

# Price and cost indicators for the euro area: an overview

*The two pillars of the Eurosystem's monetary policy strategy represent, on the one hand, a prominent role for money, signalled by the announcement of a reference value for money growth and, on the other, the analysis of financial and other economic indicators in order to formulate a broadly based assessment of the outlook for price developments and the risks to price stability in the euro area as a whole. Price and cost indicators constitute one group of variables that enter this broadly based assessment. This article presents the interrelations between the euro area Harmonised Index of Consumer Prices (HICP) and its components and the price and cost indicators which are available for the euro area. These include variables such as import and commodity prices, producer prices, labour cost indicators and direct survey-based measures of expected price developments.*

## I Introduction

In its broadly based assessment of the outlook for future price developments and the risks to price stability under the second pillar of the monetary policy strategy of the Eurosystem, the Governing Council of the ECB thoroughly analyses a wide range of information on the economic and financial situation. This large information set includes indicators of demand and supply pressure, price and cost indicators, asset prices and other financial variables, as well as various forecasts of the macroeconomic outlook. Together with the analysis of the other indicators which underpin the second pillar, the analysis of price and cost developments complements the analysis of monetary developments which is undertaken under the first pillar of the monetary policy strategy.

A general discussion of the wider set of indicators which are taken into account under the second pillar has already been presented in an earlier article entitled "The role of short-term economic indicators in the analysis of price developments in the euro area", which was published in the April 1999 issue of the ECB Monthly Bulletin. However, since then a number of articles have taken a more detailed look at the role of particular indicators. Against this background, this article focuses on price and cost indicators. The following indicators are discussed: (i) import and world commodity prices, (ii) producer prices, (iii) labour cost indicators and (iv) survey-based indicators of expected price developments. This group of variables is regularly discussed in the "Price developments" section of the ECB Monthly

Bulletin. It represents a restricted but fairly homogenous class of closely interrelated indicators.

Although the euro area is a relatively closed economy compared with its constituent countries, import and commodity prices are helpful in explaining developments in the HICP, because they either affect consumer prices directly or enter the chain of production and thereby feed through to domestic producer prices for consumer goods. By contrast with commodities, which predominantly enter at the earliest stage of the chain of production, labour is a main input at every stage in the production process. Therefore, labour costs are a key determinant of price developments at all stages of production and thus have a major influence on consumer price developments. Owing to the fact that expectations of future price developments may affect the development in wages and profits and thus have an impact on future price developments, surveys of the private sector's expectations about future price developments are also a useful indicator for monetary policy.

The Governing Council has defined its primary objective of price stability with reference to the HICP in the euro area. This article identifies and explains the relationships, both direct and indirect, which exist between the various price and cost indicators and the euro area HICP and its main components. Such an analysis serves to help in understanding the overall price climate and also to distinguish purely short-term from

more underlying developments in prices. While in the medium to longer term inflation is ultimately a monetary phenomenon, in the short to medium term developments in production costs and import prices (cost push factors), as well as the development in economic activity (demand pull factors), can significantly affect price developments.

Much can be learned by considering the historical interaction between various indicators and consumer prices. In the remainder of this article, these historical interactions are presented using graphical analysis and correlations. This indicates the strength or weakness of the relationships which exist between the various indicators

**Table I**  
**Summary table: Price and cost indicators in the euro area**

(annual percentage changes, unless otherwise indicated)

	Averages			Max.	Min.	Std. dev.	Relative std. dev. <sup>1)</sup>
	1990-2000	1990-95	1995-2000				
Overall HICP <sup>2)</sup>	2.6	3.4	1.7	5.0	0.8	1.1	1.0
Goods	2.2	2.8	1.4	4.8	0.1	1.1	1.0
Food	2.2	2.9	1.5	4.6	-0.3	1.2	1.1
Unprocessed food	2.0	2.5	1.3	7.0	-1.9	2.2	2.0
Processed food <sup>3)</sup>	2.4	3.2	1.6	4.5	0.6	1.0	1.0
Industrial goods	2.1	2.8	1.3	5.2	-0.4	1.2	1.1
Non-energy industrial goods	1.9	2.6	1.0	3.4	0.3	1.0	0.9
Energy	3.1	3.5	2.4	15.3	-4.9	4.0	3.7
Services	3.6	4.7	2.4	6.0	1.3	1.4	1.3
Oil prices (EUR per barrel) <sup>4)</sup>	15.9	15.0	16.4	31.5	8.8	42.0	38.7
Non-oil commodity prices <sup>5)</sup>	-0.2	-0.6	0.7	26.4	-23.5	12.6	11.7
Import unit values <sup>5)</sup>	1.9	1.2	2.9	22.8	-12.2	6.3	5.8
Industrial producer prices <sup>6)</sup>	1.4	1.9	1.2	6.5	-2.7	1.7	1.6
Intermediate goods	1.3	2.0	1.2	10.9	-5.3	3.1	2.9
Capital goods	0.8	1.0	0.7	2.6	-0.1	0.7	0.6
Consumer goods	2.3	3.3	1.4	5.6	-0.2	1.4	1.3
Unit labour costs <sup>7)</sup>	2.2	3.1	1.1	5.3	-1.6	2.0	1.8
Compensation per employee <sup>7)</sup>	3.7	4.7	2.4	6.7	1.1	1.8	1.7
Labour productivity <sup>7)</sup>	1.5	1.7	1.4	2.8	-0.1	-	-
Total hourly labour costs <sup>8)</sup>	.	.	2.5	3.6	1.7	0.7	1.3
Selling price expectations <sup>9)</sup>	5.9	10.3	3.2	24.0	-11.0	-	-
Expected price trends <sup>10)</sup>	25.0	32.0	17.5	51.0	7.0	-	-

Sources: Eurostat (HICP, import unit value, industrial producer prices and total hourly labour costs), International Petroleum Exchange (oil price), HWWA – Institut für Wirtschaftsforschung (Hamburg) (non-oil commodity prices), national data (unit labour costs, compensation per employee and labour productivity), European Commission Business and Consumer Surveys (selling price expectations and expected price trend) and ECB calculations.

- 1) Shows the standard deviation of the annual percentage change in each of the indicators relative to that in the overall HICP. Other than total hourly labour costs (see footnote 8 below) this is calculated for 1990 onwards.
- 2) Data before 1995 are estimates based on national definitions and are not fully comparable with HICPs starting in 1995.
- 3) Includes alcoholic beverages and tobacco.
- 4) Brent Blend (for one-month forward delivery). In ECU up to December 1998. The standard deviation measures are calculated using annual percentage changes.
- 5) In euro; in ECU up to December 1998.
- 6) Excluding construction.
- 7) Whole economy. Quarterly data.
- 8) Whole economy (excluding agriculture, public administration, education, health and other services). Quarterly data, the series starts in 1996Q1.
- 9) Months ahead. Percentage balances.
- 10) Next 12 months. Percentage balances.

and developments in final consumer prices in the short or the medium term.

