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## **Euroland: Peak of the upswing – Little evidence of a new economy**

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## **Euroland: Peak of the Upswing — Little Evidence of a New Economy**

**by Klaus-Jürgen Gern, Christophe Kamps, Carsten-Patrick Meier and  
Joachim Scheide**

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- In the summer of 2000, the economic expansion in Euroland has continued at a rapid pace. However, a number of leading indicators suggest that the upswing will pass its peak in the second half of this year. Several reasons are responsible for the slowdown. The European Central Bank has corrected the expansionary course after the inflationary risks in the euro area had increased; households and firms experience a reduction of real income due to the deterioration of the terms of trade; finally the export boom is coming to an end as the world economy slows down somewhat and the effects from the euro depreciation slowly fade.
- Real GDP will rise by 2.9 percent next year. While output growth will slow down gradually and approach the growth rate of potential output, employment will continue to expand swiftly, and the unemployment rate will decline to around 8 percent by the end of 2001. Inflation will remain above the ECB's target of 2 percent for the rest of this year and decelerate only moderately in the course of next year. While external factors will lose their impact, the core rate of inflation will remain headed upwards.
- The situation of public budgets seems to improve as there will be large revenues from the sale of mobile phone licenses in a number of countries. European governments intend to use these receipts to reduce public debt. The savings in terms of interest payments should also not be used to raise public spending. Sustained fiscal consolidation requires that government expenditures increase at a lower rate than GDP over an extended period of time. This is also necessary to support the course of lowering the tax burden in order to strengthen economic growth. Direct taxes will be reduced considerably in 2001, the reduction will amount to some 0.8 percent of GDP. As a consequence, structural budget deficits will rise.
- The increases of key interest rates can be justified on the basis of the strategy of the ECB. Since the beginning of EMU, money growth has been higher than intended. Thus, there was a need for correction. Otherwise, the risks for price level stability would have increased even more. The ECB should make sure that it will achieve its target of price level stability because this is essential for its credibility. It is also important for the attractiveness of the monetary union in general. Stability risks in Euroland did, however, not emerge because of a wrong strategy but because the strategy was not followed strictly enough by the ECB.
- In contrast to the situation in the United States, there is not yet an acceleration of the increase in productivity in Euroland. However, the "new economy" will also gain ground in the euro area especially since the use of the internet is increasing rapidly. But productivity gains will remain below those observed in the US partly because the share of the computer industry is smaller. In addition, the advance of new technologies is connected with substantial structural changes in the economy. If the gains in productivity are to materialize, product and labor markets must show sufficient flexibility; this, however, is more likely in the US than in Euroland.
- The current weakness of the euro is usually explained by cyclical factors. Interest rate differentials as well as differences in economic growth play a key role. It can be shown that there is a close relationship between real interest rate differentials and the real exchange rate. Growth differentials do not have much additional explanatory power. On the basis of the model, a gradual appreciation of the euro towards parity vis-à-vis the US dollar is forecast.

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## **Euroland: Peak of the Upswing — Little Evidence for a New Economy**

Economic expansion in Euroland has continued at a rapid pace in the summer of 2000. For the year as a whole, an increase in real GDP of 3.4 percent can be expected. While this rate is slightly higher than our previous forecast, we still expect that the upswing will pass its peak in the second half of this year. Several leading indicators point in this direction, especially the results of industry surveys have started to deteriorate slightly.

The slowdown is due to the weakening of several important factors. The European Central Bank (ECB) has corrected its expansionary stance after inflationary risks in the euro area had increased. Furthermore, households and firms are burdened by the deterioration of the terms of trade; the additional oil bill for this year alone is equal to about 1 percent of GDP. The consequent reduction of real income will also dampen economic activity. Finally, the export boom, which had been the main driving force of the upswing for more than a year, will slowly come to an end. Not only will the expansion of the world economy moderate, but also the stimulus resulting from the weakness of the euro is likely to fade. A renewed set-back for the euro is not likely in the near future; this forecast is derived in a model which will be later introduced and which explains the exchange rate quite well over time.

All these factors imply that the upswing will lose momentum in the forecast period and that the rate of increase of real GDP will approach the growth rate of potential output; only fiscal policy will have an expansionary effect in the coming year. A strong downturn, however, is not likely. This would materialize only if, contrary to expectations, the inflationary tendencies aggravated and the ECB turned to a restrictive stance.

Apart from the cyclical elements, it is to be investigated whether potential output growth accelerates. So far, there is only very limited evidence for a new economy in the euro area. Therefore, it cannot be expected that real GDP will increase by more than 2.5 percent over an extended period of time.

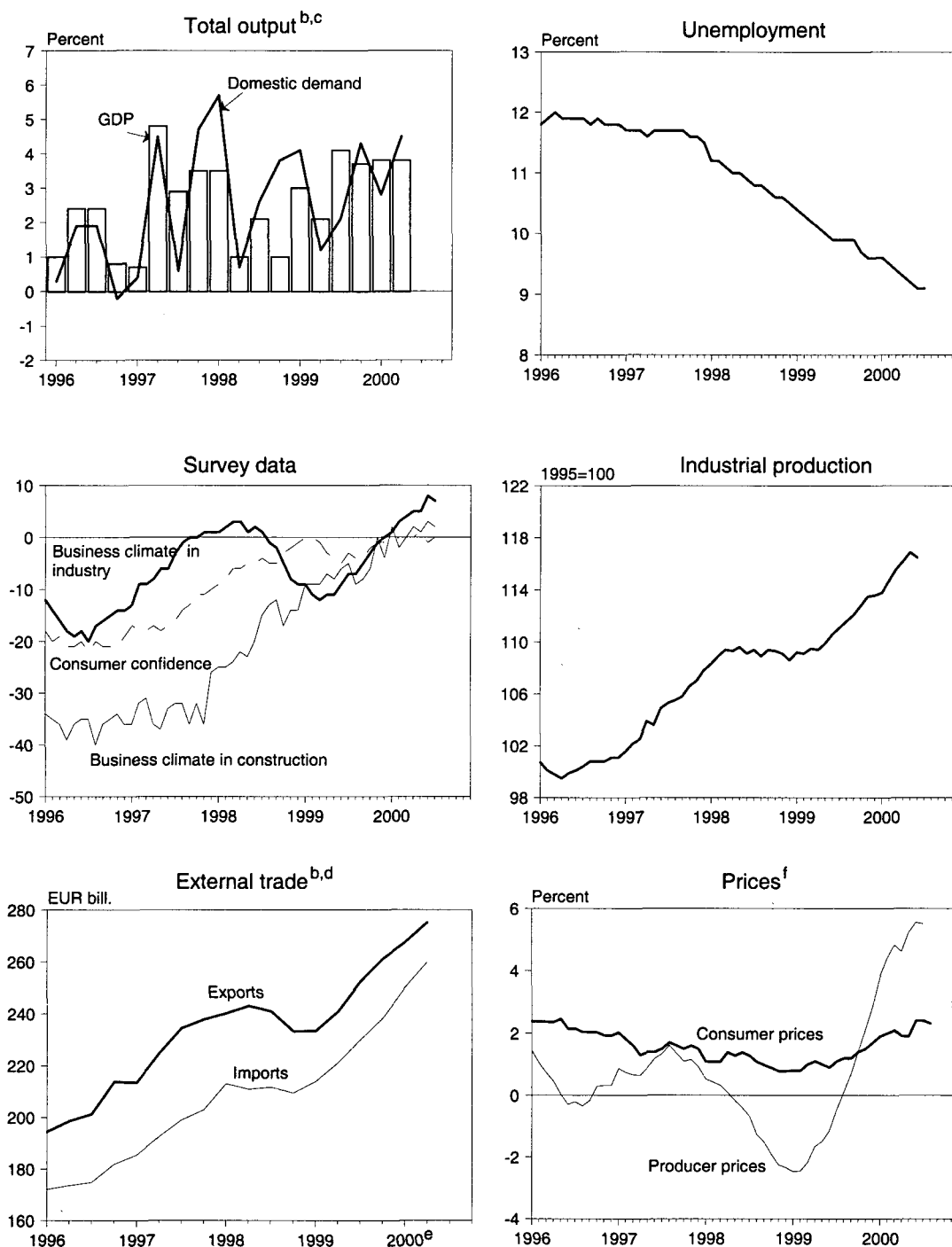
### **1 Further Accelerated Upswing**

Economic activity in Euroland moved up strongly in the first half of 2000. As in the preceding semester real GDP increased at an annual rate of more than 3.5 percent (Figure 1). For the past twelve months the speed of expansion considerably exceeded potential output growth, which we estimate to be around 2.5 percent. The output gap, which had become larger in the wake of the crises in emerging economies, should have closed in the meantime. According to surveys of the European Commission capacity utilization in the manufacturing sector has continued to rise until recently and is substantially above its long-term average. Leading indicators point to a continuation of the strong upswing in the third quarter of 2000, even though at a slightly lower rate.

