model are a vintage capital structure with a putty clay technology and consumption habit formation in an inter-temporal utility maximising framework. The stickiness that this induces in consumption is also complemented by some stickiness of nominal values, interest rate parities, monetary rules, etc. The model assumes inter-temporal equilibrium of the budget of each government and of the balance of payments of each country. More details are provided in Annex 3 of the extended version of the Report.

The first set of simulations is designed to deconstruct the US slowdown in 2001. The US recession in 2001 had its roots in the deterioration of the economic environment of the US private sector, but it is not clear whether it was driven mainly by demand or supply factors. Households' expenditures slowed down, as a reaction to an increase in the perceived uncertainty of their environment. But the contribution of the new economy to high growth and productivity also decreased, and is expected to be lower also in the future. Two shocks are examined; (a) a negative shock to household time preference in consumption, and (b) a fall in total factor productivity.

### **1. A Demand Shock in the US?**

In this simulation it is assumed that the rate of time preference for US households decreases from 4% to 3.5% for a period of five years, and households reallocate their consumption further into the future and raise current savings. Higher savings result both in higher investment by US firms and in an improvement in the current account

of the balance of payments. Higher investment should increase the capital intensity of newly installed vintages and raise employment. The effects relative to the base scenario are shown in Table 2. Overall, they do not support the argument that a demand shock has a role in the US downturn.

Table 2: The effects of a negative shock on the time preference rate of US consumers

US	YEAR 1	YEAR 2	YEAR 3
Production	-0.086	-0.070	-0.038
Consumption	-0.225	-0.327	-0.344
Investment	0.283	0.677	0.855
Capital intensity	0.097	0.099	0.101
Scrapping age	0.001	0.005	-0.001
Employment	-0.004	0.008	0.020
Real cost of labour	-0.009	-0.006	0.002
Inflation rate	-0.027	-0.024	-0.020
Real exchange rate	0.183	0.1843	0.183
Nominal interest rate	-0.029	-0.025	-0.022
Real interest rate	-0.004	-0.005	-0.006
Public balance	0.002	0.003	0.005
Trade balance	-1465.3	415.6	1581.5

Note that the US time preference rate is reduced from 4% to 3.5% for 5 years.

Units: percentage deviation from the baseline with the exception of interest rates, expressed in absolute deviations, government balance, expressed as absolute deviation in percentage points of baseline GDP, and trade balance, expressed as absolute deviation in million of US\$.

The real interest rate progressively adjusts to the discount rate of households. In the model, central banks are assumed to operate according to a Taylor rule. The nominal interest rate over-reacts to a change in inflation so the real interest rate varies with the rate of inflation. Moreover, inflation in the model decreases if there is excess capacity. As effective production is identical to total demand, this means that the decrease in consumption is only partly compensated for by the increase in investment. However, if the sensitivity of the nominal interest rate to a change in inflation in the Taylor rule was lower, the temporary contraction of output would disappear and the increase in investment would be larger than the decrease in consumption.

## 2. A Supply Shock in the US?

In this simulation the total factor productivity of new investment is assumed to decrease by 0.50% for five years. This can be thought as a consequence of the dramatic surge in private investment between 1998 and 2000, leading to an excessive build-up of productive capacity, with negative repercussions for total factor productivity. The results are shown in Table 3.

Table 3: The effects of a negative productivity shock in the United States

US	YEAR 1	YEAR 2	YEAR 3
Production	-0.610	-0.750	-1.037
Consumption	0.116	0.147	0.144
Investment	-3.381	-4.426	-6.097
Capital intensity	0.526	0.505	0.499
Scrapping age	0.070	0.139	0.275
Employment	0.044	-0.044	-0.121
Real cost of labour	-0.093	-0.205	-0.374
Inflation rate	-0.192	-0.188	-0.226
Real exchange rate	-0.305	-0.243	-0.162
Nominal interest rate	-0.272	-0.297	-0.384
Real interest rate	-0.081	-0.068	-0.051
Public balance	0.089	0.048	0.016
Trade balance	14724.6	21952.6	31760.7

Note that the US total factor productivity is temporarily reduced by 0.50% for 5 years.

Units: percentage deviation from the baseline with the exception of interest rates, expressed in absolute deviations, government balance, expressed as absolute deviation in percentage points of baseline GDP, and trade balance, expressed as absolute deviation in millions of US\$.