At the outset, it should be emphasised that the implications for consumer prices of developments in particular indicators will often vary depending on the particular circumstances and the broader macroeconomic context in which such developments take place. Moreover, structural and behavioural changes in the economy, such as changes in the production process, technological innovation, deregulation or a significant change in the macroeconomic policy environment, could, over time, lead to gradual changes in the relationships between various indicators and future price developments. One example of such a change is the introduction of the single currency in January 1999 which, *inter alia*, is likely to have contributed to more intensified competition. These considerations have to be borne in mind when analysing price developments. In addition, changes in indirect taxation and administered prices are also factors which can have a significant effect on price developments.

Table I provides various summary statistics for the euro area HICP, its sub-components and the various price and cost indicators discussed in the remaining sections. The table shows that the downward movement in average HICP inflation which occurred over the course of the 1990s, from 3.4% on average in the period from 1990 to 1995 to

1.7% on average in the period from 1995 to 2000, was broadly matched by a downward movement in the year-on-year change in other price and cost indicators. For example, the year-on-year change in unit labour costs declined from an average of 3.1% in 1990-95 to 1.1% in 1995-2000 while, over the corresponding periods, the annual increase in industrial producer prices declined from an average of 1.9% to 1.2%. These developments represent the gradual move from a higher inflation environment to one consistent with price stability, largely reflecting the efforts among the Member States associated with the process of convergence prior to the establishment of Economic and Monetary Union.

From Table I it is also evident that, over the course of the 1990s, many of the available price and cost indicators, and especially import, oil and commodity prices, exhibited a degree of short-term variability which was significantly greater than that in the euro area HICP. This is partly explained by the fact that profit margins tend to function as a buffer, reducing fluctuations in consumer prices as compared with production costs. In this context, it should be noted that labour costs are a much more important cost component than import prices for the euro area, and that, therefore, the order in which the indicators are presented in this article does not reflect their importance for trends in HICP developments.

## 2 Import and world commodity prices

Although the euro area is a larger and relatively more closed economy than its constituent countries, developments in import and world commodity prices provide important information for understanding the outlook for domestic price developments. In particular, the analysis of import and world commodity prices is of help in arriving at an assessment of the extent to which global price developments, together with developments in the nominal exchange rate

of the euro, may influence consumer prices in the euro area.

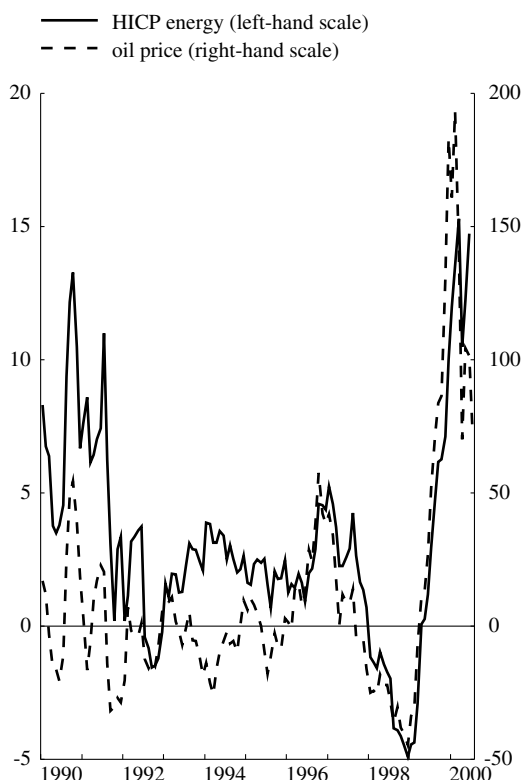
Import and commodity prices contain useful information on current and future consumer price inflation for a number of reasons, most notably because imports and commodities either feed directly into private consumption or are an important input in the production of domestic goods and services. In this regard, it is possible to distinguish between the direct,

indirect and second-round effects of import price developments on consumer prices. The *direct* effect occurs via commodities and other final goods imports, which are more or less directly consumed by households. By contrast, *indirect* effects arise as higher imported input costs are gradually passed along the chain of production via producer prices to consumer prices (producer prices are discussed in more detail in Section 3). While the variation in domestic profit margins can, to some extent, offset the effects on domestic prices of short-term changes in imported input costs, sustained changes in imported input costs are likely to be reflected in domestic prices. In addition, the realisation of such effects, or the prospect that they are likely to occur, can influence wage developments and thereby give rise to *second-round* effects on consumer prices. The role of wage developments and that of inflation expectations are addressed in Sections 4 and 5 respectively. The interplay between these three kinds of effects implies that the ultimate impact of developments in commodity and import prices on consumer prices can take place over quite an extended period of time (two to three years, or even longer if second-round effects have a chance to occur).

In the light of the above considerations, it is useful to distinguish between import prices for manufactured goods and prices for raw material imports, such as oil and non-oil commodities. Such a distinction is also of interest because changes in the exchange rate tend to have an immediate and one-to-one effect on the euro price of raw material imports, such as oil and non-oil commodities while, by contrast, the impact of exchange rate changes on the euro price of imports of manufactured goods – which include intermediate as well as final consumer and capital goods – is likely to be less than one-to-one. This reflects the fact that foreign producers exporting these goods to the euro area have to take into account the competition that they face from producers of similar products within the euro area. As a result, in the case of a depreciation of the

**Chart 1**  
**HICP energy and oil prices in the euro area**

(annual percentage changes; monthly data)



Sources and data: See Table 1.

euro, for example – particularly if it is perceived to be transitory – firms may not find it optimal to increase the euro price of products sold to the euro area to reflect fully the exchange rate change (i.e. to keep the price unchanged in the foreign producer's domestic currency), as this could lead to a loss of market share. However, more protracted changes in the exchange rate do generally feed through to import prices at some point in time. In addition, there is a similar effect working in the opposite direction, since a fall in the import price can exert downward pressure on prices for similar competing goods produced in the euro area.

**Direct oil price effects are most clearly seen in the HICP energy component**

Oil prices have recently been the most prominent example of commodity prices

having a direct impact on consumer price developments (via energy prices). Although many factors other than oil prices also influence energy price developments (such as energy taxation and deregulation), at times of major movements in the euro price of oil, these dominate the developments in the energy component of the HICP (see Chart 1). The development in oil prices is thus the main explanatory factor behind the year-on-year decline in energy prices in 1998

and early 1999, as well as the strong rise in the annual rate of increase in energy prices since April 1999. A relatively quick pass-through of oil prices to energy prices is confirmed by the high correlation (0.7) between the annual rate of increase in the HICP energy component and the annual rate of increase in the oil price one month earlier (see Box I for a further discussion of the use of correlation coefficients in assessing the co-movement of different variables).