Exports whose recovery had brought about the turnaround in economic activity last year, have evolved dynamically until recently (Figure 2). They have been pushed by the depreciation of the euro: After its real effective exchange rate had already declined by 11 percent in the course of 1999, it went down by another 3 percent between December and August. Apart from improved competitiveness exporting companies in the euro area have benefited from the prosperous economic situation in the most important sales markets. Because of the recovery of production in Southeast Asia and in Central and Eastern Europe the demand from these regions has increased strongly as well. Furthermore, the deliveries to the United States and to the United Kingdom have expanded lively since economic activity in these two countries has hardly shown signs of deceleration. The export boom should have carried on at a high pace in the third quarter; export expectations in Euroland reached a very high level

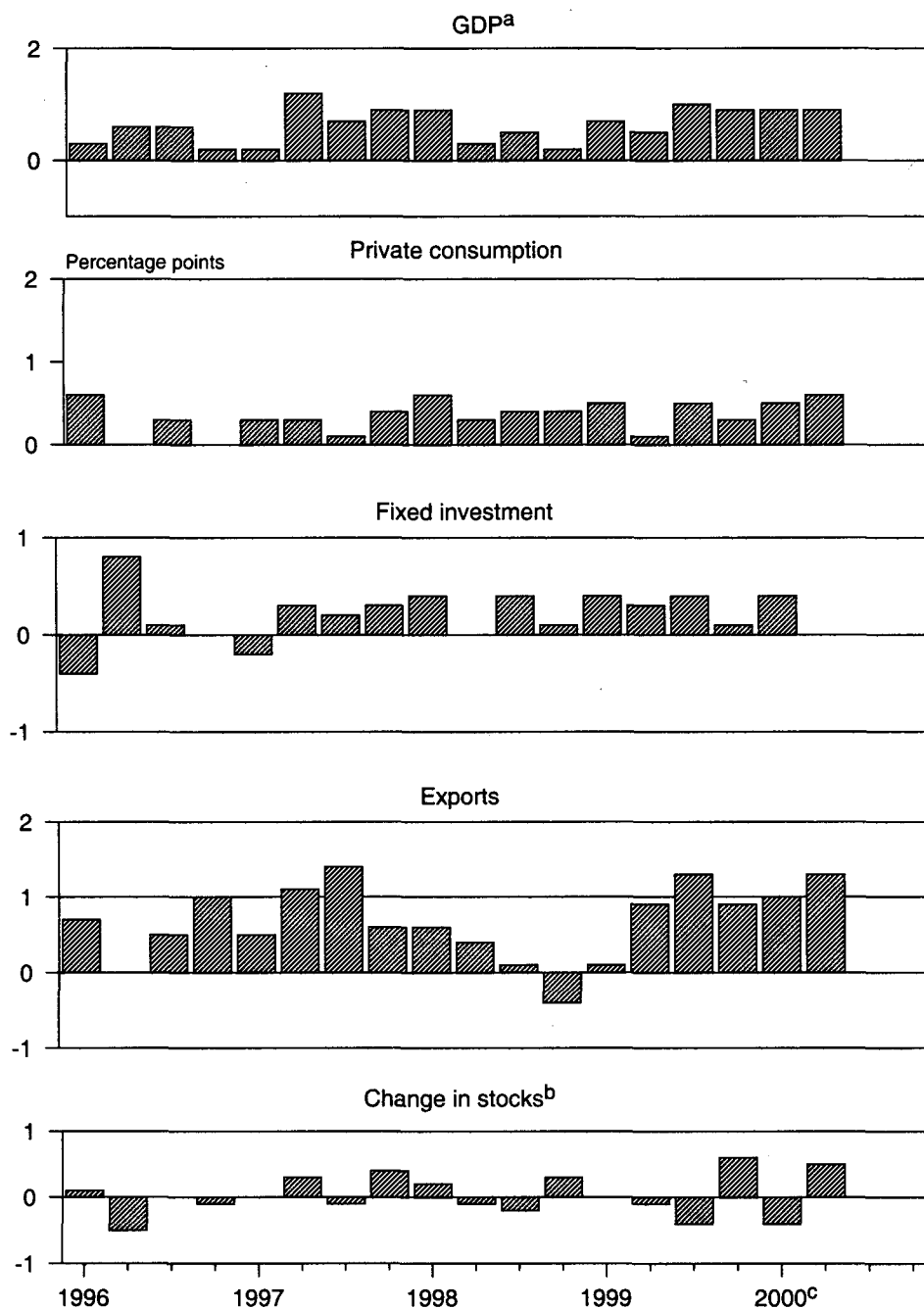
in July. In view of strong domestic demand imports have risen even faster than exports since the fall of 1999. In consequence, net exports have not contributed to real GDP growth.

Figure 1: Business Cycle Indicators<sup>a</sup> for Euroland



<sup>a</sup>Seasonally adjusted. — <sup>b</sup>At constant prices. — <sup>c</sup>Percentage change over previous quarter (annual rate). — <sup>d</sup>Estimation on basis of the national accounts excluding intra-Euroland trade. — <sup>e</sup>Partly estimated. — <sup>f</sup>Percentage change over previous year.

Figure 2: Contribution of Demand Components to GDP Growth in Euroland



<sup>a</sup>Change over previous quarter. — <sup>b</sup>Change in stocks in percent of previous quarter GDP. — <sup>c</sup>Partly estimated.

Meanwhile, domestic demand expansion further accelerated in the first semester of 2000. Especially private consumption expenditures went up substantially stimulated by the positive evolution on the labor market. According to estimates by the European Central Bank (ECB 2000: 26) the number of employed persons has been increasing at an annual rate of 2 percent since the beginning of this year. The unemployment rate according to the ILO concept declined to 9.1 percent in July, the lowest level since the spring of 1992. In view of favorable financing conditions and excellent sales and profit

expectations, companies in the euro area have expanded their investment considerably. As capacity utilization is above average and is further increasing, gross fixed capital formation and labor demand will remain vigorous in the coming months. In view of consumers' unclouded optimism, private consumption will continue to rise at a high pace, although no acceleration can be expected due to the real income losses in the wake of the oil price surge.

The bright overall picture is stained by the accelerated increase in consumer prices. Between December and July, the seasonally adjusted Harmonized Index of Consumer Prices (HICP) rose at a rate of more than 2 percent. In July, it was 2.4 percent higher than one year before, a rate that substantially exceeds the medium-term reference value of the ECB. Yet it is above all the energy component of the index that has risen in the wake of higher quotations on the market for crude oil, whereas the core inflation rate (HICP without energy, food, alcohol and tobacco) has only moved up slightly in recent months. However, we expect that companies in the euro area will increasingly exhaust the scope for raising prices arising from the still strong economic expansion.

## 2 Fiscal Policy: Windfall Gains and Tax Cuts

At first sight the situation of public finances in Euroland looks outstandingly well. In the year 2000, the consolidated budget of EMU countries will exhibit a surplus for the first time since the 1960s; it will amount to 0.3 percent in relation to nominal GDP. At the same time the public debt ratio will make a great leap in direction of the reference value — 60 percent in relation to GDP — laid down in the Maastricht Treaty (Table 1). Are European governments indeed intensifying their course of fiscal consolidation? Since 1990, when the structural deficit ratio reached its highest level of more than 5 percent, fiscal policy without any doubt has made considerable progress on the road to a balanced budget on a medium-term basis. However, consolidation efforts have perceptibly waned in the recent past. Closer inspection reveals that the budget surplus arising this year is above all due to one-off revenues. Since these windfall gains will be considerably lower next year, the budget will once more display a deficit.

In 2000 and 2001, several countries of the euro area will obtain a large amount of extra revenue in the wake of the allocation of mobile phone licenses (UMTS) (Table 2). The Statistical Office of the European Communities (Eurostat 2000b) has decided that these receipts have to be fully recorded at

Table 1: Indicators of Fiscal Positions in Euroland, 1998–2001

	Gross public sector debt <sup>a</sup>				General government balance <sup>a</sup>			
	1998	1999	2000 <sup>b</sup>	2001 <sup>b</sup>	1998	1999	2000 <sup>b</sup>	2001 <sup>b</sup>
Germany	60.7	61.1	59.4	57.4	-2.1	-1.4	1.3	-1.6
France	59.7	58.9	57.5	56.0	-2.7	-1.8	-1.2	-0.2
Italy	116.2	115.1	109.5	106.0	-2.8	-1.9	0.2	-1.1
Spain	65.1	63.7	61.5	60.0	-2.6	-1.1	-0.4	0.0
Netherlands	66.6	62.9	60.0	57.0	-0.7	1.0	1.5	1.2
Belgium	119.6	116.1	110.0	105.0	-0.9	-0.7	0.2	-0.2
Austria	64.0	65.2	63.5	62.0	-2.3	-2.1	-1.7	-0.7
Finland	48.7	46.6	41.0	37.0	1.3	1.9	4.5	3.5
Portugal	55.7	55.8	55.0	54.0	-2.3	-2.0	-1.7	-1.2
Ireland	55.0	50.1	45.0	41.0	2.1	1.9	4.0	3.0
Luxembourg	6.4	6.0	6.0	6.0	3.7	4.4	4.0	3.5
Euroland	73.5	72.2	69.4	67.1	-2.1	-1.3	0.3	-0.6

<sup>a</sup>In percent of nominal GDP; Maastricht definition. — <sup>b</sup>Forecast.

Source: ECB (2000); own calculations and forecasts.



Table 2: Discretionary Revenue Changes in Selected Countries, 2000–2001

	Additional revenue from the allocation of mobile phone licenses				Shortfall in revenue as a result of tax cuts in the year 2001	
	2000		2001			
	Bill. euro	in percent of real GDP	Bill. euro	in percent of real GDP	Bill. euro	in percent of real GDP
Germany	50.8	2.5	—	—	23.2	1.1
France	—	—	19.8	1.4	8.7	0.6
Italy	20.0	1.7	—	—	7.5	0.6
Spain	0.5	0.1	—	—	—	—
Netherlands	2.7	0.7	—	—	3.0	0.7
Total	74.0	1.2 <sup>a</sup>	19.8	0.3 <sup>a</sup>	42.4	0.6 <sup>a</sup>

<sup>a</sup>In percent of Euroland nominal GDP.

<sup>a</sup>In percent of Euroland nominal GDP.

