Inflation Differentials in the Euro Area

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INTRODUCTION

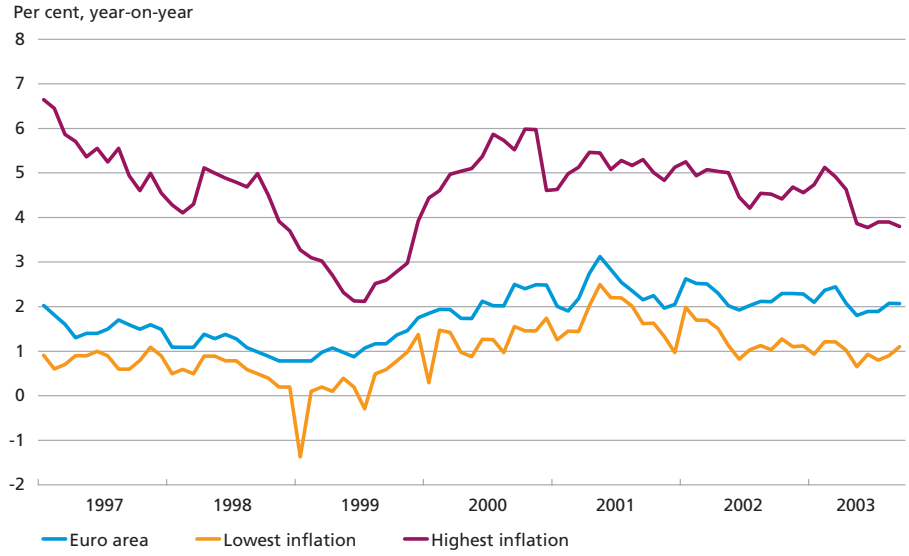
Inflation varies considerably across the euro area member states with low inflation in Germany and inflation significantly above average in a number of small member states such as Ireland. The inflation differentials among the 12 member states became an important issue in connection with the transition to the third stage of EMU in January 1999 since the objective of the single monetary policy is to achieve price stability in the euro area taken as one without considering inflation differentials among the individual member states. It is therefore interesting to observe the development of the differentials since the beginning of 1999, and to examine their possible causes. Whether the differentials will pose a problem very much depends on their underlying factors.

In some cases, inflation differentials entail no problems for the economy. In a monetary union where monetary and foreign-exchange policy cannot be used for stabilisation purposes in the individual member states, changes in relative prices (and thus inflation differentials) may be necessary for adjustment to asymmetrical shocks. In addition, inflation differentials may be the result of real-economic convergence with high growth rates in member states with low income levels, which can thus catch up with the rich member states. Differences in the member states' cyclical positions can also lead to inflation differentials without causing problems.

On the other hand, inflation differentials can be source of concern if they reflect inappropriate economic policy, wage increases out of line with productivity, bubbles in the stock market or the housing market, etc.

Furthermore, inflation differentials are of significance to monetary policy. As mentioned a single monetary policy applies in EMU where no special account can be taken of developments in individual member states. As a result, monetary policy may seem too expansionary in member states with high capacity utilisation and inflation above the EMU average. Conversely, monetary policy may seem too contractive in member states with relatively low inflation and available capacity.

INFLATION IN THE EURO AREA Chart 1



Note: Inflation measured in terms of HICP. The lowest/highest inflation shows inflation for each month in the member state with the lowest/highest inflation rate.
Source: EcoWin and own calculations.