### Box I

#### Interpreting historical correlations between price and cost indicators

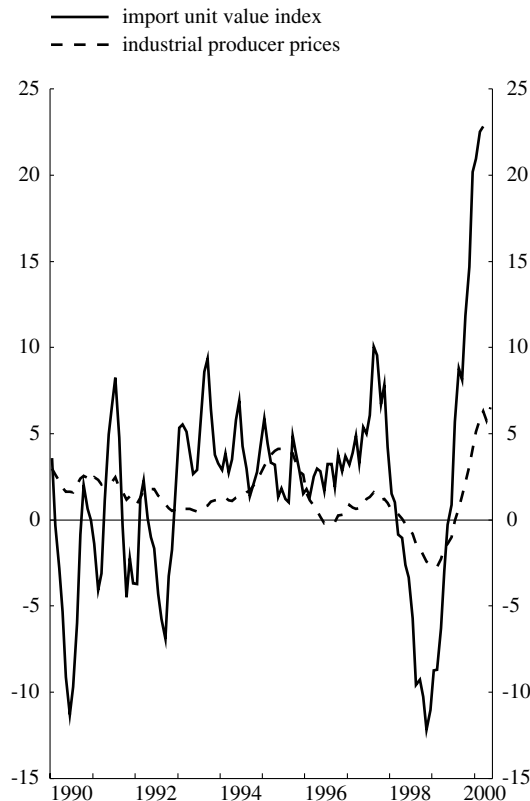
The correlation coefficient can be used to shed light on the relationship between various indicators. There are several examples where a high degree of correlation between economic variables confirms a close link that would be expected to exist between them. One example is the observation that changes in the price of oil (measured in euro) are almost immediately reflected in developments in the consumer price of energy. The link makes sense, given the extensive use of oil as a source of energy. This interdependence is also reflected in a high correlation of the annual rate of increase in the HICP energy component with the annual rate of increase in the oil price. Measured over the period from 1990 to 2000, this correlation reaches its maximum (0.7) when current energy price developments are compared with oil price developments in the preceding month.

While the correlation coefficient contains some useful summary information, it also has several shortcomings. First, correlation is simply a measure of the co-movement of two variables. A high value for a correlation coefficient is not, in itself, sufficient to infer that there is any causal link between the two variables. A high rate of correlation may be the result of other independent factors which can affect both the indicator and the HICP. In this connection, the progress towards convergence at low levels of inflation in the euro area countries in the 1990s implies that the developments in the annual rate of increase in most price and cost indicators for the euro area followed a broad downward trend in this period. As a result of this trend, the historical correlation over the whole of the 1990s may overstate the relationship, compared with an environment of price stability. Correlation coefficients may also change over time. This can happen as a consequence of structural changes in the economy, such as changes in production processes, technical innovation or a shift in the policy regime. Finally, correlation only analyses linear relationships, while there may be a non-linear relationship between the variables. It is, therefore, necessary to supplement the review of correlation coefficients with a broader economic analysis based on knowledge of the working of the economy (a priori hypotheses on causation inferred from economic theories, knowledge of production practices, etc.).

In addition to the complications which arise as a result of structural or behavioural changes, the interaction between monetary policy and inflation, on the one hand, and between inflation and inflation indicators, on the other, complicates the observed correlations between various indicators and future price developments. For example, a forward-looking monetary policy which takes pre-emptive action in response to inflationary risks will tend to offset the independent effects of various indicators on consumer prices. Under such circumstances, one might observe no leading indicator role for a particular variable and therefore no clear correlation when analysing developments in a historical set of data. Of course, this does not mean that the central bank should ignore such an indicator altogether. Instead, it is an indication that policy has reacted appropriately to the inflationary pressures in the economy in the past. Hence, the fact that a particular variable may have exhibited poor leading indicator properties for inflation in the past, does not imply that it contains no relevant information from the perspective of current or future monetary policy.

**Chart 2**  
**Import unit value index and industrial producer prices in the euro area**

(annual percentage changes; monthly data)



Sources and data: See Table 1.

**Indirect effects via producer prices**

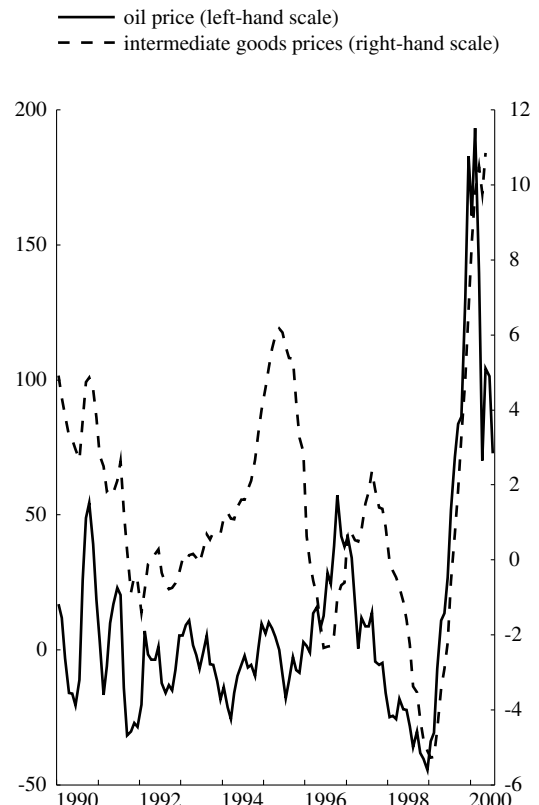
The indirect effects of commodity and other import prices on domestic prices in the euro area are illustrated by a relatively close relationship between overall domestic producer prices and overall import prices. The maximum correlation between euro area producer prices and import prices is 0.5, with a lag of one month. This correlation reflects the fact that price developments in imported raw materials and intermediate goods affect developments in the domestic producer price for intermediate and subsequently also final goods in the industrial sector. However, as measured by unit value indices, developments in euro area import prices tend to be more volatile than developments in industrial producer prices (see Chart 2). This relatively higher volatility is partly a result of the fact that domestic producer prices are also

affected by developments in domestic costs and profit margins, which may tend to offset the volatility coming from imported input prices. Moreover, statistical shortcomings of the unit value indices for the purpose of measuring price changes may explain much of their high short-term (month-to-month) volatility. They are, however, the only comprehensive import price indicator currently available for the euro area.