Source: OECD (2000a), national sources, own estimates and forecasts.

the time of the completion of the sale, irrespective of the time of payment. Thus, the license receipts have immediate implications for the budget. As a consequence, the meaning of fiscal indicators like the structural budget deficit is reduced. By definition, the structural deficit is reduced by the amount of the special revenues because they are not due to cyclical fluctuations. But this does not mean that fiscal policy becomes more restrictive. The profit burden loaded on the license purchasers will probably not decrease capital formation in the telecommunications sector. Some of the involved companies have already announced that the construction of the UMTS network will be accelerated in the coming years. Moreover, the license expenses are tax-deductible. All in all, the license payments should not exert a contractive effect on economic activity.

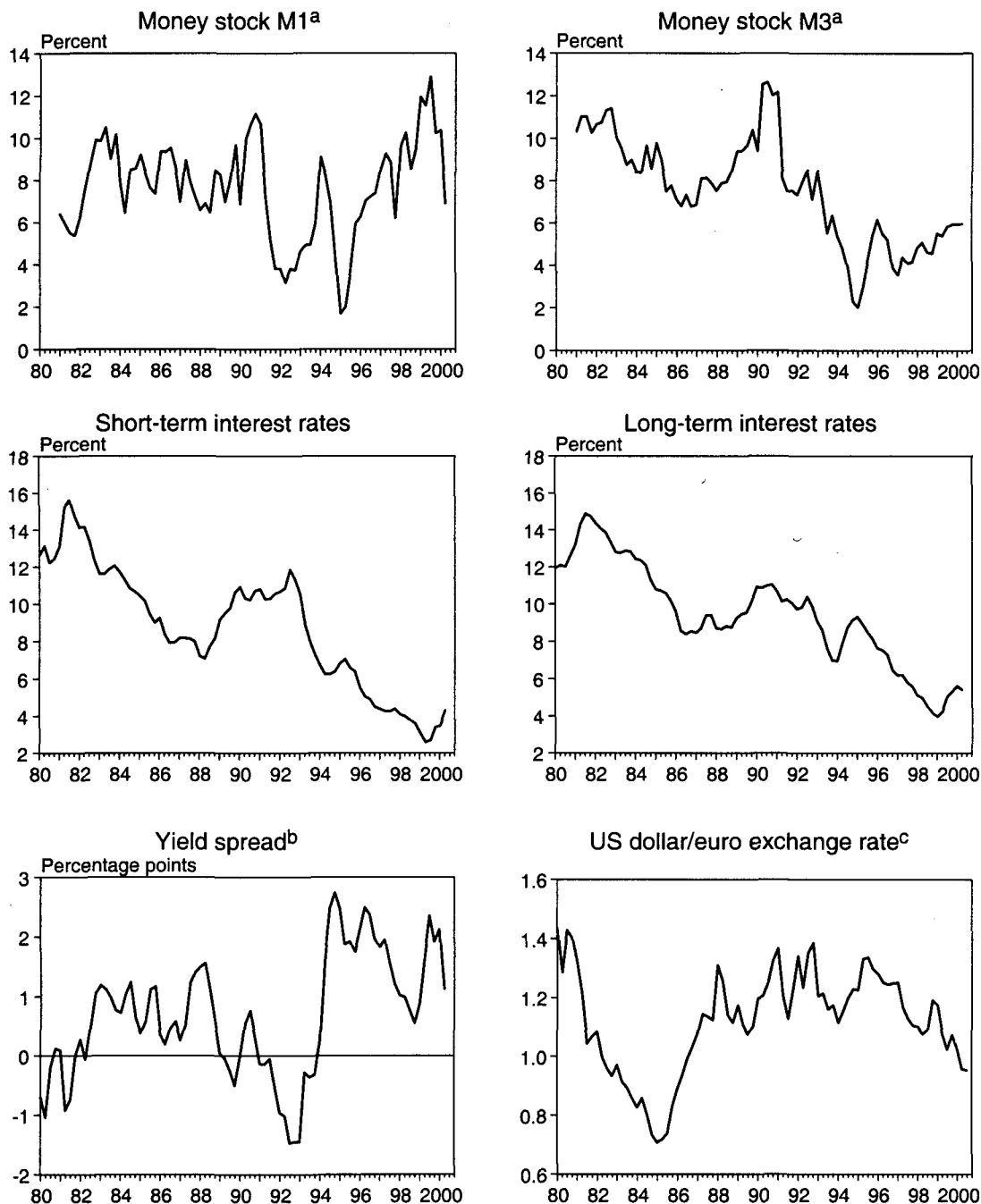
The intention of European governments to use most of the license revenue to reduce public debt is highly welcome. The savings in terms of interest payments, however, should not be used to raise public spending as planned by governments. A sustained fiscal consolidation requires that government expenditures increase at a lower rate than GDP over an extended period of time. In order to be prepared for the challenges which ensue from population aging, governments in Euroland should not deviate from the course of strict expenditure discipline. Of course, expenditure constraints do not prevent efficiency-enhancing changes in the structure of government spending — on the contrary: A reorientation of resources from transfer systems to public investment or increased promotion of human capital formation is required.

Moreover, it is necessary to stick to expenditure discipline in order to give room to the tax cuts that are planned for the coming years. Otherwise, there would be the risk that budget deficits increase beyond the Maastricht threshold if economic activity deteriorated. We welcome the endeavor of European governments to strengthen economic growth by reducing the tax burden, which is still very high. Especially the large countries in the euro area plan to cut direct taxes considerably in the year 2001 (Table 2). For Euroland as a whole the measures should add up to 0.8 percent in relation to GDP. Thus, fiscal policy will move to an expansionary course next year. As a consequence, the consolidated budget of the euro area will exhibit a deficit.

### 3 ECB Reacts to Inflationary Risks

Monetary conditions in the euro area are not as favorable as they were half a year ago. The ECB raised key interest rates further. Since the beginning of September the main refinancing rate stands at 4.5 percent. This means that this rate — as well as the other key interest rates — is 1 percentage point higher than six months ago. The 3-month money market rate increased to 4.9 percent (Figure 3). In

Figure 3: Indicators of Monetary Policy in Euroland



<sup>a</sup>Percentage change over previous year. — <sup>b</sup>Long-term interest rate minus short-term interest rate. — <sup>c</sup>Before 1999: exchange rate US dollar/ecu.

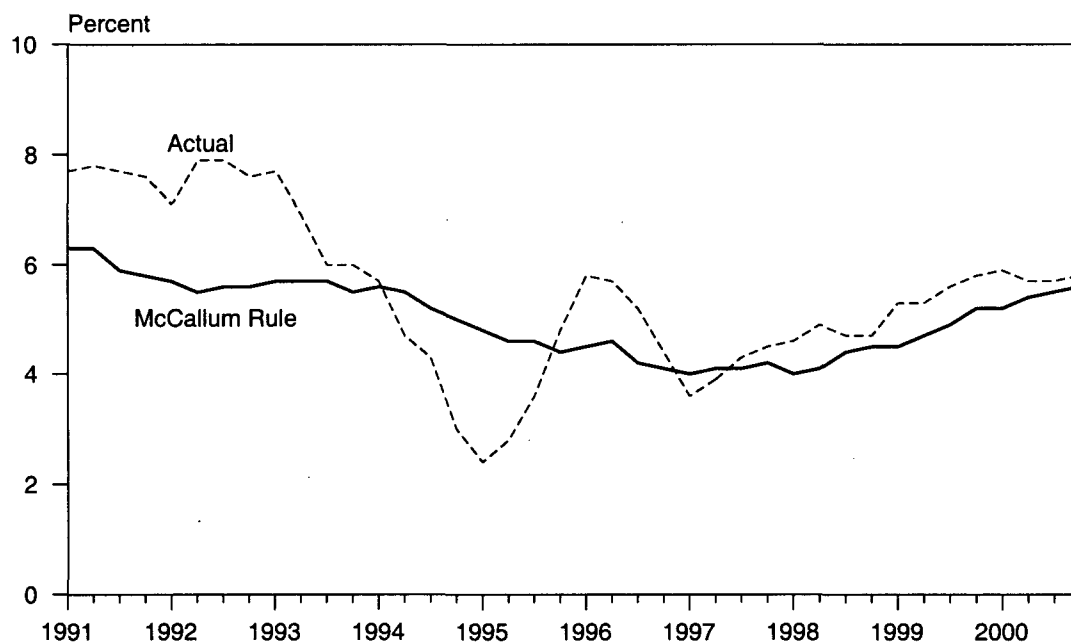
real terms, the short-term interest rate is only slightly lower than the long-term average. If the core inflation rate is used instead of the headline inflation, the real interest rate is somewhat higher than the average over the past years, which we consider the neutral rate. The interest rate policy of the ECB has contributed to the deceleration of M3 growth. While there was an acceleration until April to more than

7 percent, the rate declined until July to approximately 5.5 percent.<sup>1</sup> Nevertheless, M3 is still growing faster than intended by the ECB according to the reference value of 4.5 percent. Long-term interest rates hardly changed in recent months, the yield for 10-year government bonds remained close to 5.5 percent until the beginning of September; in real terms, long-term interest rates went down somewhat and are below the long-term average. There was a further stimulation from the renewed depreciation of the euro; its real external value declined in the six months until August by about 3 percent. We expect that the ECB will raise key interest rates again by 25 basis points in the coming weeks mainly because of the persistently high rate of inflation. Furthermore, monetary expansion will slow down further, and the euro will appreciate slightly in the forecasting period. All in all, monetary conditions will become less favorable so that economic activity is not stimulated anymore.

The turnaround of interest rates, which started in November last year, can be justified on the basis of several gauges for monetary policy; also the size of the increase was adequate. Since the beginning of the monetary union, M3 has expanded faster than intended by the ECB. If we use different estimates for the determinants of the reference value than the ECB we also conclude that monetary expansion has been too high. This can be shown, for example, by using the McCallum Rule (Figure 4). This rule is more flexible with regard to the estimation of trend values (real GDP and velocity) which are necessary to gauge the stance of monetary policy; it is thus more “flexible” than the rule of the ECB (Gern et al. 1999: 7). Because of the liquidity overhang, risks for price level stability have emerged. In order to slow down monetary expansion, it was necessary to raise the price for central bank money.