Because the investment decision is forward looking, the return to previous levels of productivity after five years provides an incentive to postpone investment, the more so the closer the year when productivity levels jump up. Hence, the decline in investment increases the closer we are to the last year of the shock. Because investment goods start being productive the year after installation, postponing or bringing forward the scrapping date of old production units changes potential production. Thus, potential production declines. However, the decrease in potential output is smoother than the decrease in investment, *i.e.* in effective production (which is identical to total demand). Therefore, excess capacity drives inflation down.

This last result may look counterintuitive, but can easily be understood. The productivity shock decreases the efficiency of new capital vintages for the five years of the shock. However, the efficiency of old vintages is not reduced. Thus, after the shock, supply does not change by much. But investment and demand are strongly reduced. So, we have a deflationary effect of the shock. The productivity shock could have been defined differently, as decreasing the efficiency of all capital vintages; old capital and new investment. Then, supply would fall, and inflation would have risen. With a putty-putty model, only this second kind of shock could be simulated. The first kind of shock was retained here because inflation strongly decreased in the US in 2001 and 2002.

### 3. The effect of the US supply shock on the Euro area

Now we examine the extent to which the US supply shock is propagated to the Euro area. The decline in the US inflation rate implies a lower price level, so that arbitrage raises the nominal exchange rate immediately. But nominal stickiness in US prices means that the real exchange rate rises (though it is unchanged in the long run as the productivity shock is temporary). The real depreciation of the Euro raises the price of

investment goods as some capital goods are imported, and investment in Europe declines.

Therefore, the US supply shock decreases the real value of the Euro, increases the real cost of capital in Europe, which in turn depresses investment and employment. However, the effects on European economies are weak, and they are not much stronger in Germany than in the other members of the European Union. The comparison with France, for example, reveals that the effects are roughly of the same order of magnitude. Thus, on this evidence, explaining the current German downturn as a consequence of the US slowdown looks unconvincing. The synchronisation in GDP growth rates in the Euro area and in the US noted in the first part of the Report can be attributed more to a common shock hitting both economies, than to the transmission of a US shock to European economies.

Table 4: Negative productivity shock in the US: its impact on the Euro area

	Euro area			Germany			France		
	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3
Production	-0.038	-0.009	-0.041	0.063	-0.034	-0.088	0.049	-0.014	-0.022
Consumption	-0.027	-0.049	-0.065	-0.027	-0.046	-0.059	-0.021	-0.032	-0.038
Investment	-0.994	-1.603	-2.582	-0.845	-2.077	-3.340	-0.696	-1.768	-2.790
Capital intensity				-0.199	-0.196	-0.191	-0.211	-0.210	-0.210
Scrapping age				0.000	-0.002	0.004	-0.005	-0.004	-0.008
Employment	0.000	-0.024	-0.074	0.000	-0.023	-0.082	-0.003	-0.019	-0.073
Real cost of labour	0.006	0.017	0.019	-0.005	0.005	-0.004	-0.001	0.016	0.015
Inflation rate	0.014	0.013	0.023	0.019	-0.001	0.0075	0.015	0.004	0.023
Real exchange rate				0.273	0.397	0.543	0.239	0.346	0.462
Nominal interest rate	0.009	0.017	0.033	0.009	0.017	0.033	0.012	0.032	0.062
Real interest rate	-0.005	-0.006	-0.009	0.009	0.010	0.011	0.009	0.009	0.011
Public balance	-0.046	-0.058	-0.075	-0.047	-0.052	-0.072	-0.050	-0.057	-0.079
Trade balance	11206.0	25164.5	42796.6	3788.2	8181.2	13606.9	1585.8	3970.5	6902.5

Note that the US global productivity of factors is temporary reduced by 0.50% for 5 years.

Units: percentage deviation from the baseline with the exception of interest rates, expressed in absolute deviations, government balance, expressed as absolute deviation in percentage points of baseline GDP, and trade balance, expressed as absolute deviation in millions of US\$.

#### 4. An Evaluation of the Policy Rule of the ECB faced with a Negative US Supply Shock

The baseline simulations suppose that the nominal interest rate for all central banks is only sensitive to the variations of the most recent observation of inflation with a coefficient of 1.5. Since the output gap is negatively related to unemployment by Okun's law, and unemployment is negatively related to inflation in the short run by the Phillips curve, an increased interest of the central bank in the real economy can be captured by a higher coefficient of inflation in the Taylor rule.