The co-movement in industrial producer prices and world commodity prices can be seen most clearly in the intermediate goods component of industrial producer prices, reflecting the high share of total inputs accounted for by raw material inputs in the intermediate goods sector. In particular, the development in both oil and non-oil commodity prices has contributed to the rise in the annual rate of increase in intermediate

**Chart 3**  
**Oil prices and intermediate goods prices in the euro area**

(annual percentage changes; monthly data)

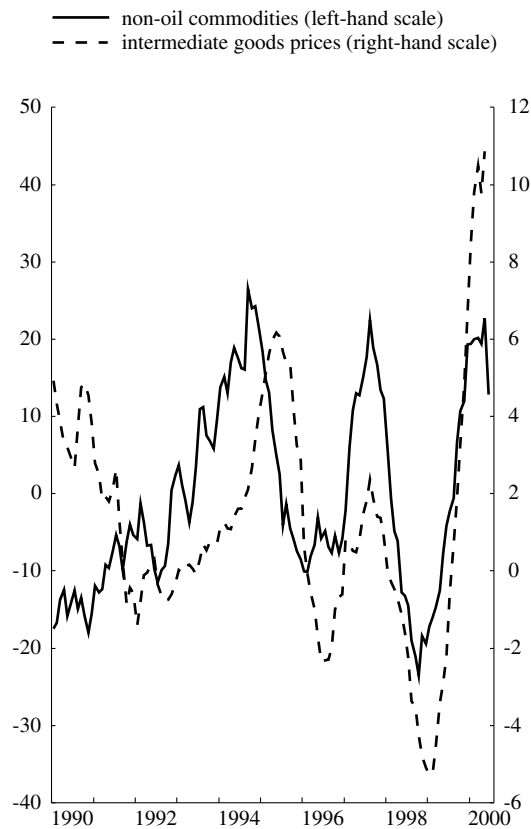


Sources and data: See Table 1.

#### Chart 4

### Non-oil commodity prices and intermediate goods prices in the euro area

(annual percentage changes; monthly data)



Sources and data: See Table 1.

goods prices since early 1999 (see Charts 3 and 4). The effects of oil and non-oil world commodity prices on intermediate industrial goods prices in the euro area are also supported by an analysis of the relevant correlation coefficients over the 1990s. The maximum correlation between the annual

rate of increase in intermediate goods prices and the annual rate of increase in oil prices expressed in euro is 0.6, for the oil price with a two to three-month lag, while the maximum correlation between the annual increase in intermediate goods prices and that of non-oil commodity prices expressed in euro is 0.5, with a lag of three months.

#### Commodity prices also have a forward-looking dimension

Commodity prices also have explicitly forward-looking characteristics, which are underlined by the storability of commodities and the existence of actively traded commodity futures markets. In particular, the current spot price of a commodity will tend to be equal to the futures price, but with a deduction for the present value of storage costs. As a result, the spot price of a commodity will tend to rise if the commodity is expected to be more valuable in the future. In addition, the existence of futures markets on which quotations of prices for the future delivery of various commodities are given provides an indication of the market participants' expectations of likely future developments in commodity prices. However, there is a limit to the information contained in commodity futures prices, since commodity markets may be affected by market-specific influences or shocks, or macroeconomic developments which are difficult to foresee and are, therefore, not fully incorporated in the term structure of commodity futures prices.

### 3 Industrial producer prices

Developments in production costs tend to be passed along the chain of production to retailers and ultimately into the prices paid by consumers. Therefore, information on producer prices is useful for the analysis of prospects for consumer prices.

By contrast with import prices, producer prices refer to the prices of industrial goods produced in the euro area. Therefore, developments in producer prices also reflect a number of domestic factors in the euro area economy in addition to developments in import and world commodity prices (as discussed in Section 2). Such factors include developments in domestic labour costs and the cyclical situation in the industrial sector, i.e. the balance between the supply and demand of industrial goods, which may also have an impact on the development in profit margins. In addition, expectations about future activity and price developments are likely to influence pricing behaviour in the industrial sector.

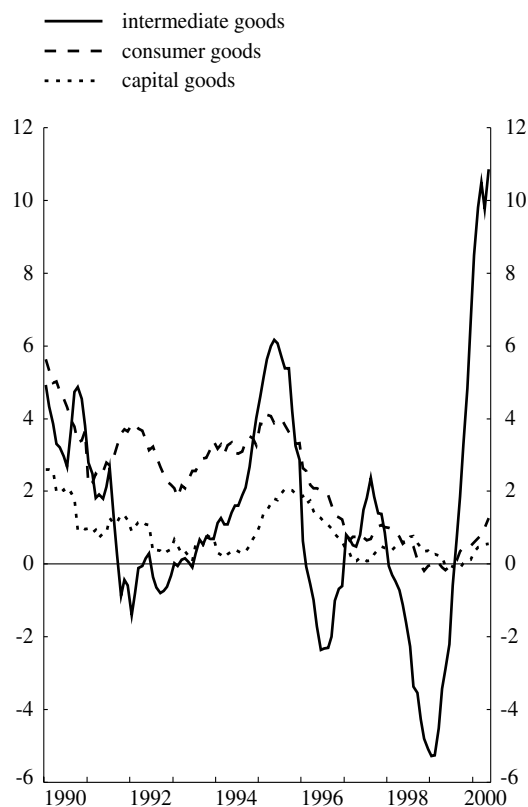
#### Producer prices for intermediate, consumer and capital goods

It is useful to break down the overall development of producer prices into three components: intermediate goods (including processed raw materials), consumer goods and capital goods prices. Developments in intermediate goods prices, which have a weight of around 47% in the total euro area Producer Price Index (PPI), tend to affect developments in final producer prices for consumer and capital goods with a time-lag (these goods have weights of approximately 38% and 15% respectively in the total PPI). Using this breakdown, an assessment can be made of the extent to which intermediate goods price developments (e.g. resulting from world commodity price developments) are passed along the production chain to final producer prices for consumer or capital goods and, subsequently, the effects of these developments on prices at the consumer level can be traced.

The relationship between intermediate goods prices and the price of other goods further along the chain of production is illustrated in Chart 5. Correlation coefficients indicate that the annual rate of increase in producer prices for consumer goods is highly correlated (0.6) with intermediate goods price developments half a year earlier, while developments in capital goods prices correlate even more closely (0.8) with intermediate goods prices around eight months earlier. Most recently, there has been some evidence that the large rise in the year-on-year change in intermediate goods prices observed since early 1999 has begun to have an upward impact on the annual changes in producer prices for both consumer and capital goods.