The short-term interest rate which follows from the Taylor Rule has been going up for some time (Figure 5).<sup>2</sup> On the basis of this rule, the end of the low-interest-rate policy can also be justified;

Figure 4: Expansion of M3 in Euroland: Actual Values and Values According to the McCallum Rule<sup>a</sup>

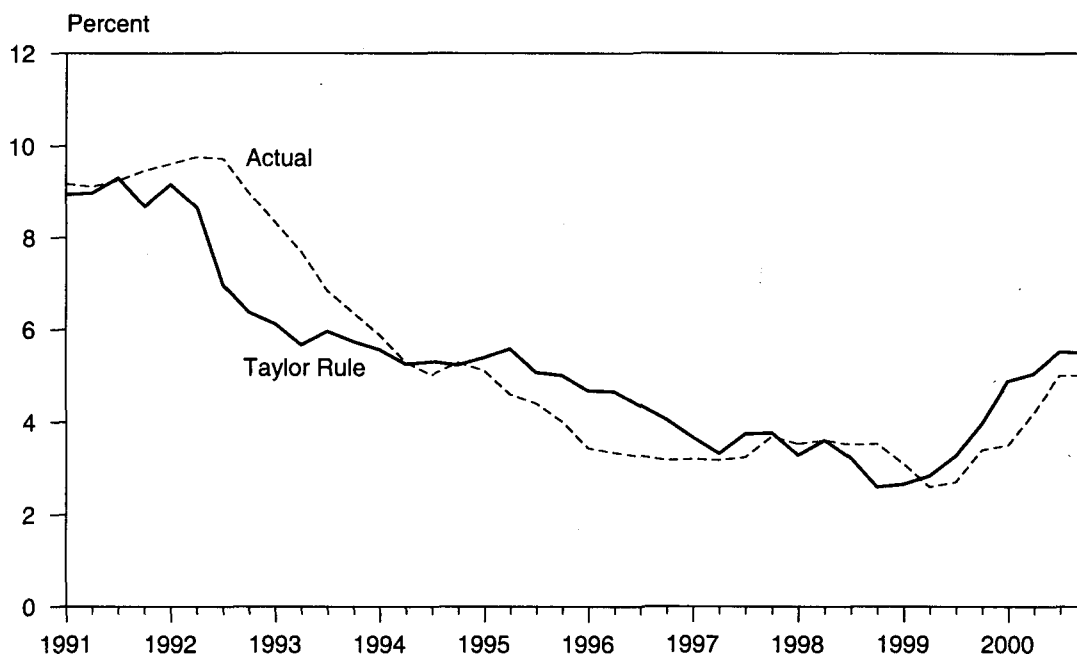


<sup>a</sup>Year-over-year increase of M3. Forecast starting 2000 III.

<sup>1</sup> The calculations are based on the six-month comparison.

<sup>2</sup> For calculating the Taylor interest rate, it is necessary to estimate the equilibrium real interest rate and the output gap. These estimates are subject to considerable uncertainty (Gern et al. 1999: 7).

Figure 5: Short-Term Interest Rates in Euroland: Actual Values and Values According to the Taylor Rule<sup>a</sup>



<sup>a</sup>3-month money market rate. Forecast starting 2000 III.

otherwise, economic activity would have been stimulated too strongly. Currently the Taylor interest rate is even slightly higher than the market rate especially because inflation is above the target. If the core rate of inflation is used for the calculation, the interest rate is around 4.5 percent; this rate will go up in the coming quarters because both the output gap as the well as the core inflation rate are likely to increase.

The main reason for the interest rate hikes by the ECB was the risk to price level stability; since the beginning of this year, inflation in the euro area has mostly been higher than the upper bound of the ECB target range. In July, the year-over-year increase of the HICP was not below 2 percent in any of the eleven countries. Inflation was especially high in those countries that had a high capacity utilization already prior to the monetary union and which had to reduce interest rates strongly before EMU started.

The ECB must make sure that its target for price level stability is not violated for a longer period of time. This does not mean that the course of monetary policy has to be tightened just because of higher oil prices or because of the weak euro. The ECB has to prevent the core rate of inflation from rising. This is not only important for its reputation. Maintaining price level stability is also one of the conditions that makes the European Monetary Union as a whole attractive, especially to those EU members which will decide about their entry to the monetary union. If inflation in the euro area is higher than in those countries, it would be difficult to convince the public that joining EMU has advantages. Also, it is possible that the monetary policy strategy of the ECB will be questioned again. Proponents of inflation targeting, a strategy that is rejected by the ECB, will gain ground if, for example, the inflation target in the United Kingdom is achieved, whereas it is missed in the euro area. According to our judgment, the risks to price level stability in Euroland have not emerged because the strategy of the ECB is wrong, but mainly because it was not followed strictly enough by the ECB. As the reference value for M3 had been missed already since the beginning of 1999, the interest rate hikes even came too late.

#### 4 Currently Only Little Evidence for a New Economy in Euroland

It is often claimed that the progressive use of new technologies in data processing and telecommunication (ICT)<sup>3</sup> has brought a new era, the so-called new economy. In the following, “new economy” is understood as an upward shift in the productivity trend in the economy with the consequence of an increased growth rate of potential output, also referred to as the “speed limit” of the economy. Developments in the United States during the 1990s suggest that something like a new economy has indeed arrived: Productivity accelerated markedly towards the end of the decade, and potential output growth picked up considerably (Gern et al. 2000).

In contrast, there is no discernible rise in trend productivity growth since the start of the 1990s in the euro area (Figure 6). This may partly be due to the fact that employment growth accelerated in Euroland during the 1990s as a consequence of labor market reforms and more wage moderation. This had a dampening effect on measured productivity. Another explanation may lie in different methodologies used to split up the value of production into a price component and a volume component; this results in a lower estimate of productivity growth in the ICT sector in Euroland compared to that in the United States.<sup>4</sup> Apart from measurement problems, a major reason for the absence of the new economy in Euroland statistics is that the share of ICT industries in total output is lower than in the United States.<sup>5</sup> Despite the relatively small (but rising) weight of ICT industries in the economy they account for a significant part of the rise in overall productivity because productivity growth in these sectors is so rapid. Finally, it is important that the United States have a substantial lead as far as the implementation of the new technologies is concerned. While at the end of the 1990s nearly 40 percent of the United States population used the internet, the share was below 10 percent in Germany and France, although it was rising rapidly (Davies et al. 2000). Lower diffusion of new technologies may not only lead to correspondingly lower productivity gains; it is also possible that productivity effects are absent altogether or even negative as long as the use of new technologies has not reached a “critical mass” that allows, for instance, to exploit network externalities.

An important aspect for future developments is the use of the internet for trade among businesses (B2B) or between businesses and consumers (B2C). While the market share of trade via internet platforms is still extremely small, enormous growth is projected, particularly as concerns B2B (Davies et al. 2000: 15ff.). Given the importance of multinational companies and the intense international competition, this trend will not be confined to the United States but can be expected to progress in Euroland at a similar speed.

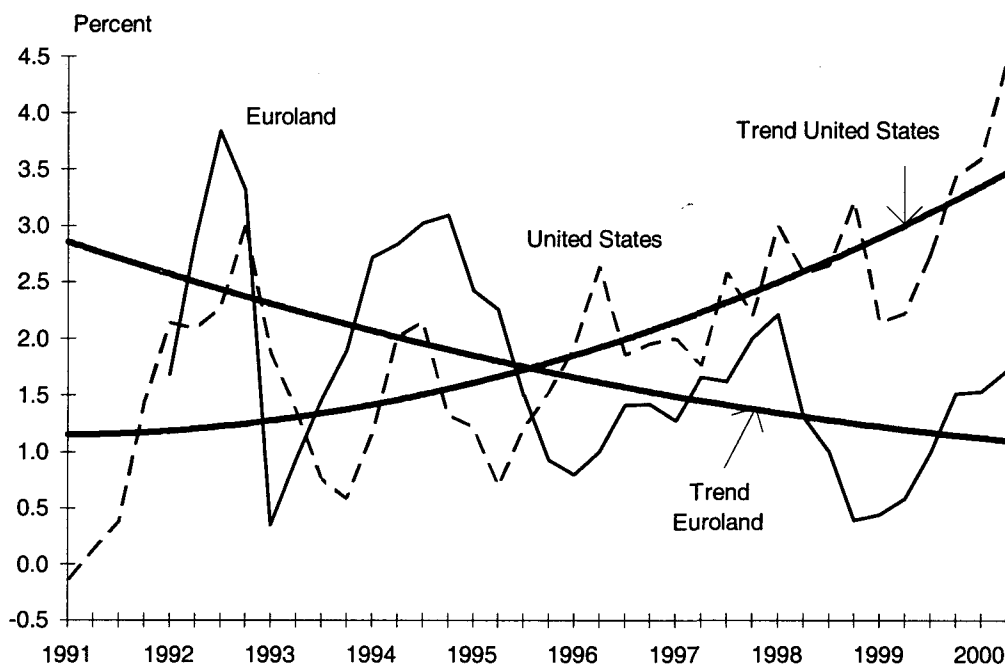
In principle, the use of the internet lowers the cost of information dramatically, and makes the search for suitable inputs easier as well as the comparison of prices. The result will be lower production costs, partly because of more efficient input combinations, partly because of fiercer price competition among suppliers. According to simulations, the direct effect on prices can be substantial: Given unchanged quantities, the price level in the five largest industrial countries would decline by at least 3.5 percent (Davies et al. 2000: 18). However, there will be a rise in output working in the opposite direction which will be the result of increased demand as a reaction to lower prices. In addition, demand will be stimulated by asset prices that can be expected to rise in line with the economic expansion and higher profit expectations. That said, the discussion of possible price effects of B2B has to be speculative at the current juncture. There is little empirical evidence by now, and the evidence that is available is mixed (OECD 2000b: 204).