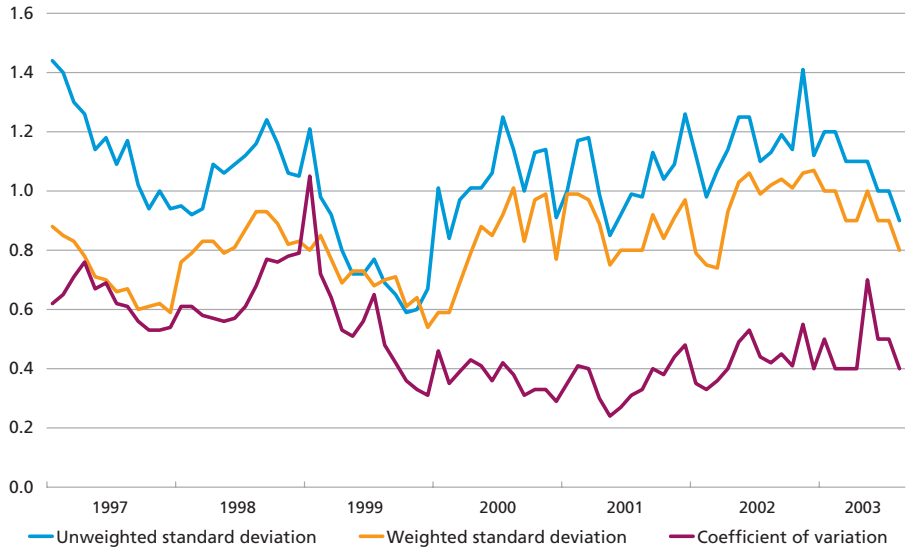
ARE THERE INDICATIONS OF CONVERGENCE OF INFLATION RATES?

Inflation in the euro area rose during 1999 and 2000 and has remained almost unchanged since then. The pattern of average inflation in the euro area covers considerable variations across the member states, cf. Chart 1. The lowest inflation rate has been around 1 per cent year-on-year, while the highest has been approximately 4-5 per cent year-on-year in recent years. The large member states – which have the greatest weights in the calculations of average inflation – experienced low inflation. It follows that inflation in the euro area is closer to the lowest than to the highest inflation rate.

Inflation differentials can be measured in several ways. The following three simple measures have been calculated monthly since 1997: unweighted standard deviation, weighted standard deviation (this measure takes into account the size of the member state, whereby large member states have a greater weight in the calculations)[1], and the unweighted coefficient of variation, i.e. unweighted standard deviation divided by average inflation (according to this measure an increase in the deviation occurring simultaneously with – and proportionally to – a rise in average inflation will not entail greater divergence).

[1] The weights applied by Eurostat to the calculation of inflation for the euro area are applied here.

INFLATION DIFFERENTIALS IN THE EURO AREA, PER CENT Chart 2



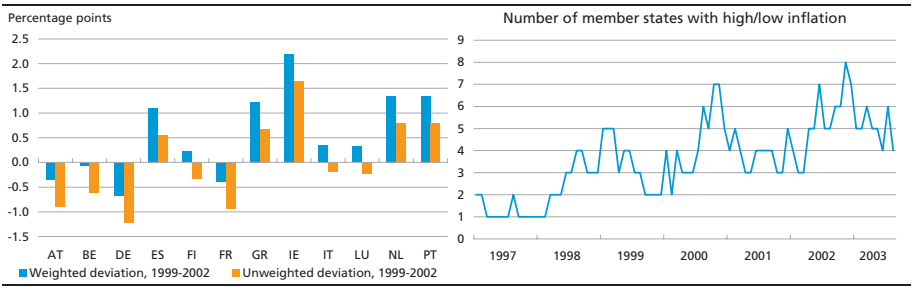
Note: Inflation measured in terms of HICP.
Source: EcoWin and own calculations.

In 2003 unweighted as well as weighted standard deviations have been almost on a par with the level at the transition to the third stage of EMU, cf. Chart 2. By these two measures, divergence declined throughout 1999, but increased in 2000 and has remained almost unchanged since then. The coefficient of variation decreased throughout 1999 and has remained almost unchanged since then. As opposed to the standard deviation, the coefficient of variation did not rise during 2000 since the increase in divergence measured in terms of standard deviation occurred simultaneously with the increase in average inflation in the euro area.