This section investigates the consequences of the higher sensitivity of the interest rate to changes in the inflation rate for the ECB. Specifically, the sensitivity of the interest rate to inflation is increased from 1.5 to 2.5. The simulation assumes the same depressive supply shock in the US as in Tables 3 and 4. The results are summarised in Table 5.

If the ECB attaches more importance to its inflation target, it will react to a given level of inflation by increasing the interest rate more, which will reduce the depreciation of the Euro. Thus, the real cost of investment decreases less in the US and increases less in Europe, which limits the decrease in investment in Europe compared with a less reactive monetary rule (compare with Table 3). Employment follows investment with a one-year lag and its decrease is also dampened. If European investment deteriorates less, consumption decreases more. Thus, the impact on the effective production is ambiguous. In our simulations, production in Europe does not change by much when the ECB is more reactive.

In summary, a change in the monetary rule of the ECB seems ineffective in protecting economic conditions in Europe against the transmission of a recession from the US. On the other hand, as discussed in details in the extended version of the Report, a change in the monetary rule of the Federal Reserve is a very effective means of shielding the US and Europe against a negative supply shock in the US. Looking at the repercussion on the countries within the Euro area, we can notice that Germany would be affected slightly more by the shock, as long as domestic demand, and especially investment, is concerned.

Table 5: Negative productivity shock in the US with an increased sensitivity of the ECB to inflation

	Euro area			Germany			France		
	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3
Production	-0.043	-0.030	-0.083	0.021	-0.060	-0.135	0.027	-0.034	-0.063
Consumption	-0.063	-0.109	-0.142	-0.076	-0.125	-0.159	-0.062	-0.102	-0.129
Investment	-0.861	-1.430	-2.404	-0.807	-1.880	-3.142	-0.601	-1.537	-2.541
Capital intensity				-0.267	-0.264	-0.258	-0.286	-0.285	-0.284
Scrapping age				0.006	0.012	0.025	0.000	0.005	0.007
Employment	0.004	-0.009	-0.047	0.004	-0.011	-0.057	0.000	-0.007	-0.048
Real cost of labour	-0.001	0.001	-0.005	-0.009	-0.012	-0.030	-0.006	0.001	-0.006
Inflation rate	0.010	0.002	0.002	0.005	-0.011	-0.013	0.008	-0.006	0.003
Real exchange rate				0.199	0.323	0.468	0.168	0.272	0.386
Nominal interest rate	0.002	0.001	0.002	0.002	0.001	0.002	0.007	0.017	0.031
Real interest rate	0.000	-0.001	-0.004	0.013	0.014	0.016	0.013	0.013	0.015
Public balance	-0.033	-0.042	-0.054	-0.033	-0.039	-0.054	-0.038	-0.044	-0.061
Trade balance in curent \$	11989	24958	41780	3931	8094	13322	1743	3922	6694

Note that the US total factor productivity is temporary reduced by 0.50% for 5 years.

In the Taylor rule for the ECB, the parameter on the European current inflation rate is increased from 1.5 to 2.5, whereas it stays equal to 1.5 for the Federal Reserve. Units: percentage deviation from the baseline with the exception of interest rates, expressed in absolute deviations, government balance, expressed as absolute deviation in percentage points of baseline GDP, and trade balance, expressed as absolute deviation in millions of US\$.



## 5. An Evaluation of a Co-ordinated Fiscal Expansion in the Euro Area

In this section we evaluate whether a fiscal expansion in Europe or a reduction in taxation would be beneficial. The results are summarised in tables 6 and 7.

### 5.1 Increase in European Government Spending

In the simulation, government expenditures in good and services were increased by 1% of GDP in 2001 in all countries of the Euro area, and this rise was assumed to be expected to last for the following 9 years.

This demand shock does not change by much the potential production of European economies and thus leads to higher inflation. Households and firms transfer their expenditures from the present to the future to avoid the transitory increase in prices. The reduction of private demand does not fully substitute for the increase in public demand because prices are sluggish in the short run. Hence, effective output is higher for two years. The crowding out effect on private demand is particularly evident in investment. At the national level, we can observe that the effects on consumption are spread quite symmetrically, whereas investment is slightly more affected in France and Germany. The higher demand for European goods induces a real appreciation of the euro. As prices are sluggish in the short run, when the exchange rate is fully flexible, the nominal value of the euro increases. The appreciation of the euro is strengthened by the raise in the interest rate in Europe.