<sup>3</sup> ICT stands for Information, Computer, and Telecommunication.

<sup>4</sup> Deutsche Bundesbank (2000), for instance, calculates that in the years 1991–1999 German real investment in data processing equipment would be four times higher if the US deflator was used instead of the German deflator. The difference in the deflators can be assumed to be mainly the result of different methodologies.

<sup>5</sup> In the mid-1990s, ICT industries produced 3.3 percent of GDP in five countries representing 85 percent of the Euroland economy as compared to 4.4 percent in the United States (OECD 2000b: 181).

Figure 6: Productivity<sup>a</sup> in Euroland and in the United States (Percentage change over previous year)



<sup>a</sup>Real GDP per person in employment.

All in all, contrary to the United States, at present there is no evidence of an increase in trend productivity in Euroland. Only part of the different behavior of the economies can be explained away by differences in statistical methodologies used for compiling the relevant data. Of major importance seems to be the fact that new technologies are less prominent in production and use in Euroland as compared to the United States. While it can be expected that the new economy will be increasingly visible also in the euro area mainly due to the rapid spreading of the internet, productivity gains will remain significantly lower than those seen in the United States for the time being because ICT production will continue to constitute a smaller share of economic activity. Finally, the implementation of the new technologies implies a substantial structural change for the economy. Flexibility on product and labor markets that is necessary to reap the possible productivity gains quickly and completely seems to be less present in Euroland than in the United States.

## 5 Implications of the New Economy for Monetary Policy

The new economy would have consequences for monetary policy. These can clearly be derived within the strategy of the ECB. If there is an acceleration of potential output growth, a higher reference value for M3 is adequate according to the first pillar; otherwise, inflation would be lower than intended. Also, according to the second pillar of the ECB strategy, a neutral (stability-oriented) monetary policy implies a stronger expansion of the money stock. It has to be considered, however, that for the definition of the reference value an estimate for the trend of velocity is required as well. In the literature on monetary theory, transaction costs play an important role. It can be expected that with the advance of new technologies transactions can be made at a lower cost than would be the case otherwise. Since economic agents reduce their cash balances, money demand declines and the velocity of money increases. This effect would by itself raise inflation (Casares 2000). How important this effect is would have to be estimated empirically; the change in the reference value due to higher potential output growth would have to be reduced accordingly. Apart from the new definition of a path

for the money stock, other monetary variables are affected as well. For example, the real equilibrium interest rate in the economy increases with the higher increase in productivity.

Although the reaction of the ECB to the new economy is clear in principle, practical policy is facing substantial problems. The identification of a new economy is only possible if macroeconomic shocks can be correctly identified.<sup>6</sup> The identification of a change in trend growth is very difficult empirically, especially for the most recent observations which are affected if we talk about the new economy. The current strong upswing in Euroland can certainly also be explained by impulses on the demand side: Monetary policy has been expansionary for some time, and there were substantial impulses from abroad. In this sense, it is the “classic” business cycle pattern. Of course, it cannot be excluded that the rate of technological progress has risen. However, since there is hardly any clear-cut evidence concerning the new economy, it is impossible to advise the ECB to loosen monetary policy.

In general, changes in potential output growth can be identified with some certainty only after a few years.<sup>7</sup> This implies a problem for monetary policy which can hardly be solved. Given this uncertainty about the “true” trend, the ECB can make two errors: Either it reacts only with a lag to an actual acceleration of potential output growth, or it loosens monetary policy although there is no such acceleration. The consequences of the first error should hardly be serious because supply shocks such as a jump in technology usually lead to an immediate increase in production. In a world of rigid prices, this increase would be higher in the short-run if monetary expansion accelerated. However, a “passive” behavior of the ECB would not prevent that the new economy would lead to a faster increase in real GDP. The consequences of the second error will probably be more serious. Inflation would be higher, and the ECB would have to change towards restriction. This way, not only cyclical fluctuations would increase; there would also be the risk that monetary policy would have to be tightened in a period when the effects of the new economy materialize. All in all, there are good reasons to be cautious when interpreting data concerning the new economy; without empirical evidence, the ECB should not change its course.

Apart from that, the risk that the ECB is providing too little liquidity is not relevant in the current situation anyhow. Since the beginning of the monetary union, the money stock has increased much faster than intended, it is currently 2 percent higher than intended by the ECB. This means that the new economy — if it is really emerging in Euroland — is not prevented at all.

## 6 Determinants of the Euro’s Exchange Rate

The current weakness of the euro is commonly explained by short-run macroeconomic factors. The discussion primarily focuses on differences in interest rates and in the rates of growth of real GDP. In the following section, we analyze whether these factors can explain the recent development of the euro and whether they can be used for forecasting.

### 6.1 Interest Rate Differentials

Starting point of the analysis is a standard exchange rate model, a so-called sticky-price monetary model.<sup>8</sup> According to the assumptions of the model, the nominal exchange rate is in the long-run equal to the difference between the price level at home and abroad, that is, purchasing power parity obtains

<sup>6</sup> This is a general problem for monetary policy. For example, the ECB has to identify whether a strong increase in GDP is due to a demand or a supply shock, because the reaction will depend on that. To be more precise, there are many distinctions that monetary policy has to consider: A jump in the level versus a change in the trend, transitory versus permanent shocks etc. All the effects would have different consequences for monetary policy.

<sup>7</sup> International organizations such as the OECD (2000b) have hardly changed their estimates concerning potential output growth until the year 2001.

<sup>8</sup> See Dornbusch (1976) and the version augmented by inflation expectations by Frankel (1979). For a survey of the literature, see Frankel and Rose (1995).

in the long run. In the short run, however, deviations from purchasing power parity may occur as goods prices adjust only slowly to shocks — such as changes in interest rates — while the nominal exchange rate adjusts quickly to fulfill the uncovered interest parity condition.<sup>9</sup> The latter is assumed to hold permanently as a result of low transaction costs on financial markets. It can be shown that the combination of uncovered interest parity with long-run purchasing power parity implies a close relation between the difference in real interest rates and the real exchange rate (see Box). For example, an increase of US real interest rates relative to European rates causes a depreciation of the euro.

**Box: An Econometric Model of the US Dollar/Euro Exchange Rate**

A close relationship between the exchange rate and the interest rate differential is suggested by the uncovered interest parity condition. According to this condition, the difference between interest rates at home and abroad for a  $k$ -period investment at time  $t$ ,  ${}_k i_t$  and  ${}_k i_t^*$ , respectively, has to equal the expected rate of appreciation of the nominal exchange rate. Let  $e_t$  be the logarithm of the current nominal exchange rate (US dollar per euro) and let  $E_t(e_{t+k})$  be its expected value  $k$  quarters ahead, the condition can be approximated as

$$(1) \quad {}_k i_t - {}_k i_t^* = -(E_t(e_{t+k}) - e_t).$$

Adding the difference of the expected price changes  $E_t(p_{t+k}) - p_t - (E_t(p_{t+k}^*) - p_t^*)$  on both sides, one gets the real version of (1) (Frankel and Rose 1995):

$$(2) \quad {}_k i_t - {}_k i_t^* - \left[ (E_t(p_{t+k}) - p_t) - (E_t(p_{t+k}^*) - p_t^*) \right] = -(E_t(e_{t+k}) - e_t) - \left[ (E_t(p_{t+k}) - p_t) - (E_t(p_{t+k}^*) - p_t^*) \right]$$

$${}_k r_t - {}_k r_t^* = -(E(q_{t+k}) - q_t),$$

where  $q$  is the real exchange rate,  $q_t = e_t - p_t^* + p_t$ , and  $r$  is the real interest rate according to the Fisher-relation  ${}_k r_t = {}_k i_t - (E_t(p_{t+k}) - p_t)$ . The equation states that for an international portfolio to be allocated optimally, higher real interest rates, say, in the United States ( $r - r^* < 0$ ) have to be compensated by an expected depreciation of the dollar against the euro.

Assume further that purchasing power parity holds in the long run, that is, the real exchange rate  $q_t$  reverts to its mean in the long run. In this case, any deviation of the current real exchange rate from  $\bar{q}$  implies a certain expected rate of change in the real exchange rate depending on the speed of adjustment towards purchasing power parity,  $\theta_k$ . If the real dollar/euro rate was currently 20 percent below its purchasing power parity level, the market would expect this deviation to be corrected over the next  $k$  quarters by the fraction  $\theta_k$ . This implies:

$$(3) \quad \theta_k (q_t - \bar{q}) = -(E_t(q_{t+k}) - q_t), \quad 0 < \theta_k < 1$$

where  $\theta_k$  is the higher, the larger the influence of the exchange rate on aggregate demand is, the higher the speed of adjustment of goods prices is, and the longer the adjustment horizon  $k$  is.

Inserting (3) and (2) gives a relationship between the deviation of the real exchange rate from purchasing power parity and the real interest rate differential. Solving for the current real exchange rate one obtains

$$(4) \quad q_t = \bar{q} + \frac{1}{\theta_k} ({}_k r_t - {}_k r_t^*).$$

This is the relation assumed as the long-run relation in the empirical implementation. In the short run, there may be deviations from the long-run relation, for instance, due to lagged adjustments.

<sup>9</sup> Uncovered interest parity is an arbitrage condition for the international capital market. It means that differences in interest rates between two investments that are identical — apart from its currency denomination — should be matched by the expected rate of depreciation of the currency with the higher interest rate.