Throughout the entire period several member states experienced higher than average inflation rates in both weighted and unweighted terms: Ireland, the Netherlands, Greece, Portugal and Spain, cf. Chart 3. In Germany, on the other hand, inflation was below average. The high-inflation member states are considerably smaller than Germany, and consequently weighted average inflation in the euro area is lower than unweighted average inflation. In the member states with high inflation, the deviations from weighted inflation are therefore greater than the deviations from unweighted inflation, while the opposite applies to member states with inflation rates below average.

Since 1999, the number of member states deviating strongly from the weighted average has increased. In the 1st half of 2003, 4-6 member states deviated from the weighted average by more than 1 percentage point, cf. Chart 3.

DEVIATIONS FROM INFLATION IN THE EURO AREA Chart 3



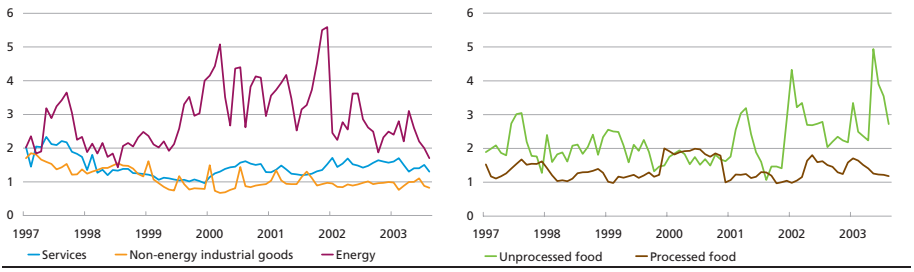
Note: AT: Austria, BE: Belgium, DE: Germany, ES: Spain, FI: Finland, FR: France, GR: Greece, IE: Ireland, IT: Italy, LU: Luxembourg, NL: Netherlands, PT: Portugal. Inflation measured in terms of HICP. The right-hand panel shows the number of member states whose inflation rate deviates from the average by more than 1 percentage point (in weighted terms).
Source: EcoWin and own calculations.

Development in the individual HICP components

The analysis of the subcomponents shows that energy and unprocessed food contribute a great deal to the inflation differentials, cf. Chart 4. The divergence in price increases for energy products rose considerably during 1999 and at the beginning of 2000 when energy prices increased strongly and the euro depreciated. The divergence has subsided a little since then.

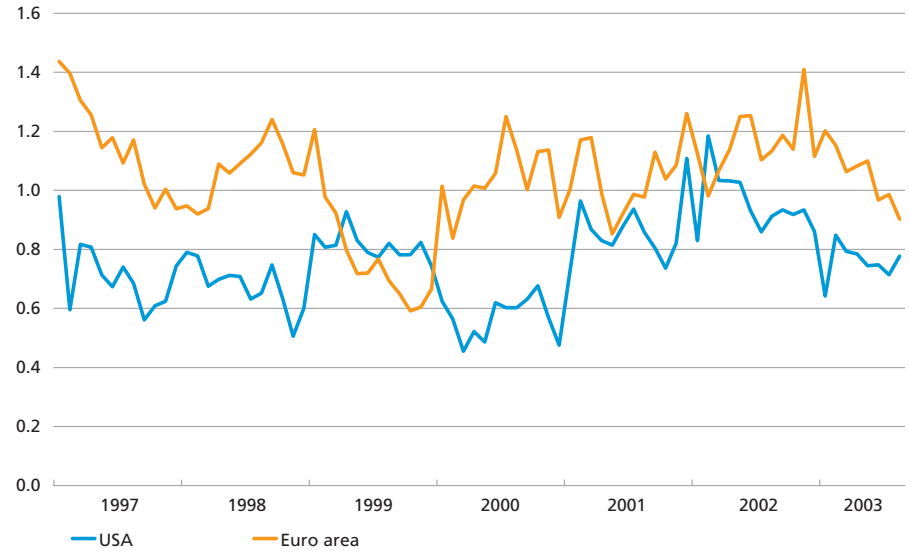
In addition, the inflation differentials across the member states are greater for services than for non-energy industrial goods. Low divergence in prices for industrial goods reflects strong cross-border competition via trade in goods. This is not least the case in Ireland, which showed the highest price increases in overall terms, but, unlike other high-inflation member states, a lower price increase for industrial goods than the average for the euro area. The high inflation can be attributed solely to strong price increases in the service sector. Inflation in the service sector was lowest in Germany and France. The pattern of inflation differentials in the service sector can reflect varying cyclical

INFLATION DIFFERENTIALS FOR HICP SUBCOMPONENTS Chart 4



Note: Inflation differentials measured as unweighted standard deviation.
Source: Eurostat and own calculations.