Table 6: The effects of an increase in European government spending by 1% of GDP

	Euro area			Germany			France		
	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3
Production	0.171	0.049	-0.025	-0.047	0.028	-0.043	0.243	0.096	-0.016
Consumption	-0.114	-0.201	-0.258	-0.164	-0.278	-0.341	-0.146	-0.254	-0.323
Investment	-2.706	-2.812	-2.862	-3.545	-2.959	-3.017	-2.988	-3.095	-3.246
Capital intensity				-0.267	-0.272	-0.271	-0.359	-0.364	-0.364
Scrapping age				-0.028	-0.016	0.028	-0.035	-0.009	0.029
Employment	-0.020	-0.093	-0.156	-0.018	-0.121	-0.182	-0.022	-0.094	-0.160
Real cost of labour	0.023	0.016	-0.044	0.042	0.024	-0.032	0.025	0.015	-0.058
Inflation rate	0.053	0.054	0.060	-0.011	0.055	0.063	0.077	0.066	0.063
Real exchange rate				-0.397	-0.400	-0.395	-0.433	-0.446	-0.443
Nominal interest rate	0.067	0.079	0.091	0.067	0.079	0.091	0.083	0.086	0.092
Real interest rate	0.012	0.019	0.026	0.011	0.016	0.019	0.017	0.022	0.027
Public balance	-0.998	-0.936	-0.885	-1.002	-0.954	-0.905	-0.977	-0.916	-0.871
Trade balance in current \$	8803	7203	6566	1900	1630	1612	1802	1495	1380

Note that government spending increases by 1% of the GDP of each European country for 5 years. Units: percentage deviation from the baseline with the exception of interest rates, expressed in absolute deviations, government balance, expressed as absolute deviation in percentage points of baseline GDP, and trade balance, expressed as absolute deviation in million of US\$.

## 5.2 Decrease in Corporate Taxes and in Wages Taxes

The decrease in the wages tax rate reduces the wedge between the real cost of labour and real wages. Hence, this measure benefits both households, as the real wages increase, and firms, as the cost of labour decreases. Because of the latter effect, employment increases. However the beneficial effects for economic conditions of a decrease in the taxation of labour are weak. The decrease in the cost of labour increases the efficiency of investment: thus investment increases and the new production units become less capital intensive. As the economy becomes more efficient, households become wealthier and consumption increases. The effects are symmetrical across countries.

Decreasing the taxation of profits is a more efficient way of improving economic efficiency. However, new investments become more capital intensive instead of less capital intensive, which dampens the beneficial effects on employment. Moreover, production increases more than capacity, and thus leads to higher inflation and interest rates.

Table 7: The effects of a decrease in the taxation of profits in the Euro area by 1% of GDP

	Euro area			Germany			France		
	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3
Production	0.117	0.126	0.114	0.163	0.135	0.121	0.151	0.126	0.114
Consumption	0.025	0.034	0.042	0.033	0.044	0.053	0.029	0.039	0.048
Investment	0.361	0.380	0.319	0.514	0.396	0.324	0.532	0.424	0.350
Capital intensity				-0.008	0.000	0.007	-0.006	0.003	0.013
Scrapping age				-0.021	-0.013	-0.012	-0.024	-0.005	-0.010
Employment	-0.017	0.007	0.020	-0.013	0.009	0.023	-0.015	0.015	0.026
Real cost of labour	0.016	0.023	0.023	0.013	0.023	0.021	0.010	0.020	0.025
Inflation rate	0.042	0.037	0.027	0.052	0.036	0.026	0.048	0.031	0.023
Real exchange rate	0.000	0.000	0.000	0.014	0.025	0.035	0.017	0.030	0.042
Nominal interest rate	0.066	0.056	0.041	0.066	0.056	0.041	0.068	0.059	0.045
Real interest rate	0.029	0.028	0.027	0.030	0.029	0.029	0.036	0.035	0.035
Public balance	-0.137	-0.116	-0.099	-0.146	-0.123	-0.106	-0.151	-0.127	-0.110
Trade balance in curent \$	-1026	-1481	-1791	-280	-364	-433	-273	-381	-425

Note that profits taxation is reduced by 1% of GDP in all the countries of the Euro area for 5 years.  
Units: percentage deviation from the baseline with the exception of interest rates, expressed in absolute deviations, government balance, expressed as absolute deviation in percentage points of baseline GDP, and trade balance, expressed as absolute deviation in million of US\$.