**Chart 5**  
**Industrial producer prices in the euro area**

(annual percentage changes; monthly data)



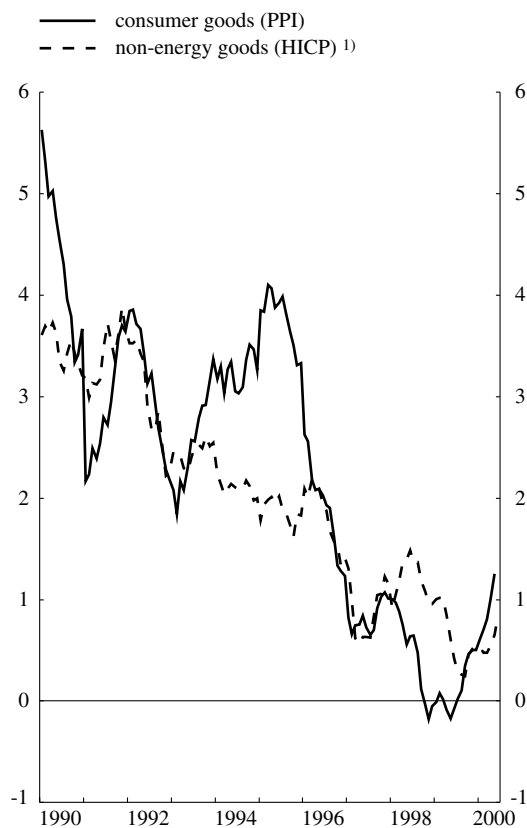
Sources and data: See Table 1.



## Chart 6

### Producer prices for consumer goods and HICP non-energy goods in the euro area

(annual percentage changes; monthly data)



Sources and data: See Table 1.

1) Comprises non-energy industrial goods and food prices.

Since final industrial goods are typically purchased by retailers and subsequently sold on to consumers there is a link between producer and consumer price developments,

## 4 Labour cost indicators

The preceding sections have focused on the analysis of price developments, both internal and external, at different stages in the production process and how such developments ultimately relate to developments in consumer prices. By contrast, this section focuses on the role of labour costs, which have an impact on prices at all stages of the production process. In turn, price developments can also have implications for future wage developments.

which is supported by a simple graphical analysis. There are, however, several factors which weaken the connection between producer and consumer prices. Variations in retail profit margins may smooth the effects of developments in producer prices on consumer prices, and variations in costs for transportation, storage and display, as well as indirect taxation, may also weaken the connection between producer and consumer prices. In addition, the three components of total producer prices will affect consumer price developments with different time-lags. As established above, intermediate goods prices feed into the producer price of both consumer and capital goods. While the producer price of consumer goods has a relatively swift impact on consumer price developments at the retail level, capital goods prices tend to affect consumer prices only very gradually, via their impact on the cost of producing consumer goods. Furthermore, differences in composition may reduce the correlation between the overall producer price index and the HICP. For example, services prices are included in the HICP but not in industrial producer prices. Reflecting this, the developments in non-energy goods prices in the HICP tend to follow movements in the producer price for consumer goods relatively closely, but with a lag (see Chart 6). It is also evident that developments in consumer prices, as mentioned above, tend to be less volatile than those in producer prices for consumer goods.

As a result, the processes of wage formation and price determination are very closely linked.

### **Inflation tends to reflect nominal wage growth in excess of labour productivity growth**

The importance of labour costs in the analysis of price developments is underlined by the

significant share of labour income in total GDP. In line with the idea that prices are set as a mark-up over costs adjusted for productivity developments, nominal wage growth in excess of labour productivity growth will ultimately tend to be reflected in prices. Of course, over the business cycle not all developments in labour costs will necessarily be reflected in prices, as profit margins may tend to act as a buffer. Nonetheless, unless there is a permanent shift in profit margins associated with structural change or increased competition, growth in nominal wages in excess of labour productivity growth will tend to push up prices, albeit with a lag. This reasoning suggests that continued wage growth in excess of sustainable growth in labour productivity would signal a risk to medium-term price stability.

While labour cost developments can have important implications for prices, it is unlikely that this interaction takes place in one direction only; price developments are also likely to influence future wage developments to some extent. For example, in making their wage demands, workers may take into account past or expected changes in the cost of living. In this context, wage earners may also be influenced by developments in profits when deciding on wage claims. Under such circumstances, actual or expected price developments may give rise to increases in wages. An important implication of this is that a general perception that price stability will be maintained helps to reinforce wage moderation. Therefore, when monetary policy is oriented to the maintenance of price stability, this helps to prevent wage-price spirals, i.e. situations where excessive wage growth first gives rise to higher prices and then these feed through to further wage increases. The quantitative definition of price stability formulated by the Eurosystem should, therefore, provide a clear reference for expectations concerning future price developments in the euro area.

For the euro area, there are a number of different labour cost indicators which are

regularly analysed by the Eurosystem. The growth in compensation per employee, which is a quarterly indicator derived from the national accounts, provides information on developments in nominal wage and non-wage labour costs (such as social security contributions) for the economy as a whole. While the data for compensation per employee are influenced by changes in the total number of hours worked (which tend to vary with the time of year and over the business cycle), total hourly earnings provide a measure of labour cost developments which is adjusted for the number of hours worked by employees (see Box 2 for further information on the data available for price and cost developments in the euro area and the need for improvement). In general, the growth rates of total hourly labour costs and compensation per employee tend to move together, although some short-term divergence is common as a result of developments in hours worked or differences in the degree of coverage of the two indicators. Finally, unit labour costs measure the compensation of all employees per unit of real GDP. Hence, growth in unit labour costs provides an estimate of the extent to which increases in nominal labour costs differ from the growth rate of labour productivity.

Chart 7 plots the annual percentage change in the overall euro area HICP, together with that for unit labour costs and compensation per employee. As suggested by the arguments set out above, over the course of the 1990s there appears to have been a relationship between both labour cost indicators and price developments. The annual increase in each of the labour cost indicators is highly correlated with the year-on-year change in the HICP, although it is clear that, as a result of cyclical fluctuations in labour productivity, unit labour costs are subject to significant short-term fluctuations which are reflected in profits rather than in the HICP. This supports the proposition that it is nominal wage growth significantly in excess of trend – as opposed to merely cyclical – growth in labour productivity which would signal a threat to medium-term price stability.

**Chart 7**

**Overall HICP, unit labour costs and compensation per employee in the euro area**

(annual percentage changes)



Sources and data: See Table 1.