INFLATION DIFFERENTIALS IN THE EURO AREA AND THE USA, PER CENT Chart 5



Note: Inflation differentials measured as unweighted standard deviation.
Source: EcoWin, US Bureau of Labor Statistics and own calculations.

positions, different degrees of flexibility in the labour market or real convergence.

Comparison with other countries

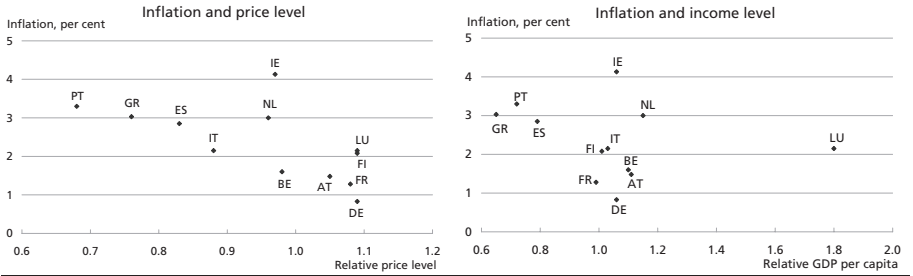
A comparison with the USA, where inflation differentials are measured across 14 Metropolitan Statistical Areas, shows slightly higher inflation differentials across the euro area members states, cf. Chart 5. However, the inflation differentials among the EMU member states are considerably greater than the inflation differentials between the regions/states in Germany, Italy and Spain.[1] In terms of size and heterogeneity the euro area resembles the USA rather than any individual euro area member state, so some inflation differentials can be assumed always to exist.[2]

UNDERLYING REASONS FOR INFLATION DIFFERENTIALS

Whether inflation differentials present a problem depends on their causes, among other factors. Some of the causes are reviewed here together with an assessment of the role of the individual factors in the development in inflation differentials in the euro area.

1 Cf. ECB (2003b).
2 The variations in the divergence between the USA on the one hand and Germany, Italy and Spain on the other can be explained by e.g. stronger growth differentials across the regions in the USA. Furthermore, fiscal policy is considerably more decentralised in the USA than in the individual euro area member states. The countries' sizes probably also play a role.

INFLATION AND PRICE AND INCOME LEVELS Chart 6



Note: AT: Austria, BE: Belgium, DE: Germany, ES: Spain, FI: Finland, FR: France, GR: Greece, IE: Ireland, IT: Italy, LU: Luxembourg, NL: Netherlands, PT: Portugal. Inflation measured in terms of HICP excluding energy and unprocessed food, as the average for the period 1999-2002. The price level and GDP are from 1998 measured in relation to the EU average.
Source: Eurostat and EcoWin.

Price level convergence

Price level differentials and price-level convergence can possibly explain the divergence in the inflation patterns. Member states with a relatively low price level have a higher than average inflation rate and will thus catch up with countries with a higher price level. Convergence in traded-goods price levels can be expected as a consequence of increased integration. Convergence in prices for non-traded goods can be explained by real-economic convergence. The Balassa-Samuelson effect is often mentioned in this connection. According to the Balassa-Samuelson effect, member states with low income and productivity levels see stronger productivity growth in the traded-goods sector, whereby they will catch up with the more affluent countries. Productivity increases in the traded-goods sector not only lead to higher wages in the sector, but also impact on the non-traded-goods sector. The result is higher prices for non-traded goods and thus higher inflation which in this case does not reflect a deterioration of competitiveness.