A tax cut policy seems more efficient to stabilise the economic activity than increasing public expenditure on goods and services. Decreasing taxes improves the supply side of the economy and has no negative effects on private demand. Thus the expansionary effect allows for the building of an automatic tax stabiliser. In the case of public expenditures, it appears that private demand decreases and public balances in European economies deteriorate more. Moreover, inflation is much higher because demand increases more than capacity which does not change substantially.

Our simulations also show that increases in government spending have a larger impact on the public deficit than tax reductions, and could even lead to bridge the SGP target in the case of Germany (table 8). Overall, in this particular context of high deficits in most of the Euro area countries, there appears to be limited room for manoeuvre of national fiscal policy to cope with large symmetric negative shocks.

Table 8: Public deficits as percentage of GDP for selected EU countries in 2001 and increase in points after expansionary fiscal policy

Deficit/ GDP	2001	Fiscal expansion by								
		Increasing public expenditures			Reducing households taxes			Reducing corporate taxes		
		2002	2003	2004	2002	2003	2004	2002	2003	2004
Germany	2.6	1.00	0.95	0.90	0.12	0.11	0.10	0.15	0.12	0.11
France	1.4	0.98	0.92	0.87	0.13	0.12	0.11	0.15	0.13	0.11
Italy	1.1	1.07	1.00	0.94	0.10	0.10	0.09	0.15	0.12	0.10

### **PART III      The Asymmetric Effects of Monetary Policy**

There has been a resurgence of interest over the last decade in models of economic activity where the effects of a shock can depend on at what point in the business cycle the shock occurs. This builds, in part, on an older tradition dating back to the 1920s (Crum, 1923, Mitchell, 1927, Keynes, 1936, Friedman, 1964)<sup>5</sup> which emphasises that the adjustment of the economy over business cycles may be asymmetric. A particularly useful way of modelling this possibility is by means of a generalisation of Hamilton's Markov switching framework. This allows for specific driving variables that not only have different effects in expansionary and contractionary phases of the cycle, but also have an effect on the probability that the economy is in one or the other of these phases.

The academic literature on the effects of unanticipated monetary shocks broadly identifies three different possibilities. In the first the *sign* of the monetary shock matters. A negative shock has a different effect from a positive shock. In the second, the *size* of the shock matters. The economy reacts differently to large shocks. Small shocks may provoke little response. And finally, the position in, or *state* of, the business cycle may matter. "*state*" asymmetries, according to which the effects on output depend on the phase of the business cycle.