Box continued

Empirical estimation uses the data described in the text for the period of 1973:2 to 2000:1. The dynamic equation is first specified as an error-correction model with six lagged first-difference terms.<sup>a</sup> Dropping insignificant short-run variables, the following equation for the quarterly change in the real US dollar/euro rate results (*t*-values in paranthesis):

$$(5) \quad \Delta q_t = \frac{0.118}{(5.968)} - \frac{0.162}{(5.620)} \left[ q_{t-1} - \frac{3.030}{(5.548)} (r-r^*)_{t-1} \right] + \frac{0.227}{(3.230)} \Delta q_{t-1} + \frac{0.210}{(2.901)} \Delta q_{t-2} + \frac{0.120}{(1.583)} \Delta q_{t-3} \\ + \frac{0.366}{(4.247)} \Delta(r-r^*)_t - \frac{0.266}{(3.282)} \Delta(r-r^*)_{t-1} - \frac{0.450}{(5.020)} \Delta(r-r^*)_{t-2} - \frac{0.408}{(4.433)} \Delta(r-r^*)_{t-3} \\ - \frac{0.371}{(4.726)} \Delta(r-r^*)_{t-5} - \frac{0.034}{(4.440)} S_{81:1} - \frac{0.134}{(7.807)} (I_{75:1} - I_{76:2} + I_{83:2} + I_{86:1} - I_{89:2})$$

( $\bar{R}^2 = 0.531$ ,  $STDERR = 0.034$ ,  $DW = 1.945$ ,  $JB [0.361]$ ,  $AR(1) [0.709]$ ,  $AR(4) [0.878]$ ,  $AR(8) [0.960]$ ,  $ARCH(4) [0.259]$ ,  $Wh [0.963]$ , marginal levels of significance in squared brackets.  $I$  are dummy variables that assume the value 1 in the respective quarter and 0 otherwise.  $S_{81:1}$  is 0 up to 1980:4 and 1 thereafter).

The estimated long-run relationship implies that an increase in the real interest rate differential by one percentage point in favor of the euro area leads to a real appreciation of the euro vis-à-vis the dollar by 3.03 percent.<sup>b</sup> Adjustment towards the long run is, however, slow. In the quarter of the interest rate shock, the euro only appreciates by 0.37 percent. According to the estimated adjustment parameter of 0.162, it takes approximately one year for a deviation from the long-run relation to be reduced by half.

To assess the forecast performance of the model, the equation is estimated first only until 1993:4. Based on the estimates, forecasts are generated for the real dollar/euro rate over the next 1, 2, 3, 4 8 and 12 quarters. Subsequently, one more quarter is added to the estimation period and a new set of 1- to 12-step-ahead forecasts are generated, and so on, until 2000:1. The following table presents the root mean squared forecast errors (*RMSE*) for these forecasts and compares them to those of a random walk model generated with the same procedure. The *RMSE* of the model for each forecast horizon is close to the standard error of equation (5) of 3.4 percent. The *RMSE* of the random walk, in contrast, increases with the forecast horizon from 4 to more than 16 percent. Thus, the model outperforms the random walk over each horizon: As one would expect, the advantage is higher for longer-run forecasts.

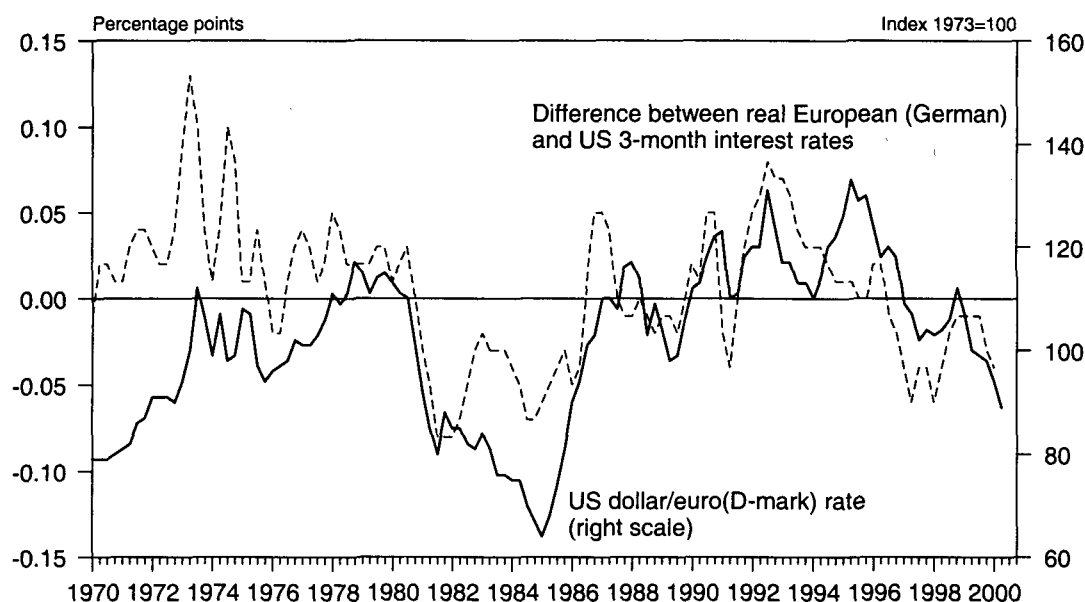
Table: Root Mean Squared Forecast Errors<sup>c</sup> of the Estimated Model and the Random Walk

Forecast horizon (quarters)	Random walk (1)	Model (2)	(2) / (1)
1	0.038	0.032	0.834
2	0.061	0.039	0.643
3	0.079	0.043	0.542
4	0.097	0.045	0.464
8	0.128	0.035	0.273
12	0.164	0.029	0.177

<sup>a</sup>We assume stationarity of both the real interest rate differential and the real exchange rate. For the latter, this is corresponding to the findings of numerous studies (Rogoff 1996). For the former, an Augmented-Dickey-Fuller test rejects the hypothesis of nonstationarity. — <sup>b</sup>To see whether simultaneity between the real exchange rate and the difference in goods prices, whose rate of change enters the equation contemporaneously via the real interest rate differential, biases the estimates, the real interest differential is separated in its nominal components. In the estimation, these are instrumented by variables which correlate highly with them. The parameter estimates change only marginally. — <sup>c</sup>The root mean

squared error is given by:  $RMSE = \sqrt{\frac{1}{T} \sum_{t=1}^T (Y_{t+k} - Y_{t+k}^f)^2}$ , where  $Y$  is the actual and  $Y^f$  the forecast value,  $k$  the forecast horizon and  $T$  the number of observations used for the calculation. In the present case  $T$  is between 14 (for  $k=12$ ) and 25 (for  $k=1$ ).

Figure 7: Real Exchange Rate<sup>a</sup> US Dollar/Euro (D-Mark) and Real Interest Differential<sup>b</sup>



<sup>a</sup>Real exchange rate and real interest rate differential calculated on the basis of industrial goods prices. — <sup>b</sup>Moving 2-quarter average.

When testing this model empirically for the dollar/euro exchange rate, one faces the problem that the euro has only been traded since January 1999. As data for six quarters is not sufficient to allow statistically reliable results, the D-mark is treated as the precursor of the euro on financial markets.<sup>10</sup> Accordingly, data for the United States are compared with data for the euro area for the period since 1999 and for Germany for the period before. Figure 7 illustrates the relationship between the real exchange rate and the real interest rate differential for the period of the first quarter of 1970 to the second quarter of 2000. The 3-month money market rates are used as nominal interest rates, expected inflation is proxied by the annualized change of industrial goods prices over the previous quarter<sup>11</sup>, and the real exchange rate is the quarterly average of the nominal exchange rate corrected for the difference in industrial goods prices.

A dynamic econometric equation for the period of 1973:2 to 2000:1 explains more than 50 percent of the variance of the quarterly changes of the real exchange rate.<sup>12</sup> The estimated long-run parameters imply that an increase of US over European real interest rates by 1 percentage point leads to a depreciation of the euro by 3 percent. The forecast error is relatively small: For out-of-sample forecasts (that use the actual real interest rate differential as an input to the forecast) over one, four,

<sup>10</sup> It is principally possible to construct a “synthetic” euro from national statistics for the time period before 1999 (see Clostermann and Schnatz 2000). The use of the D-mark as the precursor of the euro has the advantage that the D-mark floated relatively freely against nonmembers of the European Monetary System (EMS). This is not true for the other EMS currencies. Their exchange rates against EMS currencies deviated from that of the D-mark because they depreciated vis-à-vis the D-mark in the course of various realignments of the EMS parities. Magnitude and timing of such realignments, however, were mainly political decisions, only loosely connected with macroeconomic fundamentals. Therefore, the relation between the fundamentals and the exchange rates of these currencies can be expected to be weaker than for the D-mark. The euro is not determined by such political factors; its behavior is thus likely to be more similar to that of the D-mark than to a “synthetic” precursor.

<sup>11</sup> Using the industrial goods prices has the advantage that purchasing power parity can be expected to hold better than for consumer prices, which comprise large components of goods that are not traded internationally.

<sup>12</sup> See Meier (1999) for a similar model for the D-mark/US dollar rate and van Aarle et al. (2000) for a different approach for modeling the euro exchange rate.

eight or twelve quarters ahead in the period of 1994:1 to 2000:1, the forecast error of the model is consistently below that of a “naive” forecast that uses the recent realized value as the forecast (random walk).

Overall, the analysis confirms a relatively close relationship between the real exchange rate and real interest rates for the dollar/euro and the dollar/D-mark relation, respectively.