There is a negative correlation between the price level in 1998 and average inflation in the period 1999-2002, cf. Chart 6.[1] This means that the member states with a low price level at the beginning of the period (Portugal, Greece and Spain) have seen higher inflation and vice versa. However, high inflation was observed in Ireland and the Netherlands despite a price level close to the average.[2] As mentioned, price-level convergence can be a result of convergence in income levels. Chart 6 shows a weak negative correlation between inflation and GDP per capita.

[1] Measured in terms of standard deviation (unweighted) the price differentials were reduced from 0.13 in 1998 to 0.11 in 2002.

[2] Hufbauer and Wada (2001) find a negative correlation between inflation in 2000 and the price level in 1999. According to the study a country with a price level 10 per cent lower than average will have an inflation rate that is 0.5 percentage points higher than average. According to the study, price-level differentials can explain only around 13 per cent of the variation in inflation rates.

INFLATION DIFFERENTIALS ACCORDING TO THE BALASSA-SAMUELSON EFFECT (BS) AND ACTUAL INFLATION DIFFERENTIALS Table 1

	BE	DE	GR	ES	FR	IE	IT	NL	AT	PT	FI
BS	0.6	-0.6	1.6	0.5	0.1	1.3	0.5	0.1	0.2	0.7	0.5
Actual	-0.1	-0.8	1.4	1.2	-0.4	2.5	0.5	1.2	-0.2	1.7	0.4

Note: AT: Austria, BE: Belgium, DE: Germany, ES: Spain, FI: Finland, FR: France, GR: Greece, IE: Ireland, IT: Italy, LU: Luxembourg, NL: Netherlands, PT: Portugal. BS is calculated by the ECB as the average of the following studies: Alberola and Turväinen (1998), IMF (1999), Canzoneri et al. (2001), De Grauwe & Skudelny, Sinn & Reutter (2001). The studies cover various periods between 1960 and 1997. Actual inflation differentials are averages for the period 1999-2002. Inflation is measured in terms of HICP excluding energy and unprocessed food.
Source: ECB (2003b), Eurostat.

Several empirical studies have assessed the role of the Balassa-Samuelson effect in inflation patterns. Table 1 shows the estimated inflation differentials according to this effect as well as the actual differentials. The Table shows that actual inflation differentials were generally somewhat higher than the hypothetical inflation differentials. High inflation in Greece and to some extent in Portugal and Spain can be explained by the Balassa-Samuelson effect. Among the low-inflation member states, the model can be applied to Germany.

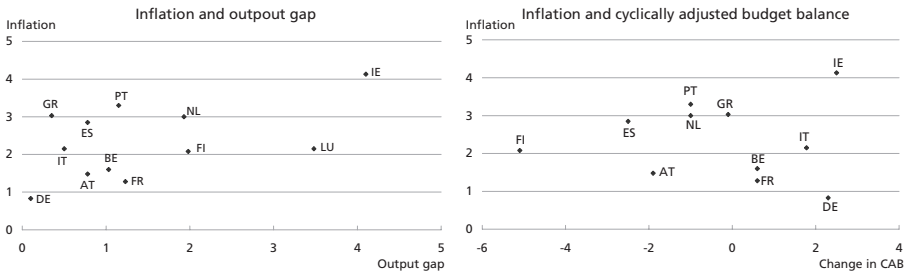
There are still considerable variations in price levels for both non-traded and traded goods in the euro area. The price variations can be explained by indirect taxes, distribution-channel structures, the competitive environment, etc. Increased integration should *ceteris paribus* lead to price convergence and thus inflation differentials. The low price and income levels in the accession countries will probably lead to higher inflation differentials in the euro area, once the accession countries have qualified for EMU membership.