**The services sector experiences a persistently higher rate of price increase than the goods sector**

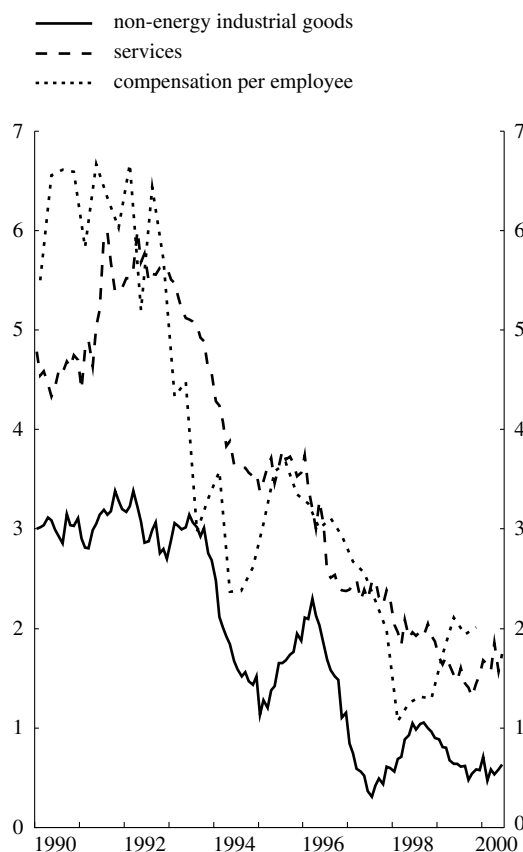
Economic considerations suggest that labour cost developments may have different effects on the different components of the HICP. For example, since the services sector tends to have a higher degree of labour intensity and a lower trend growth rate of productivity than the goods sector, services prices tend to be more closely linked to developments in nominal wage costs. To shed some light on the likely impact of labour cost developments on the different components of the HICP, Chart 8 plots the year-on-year increase in nominal compensation per employee along

with that for both non-energy industrial goods and services prices in the HICP. From the chart it is evident that while the rate of increase in services prices has closely matched the growth rate in compensation per employee, it has been significantly above the growth rate in non-energy industrial goods prices. This may reflect the fact that productivity growth in the relatively non-traded and more labour intensive services sector tends to be persistently lower than that in the goods sector. However, nominal wage increases tend to be broadly similar across both goods and services sectors. As a result, the services sector experiences a persistently higher rate of price increase than the goods sector.

**Chart 8**

**HICP components and compensation per employee in the euro area**

(annual percentage changes)



Sources and data: See Table 1.

In addition to the indicators of actual labour cost developments, information on wage bargaining agreements in individual euro area countries can also help in forming a broad assessment of the outlook for price stability. Depending on the extent of coverage of these agreements, i.e. the proportion of total workers to which they apply, information on bargained wages may help provide an assessment of any threats to price stability arising from labour cost developments. However, there is a need to exercise caution in drawing inferences about likely future wage

developments on the basis of bargained wages alone. In particular, over the course of the business cycle there may be scope for actual wages to drift away from bargained wages. Hence, in assessing the outlook for future developments in labour costs it is important to take account of the broader macroeconomic context, including any changes in the expected pace of economic activity which could give rise to a drift in actual wages away from those previously negotiated.

## **Box 2**

### **Statistical information on price and cost developments in the euro area**

In order to ensure that the Governing Council is adequately informed when making monetary policy decisions, the Eurosystem requires consistent, timely and reliable statistical information. In addition, for the purpose of studying historical relationships with a view to achieving a better understanding of the current situation, long historical time series are highly desirable. While the situation in the field of price and cost statistics is generally satisfactory, further progress is necessary, especially in the fields of import and labour cost statistics.

#### **Consumer price statistics**

The current HICP data broadly fulfil the statistical requirements of the ECB in terms of harmonisation, reliability and timeliness. Monthly data are available as from 1995; both the overall HICP and a breakdown into components, as presented in Table 1. Estimated backdata before 1995 are based on national CPIs and are not fully comparable with HICPs from 1995. The euro area data are released in a timely manner by Eurostat (17 to 22 calendar days after the end of the reporting month). The main item still excluded from the HICP is household expenditure on owner-occupied housing. Given the importance of housing in household expenditure, it is important to find an acceptable solution for this, admittedly, difficult item as soon as possible.

In addition to the HICP, consumer expenditure deflators from national accounts are available for the euro area. While being of interest for the analysis of price developments in the euro area, these data have the disadvantage of being less up to date and at a lower frequency (quarterly data) than the HICP.

#### **Import and commodity prices**

Import price indices for trade between the euro area and the rest of the world are not available. Instead, import price developments are measured by Unit Value Indices (UVIs), which are calculated by dividing the value of trade by its volume. However, these data cover trade in goods only, and not trade in services. While not being of the same quality as price indices, UVIs remain useful indicators of import price developments. The data are available from Eurostat on a monthly basis going back to 1989, but they are published with a considerable lag (around 90 to 95 calendar days after the end of the reporting month) and they are frequently subject to some revision. While in theory it is possible to aggregate national accounts import price deflators, these data are in practice not used for the assessment of developments in euro area import prices since they would include trade between euro area countries.

Oil price data measured in US dollars per barrel are available daily from a number of sources, including the International Petroleum Exchange. These data can easily be transformed into euro by using the exchange rate between the US dollar and the euro, while the exchange rate of the ECU is used for periods prior to 1999.

For non-oil commodity prices, daily data collected and compiled by the Institut für Wirtschaftsforschung in Hamburg (HWWA) are used. Commodity price data are available with a very short time-lag. The index is weighted according to the imports of OECD countries from 1989 to 1991, but excludes intra-EU trade. Therefore, the weights do not specifically reflect euro area trade with the rest of the world. Sub-indices for food, tropical beverages and industrial raw materials are available.

### **Producer prices**

Eurostat provides monthly producer price data for the total industrial sector (excluding construction) and intermediate, capital, durable and non-durable consumer goods components. Even though the situation has improved over the past year, the country data underlying the euro area aggregates are not as comparable as the HICP data. In particular, the developments in the sub-sectors are not fully consistent with the data for the industrial sector as a whole, because the underlying main industrial groupings have not been fully harmonised. Data for total industrial producer prices are available from 1981 onwards. The release of the data (37 to 39 calendar days following the end of the reporting month) is also not as timely as for the HICP.

### **Labour costs**

Eurostat provides quarterly total hourly labour cost data for both the whole economy (excluding, however, agriculture, public administration, education and health services) and sub-sectors, with a sub-division into wages and other labour costs. These data are derived from national sources but follow common broad definitions. Results are published with a delay of 90 to 100 days, leaving scope for improvements in the timeliness of the data. Unfortunately, the data are only available as from the first quarter of 1995. Further improvements are necessary to make the coverage of individual sectors more comparable and comprehensive.