## 6.2 Growth Differentials

Another often-cited explanation for euro’s current weakness are the substantial differences between the growth rates of real GDP on both sides of the Atlantic. Differences in growth rates can indeed influence exchange rates, the relative price of two currencies. According to the monetary theory of exchange rates, an increase in US relative to European production causes a real depreciation of the euro: Real money demand increases in the United States, so real interest rates rise with the consequence that international investors increase their demand for dollars as they attempt to shift their investments to the United States. Alternatively, one may argue that higher growth means higher demand for capital and thus higher real interest rates. Again, the consequence is that the currency of the country that is growing faster appreciates in real terms.

Both lines of argument also indicate, however, that in a model that controls for real interest differentials, there may not be much left to be explained by differences in GDP growth since the latter difference usually comes along with the former. In the end, both variables are only symptoms of the underlying demand and supply side processes. To test this hypothesis, the difference in the growth rates of industrial production between Euroland (Germany) and the United States is used as an additional variable in the equation. It is found that the explanatory power of the variable is indeed weak.<sup>13</sup>

## 6.3 Explaining Recent Developments

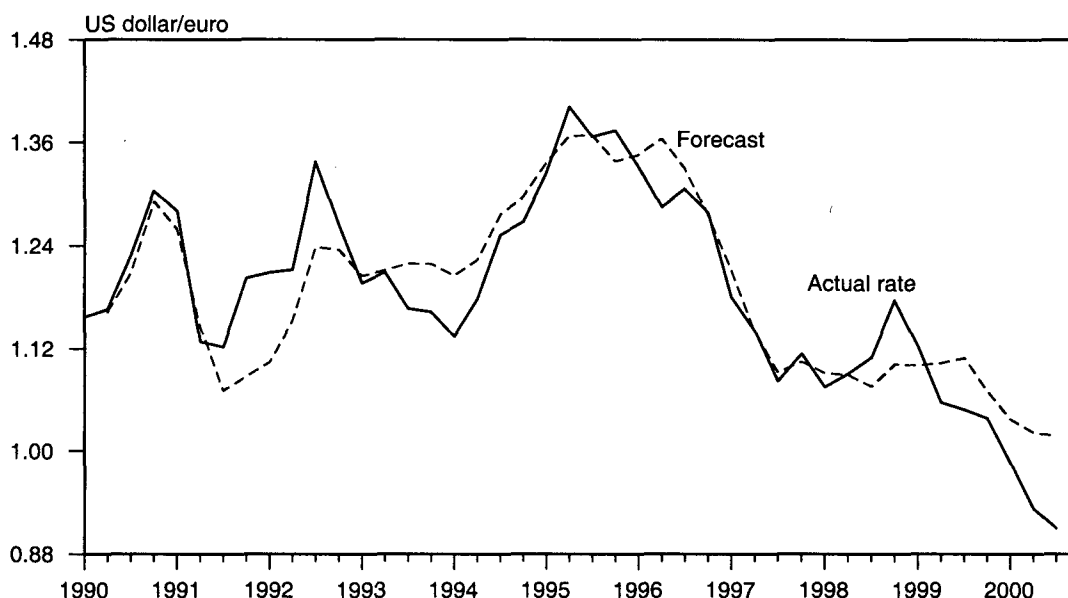
Figure 8 shows the actual nominal dollar/euro rate and a dynamic ex post forecast generated with the model presented in the box starting in 1990:1. The equation obviously explains most of the actual developments. Even the devaluation of the euro since the start of the European Monetary Union in 1999 is “predicted” by the model; recent developments, thus, seem to a large extent justified in terms of the fundamentals of the model, that is, nominal interest rates and prices. However, the equation predicts the euro’s depreciation to start in the fourth quarter of 1999 whereas the actual depreciation already started at the beginning of the year. Moreover, the model significantly underestimates the magnitude of the devaluation. It is true, deviations between actual and predicted values of that size have occurred also in earlier periods, for instance in 1991/92. Special factors that are not included in the model may be the reason. However, large forecast errors may also indicate that the estimated relationship is not stable. The fact that a dummy variable — that has the value 1 starting with the first quarter of 1999 — is statistically significant is in favor of this hypothesis.<sup>14</sup> With this variable included the equation tracks recent developments much closer. Other formal tests, however, do not

<sup>13</sup> No long-run statistical impact of the difference in growth rates is found once one controls for the fact that the growth difference is not “exogenous” but itself influenced by the real exchange rate. Changes in the growth rate difference, however, have a significant impact on the current real exchange rate with a lag of eight quarters.

<sup>14</sup> Such a jump in the real exchange rate could indicate that with the change to the euro, the risk premium for holding dollars has declined. This could be expected if the euro area as a whole had a smaller net foreign asset position (in relation to GDP) than Germany alone. Unfortunately, this hypothesis cannot be checked empirically due to lack of data for the euro area. Still, the fact that in the past Germany tended to have by far the highest current account surpluses among all countries in the euro area supports this view. Another explanation could be that the European Central Bank lacks the reputation of the Bundesbank and the euro therefore is discounted on financial markets. This may, however, be only temporary. We expect that the European Central Bank will achieve its target of price level stability. If the markets reach the same conclusion, the risk premium — if it exists — will disappear.

point to a structural change at the end of the sampling period. We assume that the recent deviation between the predicted and the actual exchange rate is only temporary.

Figure 8: Nominal US Dollar/Euro Rate and Dynamic Ex Post Forecast<sup>a</sup>



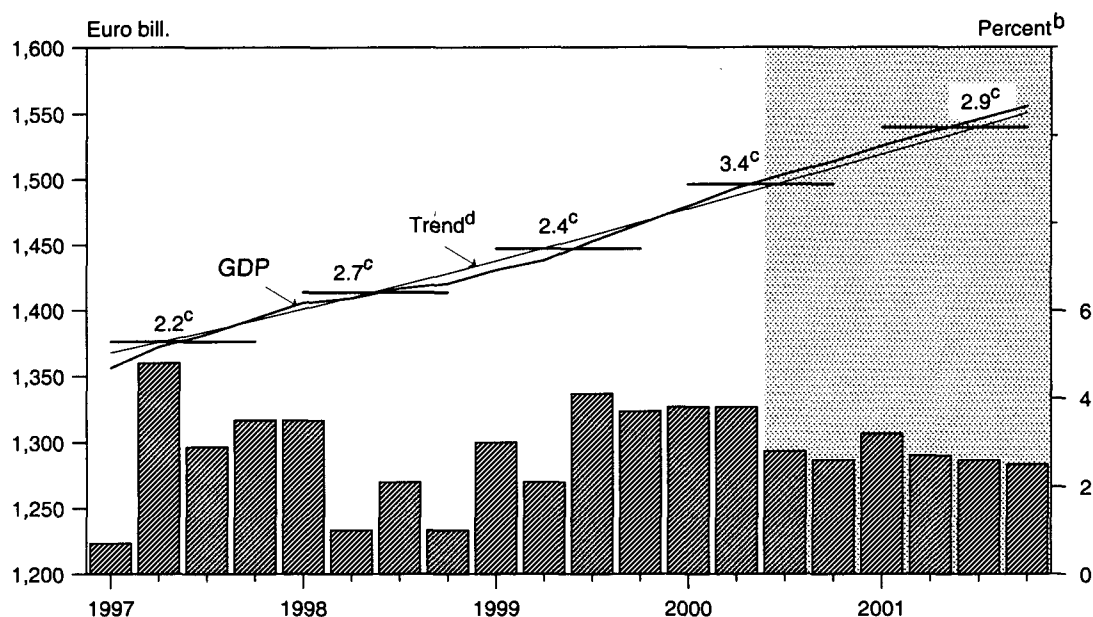
<sup>a</sup>Before 1999, the D-mark is used instead of the euro, converted at the rate of 1.95583 D-mark/euro.

This assumption is also the basis of our forecast. For the third quarter of 2000 the equation predicts a euro rate close to parity vis-à-vis the dollar whereas the actual rate is about 0.90 dollar. We presume that the difference between the fundamentally justified level of the exchange rate as given by the equation and the actual rate will become smaller in the forecast period. In addition, the real interest rate differential will move in favor of the euro: While according to our assumption nominal interest rates will increase slightly more in the United States than in the euro area, European producer price inflation rate will fall more than in the United States. On the basis of the model, one can expect that the nominal dollar/euro exchange rate will be somewhat below parity at the end of 2001.

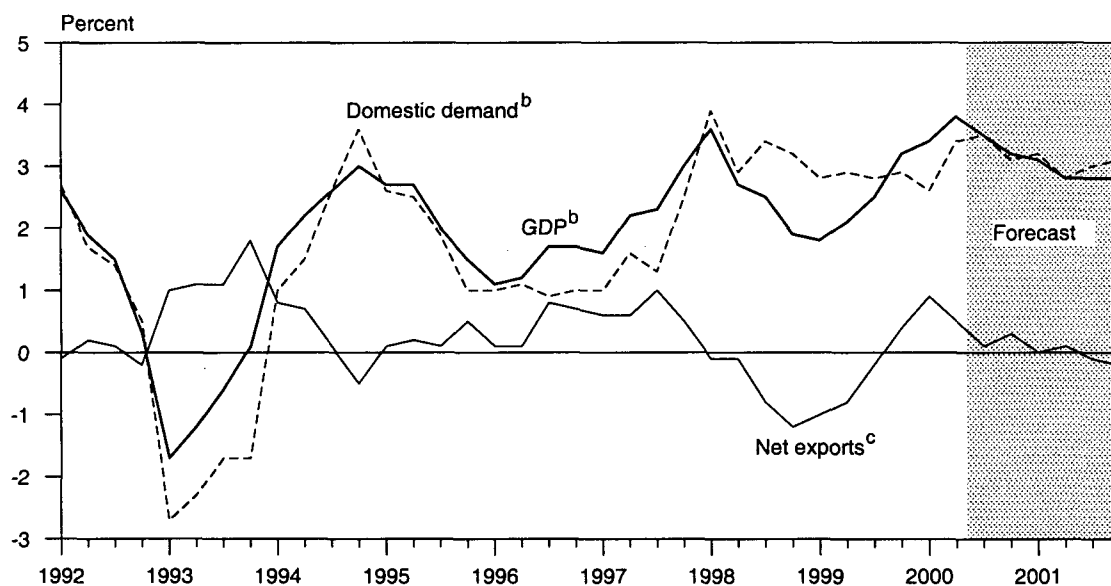
## 7 Outlook: Upswing Loses Momentum

Starting in fall of 2000, economic activity will evolve less dynamically than before (Figure 9). This is suggested by several leading indicators. Confidence in the industrial sector has weakened somewhat since the middle of the year, and the assessment of orders is less optimistic than before. Furthermore, the decline in the Purchasing Managers' Index (PMI) points at a slower pace of expansion. The slowdown in economic activity will not be dramatic, however, since consumer confidence remains near its historical peak and since the composite economic sentiment indicator calculated by the European Commission is still at a high level, too.