Cyclical position

The individual member states are at various cyclical stages which also contributes to explaining the divergence in price developments. In periods with higher output than the potential level the member state in question would typically be subject to inflationary pressure and vice versa. Chart 7 shows a positive correlation between the output gap and inflation. Ireland accounted for the highest inflation rate and the widest positive output gap, and in the Netherlands, a correlation between a strong cyclical position and relatively high inflation can also be observed. Germany at the other end showed both the lowest inflation and the narrowest output gap. Differentials in employment and wage patterns, wage drift and growth in lending also support the hypothesis that inflation differentials are attributable to e.g. cyclical factors.

The fiscal-policy stance is of significance to the inflation differential pattern. Expansionary fiscal policy tends to stimulate growth and thus

INFLATION, OUTPUT GAP AND BUDGET BALANCE, PER CENT Chart 7



Note: AT: Austria, BE: Belgium, DE: Germany, ES: Spain, FI: Finland, FR: France, GR: Greece, IE: Ireland, IT: Italy, LU: Luxembourg, NL: Netherlands, PT: Portugal. Inflation measured in terms of HICP excluding energy and unprocessed food. Inflation and output gap are averages for the period 1999-2002. Change in the cyclically adjusted budget balance (CAB) is calculated as the difference between the CAB in 2002 and 1998.
Source: Eurostat and EcoWin.

impact on the output gap. This can affect inflation. However, there is no unequivocal correlation between fiscal policy and inflation. Ireland's fiscal policy was expansionary during this period which probably contributed to the high inflation rate, but Germany's almost equally expansionary fiscal policy did not prevent low inflation since Germany had idle resources.

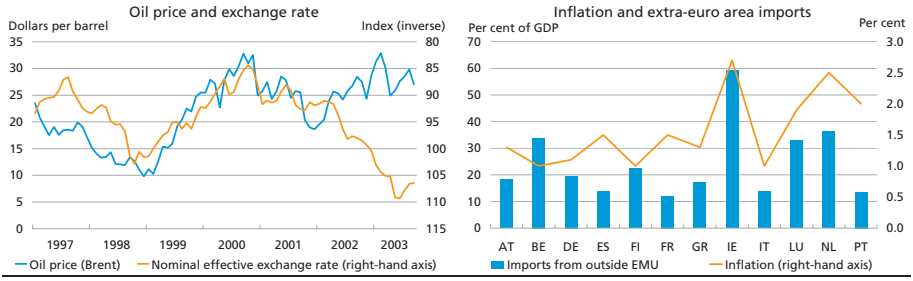
Asymmetrical shocks

A varying degree of dependence on oil can lead to strong deviations in inflation rates across the member states in periods of large changes in oil-prices e.g. in 1999 and 2000, cf. Chart 8 and the section on development in the HICP subcomponents. There is no strong correlation between the member states' dependence on oil (measured in terms of net imports as a ratio of GDP) and inflation in the period 1999-2002.[1] Among the high-inflation member states Greece and Portugal are strongly dependent on oil. The weak correlation between inflation and the member states' dependence on oil can be explained by various administrative measures to counter the effect of energy prices on the consumer-price index.

The euro depreciated strongly in the period 1999-2000. Exchange-rate fluctuations can have a varying impact on the individual member states since some are more dependent on extra-euro area imports than others, cf. Chart 8.[2] Ireland, the Netherlands and Belgium are the most open member states measured as the ratio of extra-euro area imports to GDP.

1 See ECB (2003b).
2 Honohan and Lane (2003) find that exchange-rate fluctuations have a considerable impact on inflation differentials. According to their empirical survey, a relative depreciation of the nominal effective change rate by 3.5 per cent leads to an inflation differential of 1 percentage point. In the period 1998-2000 Ireland's nominal effective exchange rate depreciated by 11 per cent, while France's depreciated by only 4 per cent.

INFLATION AND OPENNESS Chart 8



Note: AT: Austria, BE: Belgium, DE: Germany, ES: Spain, FI: Finland, FR: France, GR: Greece, IE: Ireland, IT: Italy, LU: Luxembourg, NL: Netherlands, PT: Portugal. The right-hand panel shows changes in inflation in the period 1999-2002. Inflation measured in terms of HICP excluding energy and unprocessed food. Extra-euro area imports measured as a ratio of GDP on average for 2000-01.
Source: Eurostat, EcoWin and Honohan and Lane (2003).