Eurostat does not publish results for unit labour costs (ULC) derived from quarterly national accounts for the euro area. ULC data, which measure labour costs per produced unit of output for the whole economy, and its components (compensation per employee and labour productivity), are therefore calculated by the ECB based on national data. Owing to the release calendar for national accounts, these ULC data are even less timely than the total hourly labour costs provided by Eurostat. The data series have been compiled from 1985 onwards. In general, there is a high degree of resemblance between developments in the data for compensation per employee and the total hourly labour costs for the whole economy provided by Eurostat. Comparable and timely ULC data provided by Eurostat, preferably also calculated per hour worked in addition to series per person employed, are needed for economic analysis. Moreover, a breakdown into sectors (such as services and industry) as well as a breakdown of compensation into wages and other labour costs would be welcome.

### **Price expectations**

The European Commission provides monthly data on selling price expectations for the months ahead in manufacturing industries and consumers' expectations for price trends over the next 12 months. These survey data are available as from 1985 and are released with a relatively short time-lag (around five days after the end of the reporting period). In addition, four times a year the ECB surveys expectations for euro area HICP developments among more than 80 professional forecasters.

## 5 Survey measures of expected price developments

All the indicators discussed so far relate to developments actually observed in various prices or costs. By contrast with the latter, this section considers direct measures of expected future price developments, which can be obtained from economic surveys. These direct measures of expectations have to be distinguished from indirect estimates which can be inferred from the prices of various assets traded on international financial markets. Such indirect measures of expectations, along with estimates of the degree of uncertainty surrounding such expectations, were discussed in the article entitled “The information content of interest rates and their derivatives for monetary policy” in the May 2000 issue of the ECB Monthly Bulletin.

Given the likely impact of price expectations on wage and price-setting behaviour, measures of expected price developments are a useful indicator for monetary policy purposes. Although such expectations can never be viewed as a substitute for a central bank’s own assessment of future economic developments, they can provide an indication of the private sector’s assessment of expected future price developments. As such, measures of price expectations may provide a timely signal of possible future upward pressure on prices before these become apparent in the recorded statistics.

A number of economic considerations suggest that inflation expectations can have a direct impact on actual future price developments. For example, in setting prices or the mark-up of prices over costs, individual firms may take account of the extent to which they expect industry-wide prices to change in the future. Expected price developments may also have an impact on production and investment decisions and hence affect the overall balance between supply and demand in the economy. Lastly, as discussed in Section 4, if workers base their wage claims on expected future changes in the cost of living, changes in inflation expectations may signal possible risks

to price stability associated with future labour cost developments.

There are various survey-based indicators of expected price developments available for the euro area, which are useful as indicators of likely future developments in prices as perceived by economic agents. On a monthly basis, the European Commission compiles Business and Consumer Surveys which are very broadly based in terms of the number of firms and households covered. Both are “tendency” surveys in the sense that they provide information on the likely future directional tendency for prices, but not on the expected quantitative change in prices.

### Industrial selling price expectations

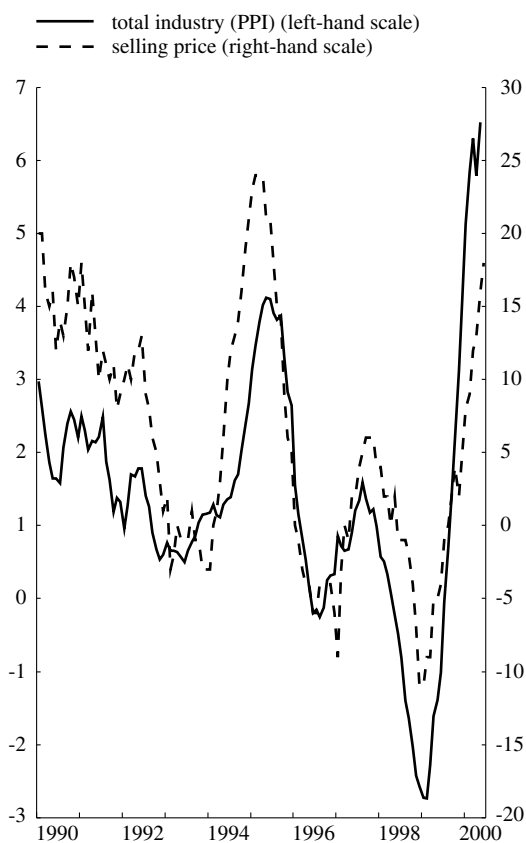
The Business Survey is a useful and timely source of information on likely developments in industrial producer prices in the very near future. Respondents to the survey are asked whether they expect their selling prices to rise, to remain unchanged or to fall “in the months ahead”. The balance statistic, i.e. the percentage of respondents expecting an increase minus the percentage of respondents expecting a decrease in selling prices, summarises the results of the survey. The balance statistic provides an indication of the likely future change in industrial producer prices in the months ahead. At the same time, the balance statistic does have some limitations and drawbacks. It excludes the information associated with those respondents indicating that they expect prices to remain unchanged. In addition, the size of the average expected increase in selling prices among those reporting an expected rise could differ from the size of the average expected decrease among those reporting an expected fall. In such a case, the percentage balance may give a biased indication of likely future developments in selling prices.

Chart 9 plots the annual percentage change in euro area producer prices over the 1990s,

## Chart 9

### Industrial producer prices and selling price expectations in the euro area

(annual percentage changes and percentage balances; monthly data)



Sources and data: See Table 1.

together with the percentage balance for expected selling prices taken from the European Commission's Business Survey. Over this period, the two series are highly correlated. Moreover, when the percentage balance is lagged by three months – a reasonable estimate of how respondents might interpret “the months ahead” – this correlation remains quite high. This suggests that the results from the Business Survey do contain useful information about likely developments in producer prices in the near future. Nevertheless, it is evident from Chart 9 that the balance has not always provided an early indication of turning-points in producer prices. For example, the most recent turning-points in the balance have often been coincident or have even lagged

those for the year-on-year change in producer prices. As discussed in Sections 2 and 3, these price developments have been mainly explained by sudden changes in the world market price for oil. Since these developments were largely unpredictable, it is reasonable that respondents would – in subsequent surveys – adjust their replies to reflect observed developments. Hence, even if the percentage balance has not always tended to lead actual developments in producer prices, this is not a reason to discard the results of the survey altogether.