For the year 2000 as a whole, we expect real GDP to rise by 3.4 percent. Employment should continue to expand rapidly, and the unemployment rate will average 9 percent, down from 10 percent in 1999. Consumer price inflation will weaken only gradually and will not fall below the upper boundary defined by the ECB (2 percent) until the end of this year; on average, the HICP will exceed its level in the previous year by 2.2 percent.

Figure 9: Real GDP<sup>a</sup> in Euroland

<sup>a</sup>Seasonally adjusted. — <sup>b</sup>Annualized quarterly rate of change in percent. — <sup>c</sup>Percentage change over previous year. — <sup>d</sup>Calculated using a Hodrick-Prescott filter.

Figure 10: GDP, Domestic Demand and Net Exports in Euroland<sup>a</sup>

<sup>a</sup>At constant prices. — <sup>b</sup>Percentage change over previous year. — <sup>c</sup>Change of net exports over previous year in percent of GDP in the same quarter of previous year.

In the coming year, the upswing will slow down further; around the end of the forecast horizon real GDP will not grow faster than potential output anymore (Table 3). The impulses coming from abroad will decline perceptibly. Demand increase in the United States and in the United Kingdom will flatten out; at the same time economic activity in Southeast Asia and in Central and Eastern Europe should

expand at a slower pace than this year. Moreover, the stimulus stemming from the depreciation of the euro will fade. We assume that its real effective exchange rate will appreciate slightly in the course of the coming year. As a consequence the increase in exports will be substantially lower than in 2000.

Table 3: Quarterly Data on the Economic Development in Euroland, 1999–2001

	1999				2000				2001			
	I	II	III	IV	I	II <sup>a</sup>	III <sup>b</sup>	IV <sup>b</sup>	I <sup>b</sup>	II <sup>b</sup>	III <sup>b</sup>	IV <sup>b</sup>
Gross domestic product <sup>c</sup>	3.0	2.1	4.1	3.7	3.8	3.8	3.0	2.7	3.2	2.8	2.5	2.2
Domestic demand <sup>c</sup>	4.1	1.2	2.1	4.3	2.8	4.5	2.5	2.6	3.5	3.1	2.8	2.6
Private consumption <sup>c</sup>	3.8	1.0	3.2	2.1	3.8	4.2	2.4	2.4	3.7	3.2	2.4	2.4
Public consumption <sup>c</sup>	1.8	0.7	1.5	1.4	2.9	0.1	0.2	1.0	2.0	1.6	1.4	1.3
Fixed investment <sup>c</sup>	7.7	5.1	7.4	1.7	7.9	0.0	6.8	5.0	4.4	4.4	4.3	4.2
Change in stocks <sup>d</sup>	−0.1	−0.6	−1.6	2.3	−1.6	2.0	−0.3	0.0	0.0	0.0	0.2	0.1
Net exports <sup>d</sup>	−1.0	0.9	2.0	−0.5	1.0	−0.6	0.5	0.1	−0.2	−0.2	−0.3	−0.4
Exports <sup>c,e</sup>	1.0	11.4	16.2	10.8	11.0	14.7	9.8	7.8	7.2	6.4	5.8	5.4
Imports <sup>c,e</sup>	4.4	8.9	10.3	13.0	8.5	17.8	8.8	7.9	8.1	7.5	6.9	6.8
Unemployment rate <sup>f</sup>	10.3	10.0	9.9	9.6	9.5	9.2	8.9	8.7	8.5	8.3	8.2	8.1
Consumer prices (HICP) <sup>g</sup>	0.9	1.0	1.1	1.5	2.0	2.1	2.3	2.3	2.1	2.1	1.9	1.8
Money stock M3 <sup>c</sup>	7.1	5.8	5.8	5.4	7.2	5.3	5.7	5.5	5.2	5.0	5.0	5.0
3-month money market	3.1	2.6	2.7	3.4	3.5	4.2	4.7	5.0	5.0	5.0	4.9	4.8
Long-term interest rate	4.0	4.3	5.1	5.3	5.6	5.4	5.4	5.5	5.5	5.5	5.4	5.4
US dollar/euro exchange rate	1.12	1.06	1.05	1.04	0.99	0.93	0.91	0.92	0.92	0.94	0.97	0.99
Real effective exchange rate <sup>h</sup>	100.0	96.0	94.6	92.6	89.5	86.6	85.9	86.2	86.2	86.8	87.7	88.3

<sup>a</sup>Partly estimated. — <sup>b</sup>Forecast. — <sup>c</sup>Annualized quarterly rate of change in percent. — <sup>d</sup>Contribution to change in GDP. — <sup>e</sup>Including intra-Euroland trade. — <sup>f</sup>In percent of the labor force, harmonized according to the ILO concept. — <sup>g</sup>Change over previous year in percent. — <sup>h</sup>Index 1999 I = 100.

Source: Eurostat (2000a), ECB (2000), OECD (2000a), own calculations and forecasts.

Domestic demand will expand at a still high rate in the first half of next year (Figure 10). The underlying trend will slow down somewhat, however, as monetary conditions do not stimulate economic activity anymore. Yet the effects stemming from the fiscal impulse will dominate until the middle of the year. Tax cuts and the further rise in capacity utilization point at a rapid expansion of gross fixed capital formation. Furthermore, employment will grow at an only slightly reduced pace since we expect wage increases to be moderate next year, too. Unemployment will decline further to about 8 percent at the end of 2001, the lowest rate in the past ten years. The tax reliefs decided in several euro area countries will temporarily boost private consumption expenditures. All in all we expect real GDP to rise by 2.9 percent in 2001 (Table 4).

Inflation rates will decelerate only slightly in the coming year. While the price increases due to external developments, which dominated this year, will gradually fade — we expect quotations on the international crude oil market to decline slowly and the real effective exchange rate of the euro to appreciate slightly —, the core rate of inflation will go up considerably as the scope for increasing prices is enlarged due to the continued rise in capacity utilization. Against this background, we expect the HICP to rise by 2 percent in 2001.

Table 4: Real GDP, Consumer Prices and Unemployment Rate in Euroland, 1998–2001

	Weights in total <sup>a</sup>	Real GDP <sup>b</sup>				Consumer prices <sup>b,c</sup>				Unemployment rate <sup>d</sup>			
		1998	1999	2000 <sup>e</sup>	2001 <sup>e</sup>	1998	1999	2000 <sup>e</sup>	2001 <sup>e</sup>	1998	1999	2000 <sup>e</sup>	2001 <sup>e</sup>
Germany	32.5	2.1	1.6	3.0	2.8	0.6	0.7	1.8	1.7	9.4	8.8	8.4	7.6
France	22.1	3.2	2.9	3.3	3.0	0.6	0.6	1.7	1.5	11.7	11.3	9.7	8.7
Italy	17.9	1.5	1.4	2.8	2.4	2.0	1.6	2.7	2.3	11.9	11.4	10.6	10.0
Spain	9.1	4.0	3.8	4.0	3.4	1.8	2.2	3.4	2.7	18.8	15.9	14.2	12.7
Netherlands	6.1	3.7	3.6	4.0	3.3	1.9	2.0	2.3	2.6	4.0	3.3	2.9	3.0
Belgium	3.8	2.7	2.5	3.6	2.8	0.9	1.2	2.7	2.1	9.5	9.1	8.3	7.7
Austria	3.2	2.9	2.0	3.6	2.8	0.8	0.5	1.8	1.7	4.7	3.8	3.3	3.0
Finland	2.0	5.5	4.0	5.9	5.5	1.4	1.3	2.8	2.1	11.4	10.2	9.5	8.5
Portugal	1.7	3.9	3.0	3.0	3.0	2.2	2.2	2.7	3.0	5.1	4.5	4.3	4.3
Ireland	1.4	8.6	9.8	8.5	7.0	2.2	2.5	5.2	4.0	7.7	5.7	4.6	4.0
Luxembourg	0.3	5.0	7.6	6.0	5.0	0.9	1.1	3.3	2.0	2.8	2.4	2.2	2.2
Euroland	100.0	2.7	2.4	3.4	2.9	1.1	1.1	2.2	2.0	10.9 <sup>f</sup>	10.0 <sup>f</sup>	9.0 <sup>f</sup>	8.2 <sup>f</sup>

<sup>a</sup>Based on GDP in current prices and exchange rates of 1998. — <sup>b</sup>Percentage change over previous year. — <sup>c</sup>Harmonized Index of Consumer Prices (HICP). — <sup>d</sup>Standardized unemployment rates according to ILO. — <sup>e</sup>Forecast. — <sup>f</sup>Based on the number of employees in 1998.

Source: CB (2000), OECD (2000a), own calculations and estimates.

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