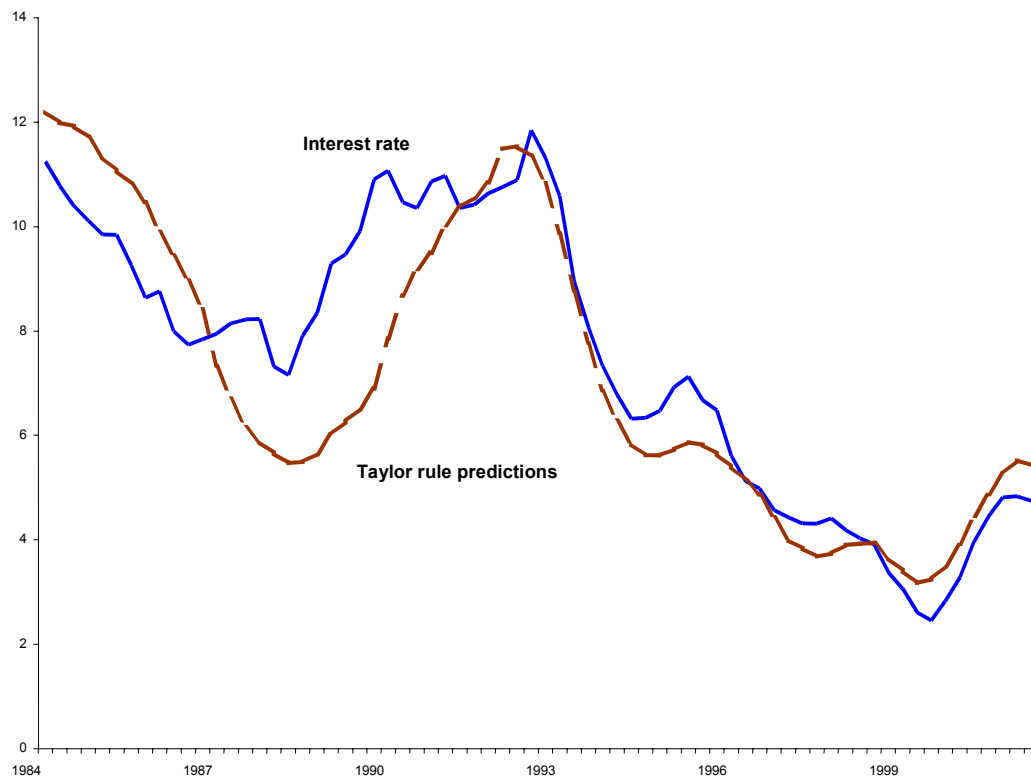
Our aim is restricted to the analysis of the possible existence of "*state*" asymmetries. In this case unanticipated changes in monetary policy can affect real output growth rates differently in business cycle recessions and expansions. Although it has received far less attention in the literature than the two other types of asymmetry, there are at least two arguments justifying its possible existence. First, there are models of price adjustment that imply a convex aggregate supply curve. This implies that monetary policy will have stronger real effects during recessions, when output is below its long-run level, than in expansions, when the aggregate supply curve is almost vertical. Secondly, there is a broad class of models that provide support for "*state*" asymmetries by explicitly modelling the credit or lending channel of the monetary transmission mechanism. According to this interpretation, if financial markets face information asymmetries, credit and liquidity may be readily available in booms whilst agents may find it harder to obtain funds in recessions. Therefore, it is likely that monetary policy will have stronger effects on consumption and investment decisions during recessions than during expansions.

We are interested in the asymmetric effects of monetary policy and need to distinguish between the anticipated and unanticipated components. The anticipated part is modelled with Taylor rule that makes the interest rate a function of inflation and the output gap. This is estimated for the Euro area. Unanticipated monetary policy shocks are then just the residuals of this reaction function. In figure 10 the predictions of the Taylor rule is plotted against the actual path for the interest rate.

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<sup>5</sup> Crum, W.L. (1923) "Cycles of Rates on Commercial Paper", Review of Economic Statistics, 5, pp. 17-29; Mitchell, W. A. (1927) "Business Cycles: the problem and its setting", NBER, New York; Keynes, J.M. (1936) "The General Theory of Employment, Interest and Money", London: Macmillan/Royal Economic Society; Friedman, M. (1964) "Monetary Studies of the National Bureau", The National Bureau Enters its 45th Year, 44th Annual Report, pp. 7-25.

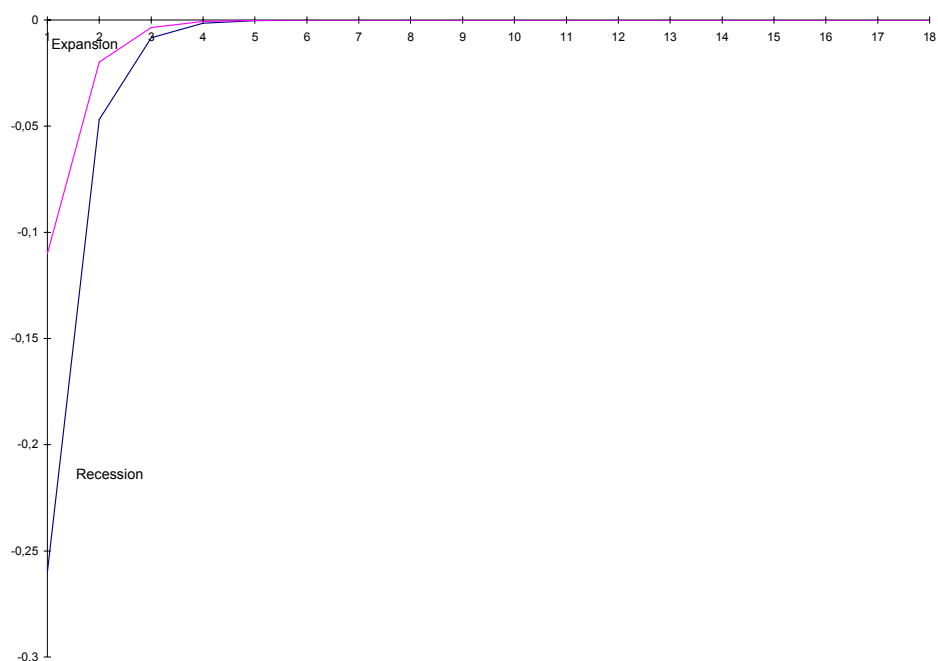
Figure 10: Actual and Taylor rule forecast for interest rate in the Euro area