As Table 2 shows, the contribution from increases in import costs is considerable in Ireland and Belgium, while the contribution from import costs to total inflation in the Netherlands is not particularly large. The inflation increase in Belgium was nevertheless moderate due to changes in administrative prices, which offset the effect of strong import inflation. The effect of the euro's latest appreciation is not yet visible in inflation to any significant extent.

The product and labour markets in the euro area are characterised by a low degree of flexibility in prices and wages, so that adjustment to shocks is slow, particularly if a downward adjustment is required. Structural labour-market reforms are a current topic in several member states. Structural reform will no doubt reduce inflation differentials in the long term, but may increase inflation differentials in the short term unless they are implemented simultaneously in all member states.

Other reasons

Inflation differentials can also be attributed to other factors such as changes in administrative prices and indirect taxes, etc. The Netherlands is the euro area member state where changes in indirect taxes contributed most to inflation in this period.

ANNUAL CHANGES IN THE FINAL DEMAND DEFLATOR (FDD) AND CONTRIBUTION FROM IMPORT COSTS (IC) Table 2

	BE	DE	GR	ES	FR	IE	IT	NL	AT	PT	FI
FDD	2.3	0.9	3.2	3.3	1.0	4.2	2.3	3.1	1.1	3.3	1.3
IC	1.6	0.8	0.8	1.1	0.5	2.2	0.9	1.3	1.1	0.7	0.5

Note: AT: Austria, BE: Belgium, DE: Germany, ES: Spain, FI: Finland, FR: France, GR: Greece, IE: Ireland, IT: Italy, LU: Luxembourg, NL: Netherlands, PT: Portugal. Average annual change in the final demand deflator in the period 1999-2002. IC is the contribution from import costs.
Source: ECB (2003b)

CONCLUSION

Inflation differentials are almost the same as at the beginning of 1999. Throughout the period inflation has been higher than average in Ireland, the Netherlands, Greece, Portugal and Spain. Germany, on the other hand, has shown low inflation. The number of member states with a relatively strong deviation from the average was on the increase until recently. The analysis of the subcomponents shows that energy especially contributes to divergence. Furthermore, as expected, the service sector shows greater inflation divergence than manufacturing industry (excluding energy). Since most factors that have contributed to the inflation differentials since the start of EMU continue to exist, some inflation differentials can be assumed always to exist. This is supported by the USA's experience.

However, this complex issue cannot be completely illuminated by the partial analysis of the causes of inflation differentials applied here. Nevertheless, the analysis provides for important conclusions. Deviation of inflation from the average can be attributed to various factors in the relevant member states. The most important factor in the three member states with the lowest income level, i.e. Portugal, Spain and particularly Greece, is price and income convergence, including the Balassa-Samuelson effect. In the Netherlands and Ireland, on the other hand, cyclical factors played a significant role. In addition, among the euro area member states changes in indirect taxes contributed most to inflation development in the Netherlands, and in Ireland exchange-rate fluctuations probably also contributed to the high inflation rate. Germany's low inflation can be attributed to cyclical factors especially, but presumably also to real-economic convergence.

If a relatively high inflation rate is attributable to price and income convergence or cyclical adjustment, it presents no problem. These factors have played a significant role, as explained above, but can hardly account for the entire development. The rigidities in the labour market entailed slow adjustment to shocks such as the oil-price increases in 1999-2000 and thus also contributed to the differentials. The structural reforms to increase the flexibility in the labour and product markets will provide for smoother adjustment to shocks. Another adjustment option is to implement a more consistent stability-oriented fiscal policy. The automatic stabilisers should thus be allowed to work and it should be possible to adjust fiscal policy more actively if there are prospects of overheating or high unemployment.

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