In the second stage, those shocks are used as explanatory variables in a multivariate Markov switching model for GDP growth, in order to examine whether the effects of unanticipated changes in monetary policy on output growth depend on the business cycle regime at the time the shock occurred.

Two interesting results are obtained. First, we find evidence of asymmetries. Monetary policy shocks have larger effects during recessions than during expansions. In figure 11 we plot the effects of an unanticipated increase in interest rates in an expansion phase of the business cycle compared to the effects in a recession. It is clear that a contractionary monetary policy during a recession has a much stronger impact on output than it does in the expansionary phase. This implies that booms need a more vigorous monetary tightening to rein them in, while in a recession monetary policy needs to be particularly loose in order to bring the economy out of recession.

Figure 11: Response of GDP growth to an unanticipated increase in interest rate in different phases of the cycle



Secondly, we find that monetary policy shocks affect the transition probabilities from one cyclical phase to another. This is particularly important since it implies that monetary policy at particularly critical times can have major impacts on the economy.

To ascertain the effects of interest rate shocks on the probability of being in expansion or recession, we use the following experiment. Suppose that the European Central Bank were to implement a negative (expansionary) interest rate shock of 100 basis points in a single quarter. Then, the question is: “*How would that shock affect the transition probability from a recession to an expansion?*” Likewise, if instead a positive (contractionary) interest rate shock of identical magnitude were to be considered, “*How would it affect the probability of a converse switch?*”

Table 9 shows the simulated changes in the probabilities with a positive or negative interest rate shock of 100 basis points. It is found that an unanticipated interest-rate cut of such a magnitude will increase the probability of getting out from a recession from 41% to 57%, whereas an unanticipated rise in the interest rate will increase the probability of entering a recession from 29% to 39%. Therefore, in accordance with the stronger real effects of monetary policy during recessions found before, the probability of escaping a recession in response to a cut in interest rates is larger than the probability of entering a recession in response to a rise in interest rates.

Although these results are for Europe, lessons can be learned for the US. Prompt, timely action by monetary authorities can help to avert the onset of recessions in powerful, non-linear ways.

Table 9: Effects of interest rate shocks on transition probabilities in different phases of the cycle

$u_t = - 100$ b.p. (t to t+1)		
	Before the shock	After the shock
$p_{rr}$	0.59	0.43
$p_{re}$	0.41	0.57

$u_t = + 100$ b.p. (t to t+1)		
	Before the shock	After the shock
$p_{ee}$	0.71	0.61
$p_{er}$	0.29	0.39

$p_{rr}$  is the probability to remain in recession.  $p_{rb}$  is the probability to exit from recession.  $p_{bb}$  is the probability to remain in boom.  $p_{br}$  is the probability to move to recession.

## **PART IV      The Extended Version of the Report**

The extended version of the Report contains a more detailed and technical analysis, with several references to the relevant literature.

In particular, the conjunctural analysis is supplemented by boxes on the cyclical relationship between the Euro area and the US industrial sectors, the construction of coincident indicators for the Euro area, and the impact of macroeconomic shocks on the key variables of the economy.

The analysis of economic policy is enriched by an investigation of the effects of changes in monetary and fiscal policy in the US, and their spillovers on the Euro area.

The evaluation of the asymmetries in the cyclical effects of monetary policy is conducted in a rigorous econometric framework, and the methodology is described in details.

Finally, there are five Annexes. Annex 1 presents a detailed real-time forecast comparison exercise, where the performance of the forecasting structural model is compared with that of a variety of linear and nonlinear, univariate and multivariate time series models, for all macroeconomic variables under analysis and over several forecast horizons. Annex 2 describes in details the structural model, and Annex 3 the Marmotte model, used in the policy simulation exercises. Annex 4 and Annex 5 give details about the data sources and the exogenous variables used in the structural forecasting model.