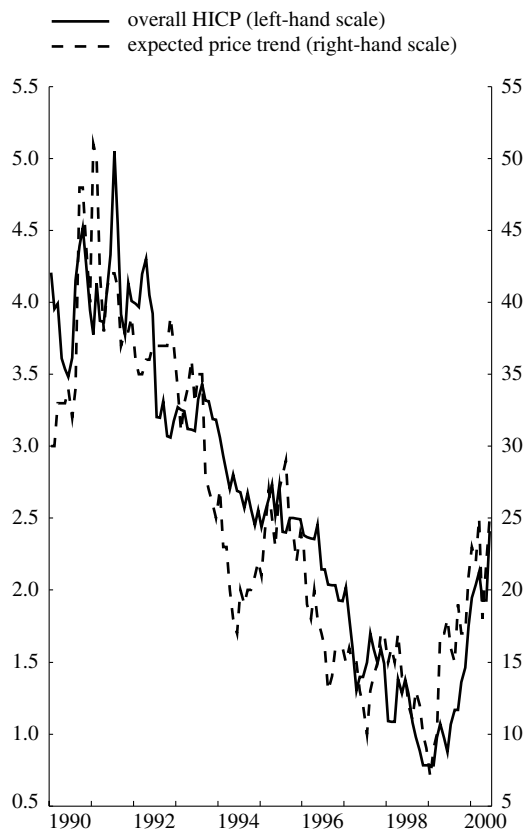
### Price expectations from the Consumer Survey

The European Commission's Consumer Survey relates more directly to consumer price developments, although the question in the survey does not specifically relate to the HICP. In the Consumer Survey, respondents are asked to compare current developments in prices with their expectations for the next 12 months and to state whether they expect prices to increase more rapidly, or at the same or a slower rate. Alternatively, respondents can indicate that they expect prices to stay about the same or to fall slightly, or that they do not have a view regarding likely future developments in prices over the next 12 months. Given the larger number of alternative answers as compared with the industry survey, a somewhat more complex balance statistic is needed to summarise the results of the Consumer Survey.<sup>1</sup> This is plotted in Chart 10, along with the year-on-year change in the euro area HICP over the 1990s. From the chart, although the question in the Consumer Survey does not specifically relate to the euro area HICP, it is evident that actual year-on-year changes in the HICP and expected price trends over the next 12 months have been highly correlated. Moreover, when the survey

<sup>1</sup> See *European Economy (1997)*, “The Joint Harmonised EU Programme of Business and Consumer Surveys”, European Commission Directorate General for Economic and Financial Affairs, Reports and Studies No. 6.

**Chart 10**  
**Overall HICP and expected price trend**  
**in the euro area**

(annual percentage changes and percentage balances; monthly data)



Sources and data: See Table 1.

balance is lagged by 12 months, it retains a significantly high correlation, suggesting that the measure of expectations may provide an indication of likely future developments in the HICP.

**The Survey of Professional Forecasters**

While both the Business and Consumer Surveys described above provide only qualitative information on the likely future directional tendency in either industrial or consumer prices, and only over a relatively short time horizon, the ECB also compiles a survey – the Survey of Professional Forecasters (SPF) – which provides a quantitative estimate of the likely future

change in consumer prices in the euro area one and two years ahead. Once a year, respondents are also requested to submit their expectations for inflation five years ahead, i.e. over a significantly longer horizon than the surveys discussed above.

The inflation expectations obtained from the SPF are based on the responses to a quarterly questionnaire submitted to over 80 forecasters throughout the EU. The sample of respondents includes experts from both financial and non-financial institutions who form their expectations using a variety of approaches ranging from formal macroeconomic forecasting to the use of simple “rules of thumb” or subjective expectations. The result obtained by aggregating these individual replies is, therefore, not a forecast in the traditional sense, but rather should be seen as a quantitative estimate of private sector inflation expectations, thus complementing the qualitative information in the Business and Consumer Surveys.

An important feature of the SPF is that the question on inflation expectations relates specifically to the euro area HICP. The results of the SPF one and two years ahead represent a useful source of information on relatively short-term expectations of a broad cross-section of experts in both the financial and the non-financial community throughout the EU. To provide an example of the information that can be obtained from the SPF, consider the HICP inflation expectations for the year 2000 obtained from the four surveys conducted between August 1999 and May 2000. Over the course of this period, there was a gradual increase in the average expected inflation rate for 2000 from 1.5% in the August 1999 SPF to 1.9% in the May 2000 SPF. The quantitative expectations from the SPF can be compared or contrasted with those available from other surveys (e.g. from Consensus Economics). In making such comparisons, it is, however, important to be aware of any specific assumptions which may underlie the reported expectations or forecasts. For example, in the latest May 2000



SPF a significant proportion of respondents indicated that their outlook was based on an assumed further increase in short-term

interest rates and a significant appreciation of the euro exchange rate.

## 6 Summary and conclusion

Indicators of price and cost developments represent an important source of information for the broadly based assessment of the outlook for price stability which is undertaken under the second pillar of the Eurosystem's monetary policy strategy.

Of major relevance for the analysis of risks to price stability are labour costs. In particular, sustained nominal wage growth in excess of productivity growth will tend to exert upward pressure on prices, while over the short term variations in profit margins may smooth the effects on prices of labour cost changes. Conversely, wage developments are influenced by actual and also expected future price developments. A number of direct measures of the private sector's assessment of expected future price developments in the euro area over short horizons can be obtained from the Business and Consumer Surveys. In addition, the ECB also conducts a survey, the SPF, which provides a quantitative estimate of private sector expectations for future changes in the euro area HICP over longer horizons.

The analysis of import and world commodity prices is helpful for assessing the extent to which external factors, as well as developments in the nominal exchange rate of the euro, are likely to exert an influence on domestic prices in the euro area. By contrast, producer prices refer to the prices of industrial goods produced in the euro area. Therefore, although they are strongly influenced by import and world commodity price developments, the behaviour of producer prices also reflects a number of domestic factors, including labour cost developments, the business cycle and expectations concerning the future economic climate. The analysis of producer prices helps to assess how such factors are affecting prices at different stages in the

domestic production process and, therefore, may help to identify price pressures before they are observed in the HICP.

The indicators presented in this article provide information which is useful for understanding short-term developments in prices and which also helps assess the short and medium-term outlook for price stability. The monitoring of such indicators is an important part of understanding the current price climate and this is a necessary step in understanding likely future developments. However, some of the indicators which have been discussed also provide information about potential threats to price stability in the medium term, such as the build-up of wage pressures associated with second-round and indirect effects of commodity price changes. In addition, there is a risk that short-term developments in prices may become embedded in inflation expectations and, as a result, give rise to more protracted effects on inflation. It should be noted that the relationships between various indicators and future price developments may be subject to change over time. Therefore, the Eurosystem must be ready to reassess and re-examine the implications and significance of developments in particular indicators for the future outlook for prices.

Overall, the various price and cost indicators discussed above are useful for understanding the current price climate and help to identify any potential threats to price stability before they have fed through to consumer prices, as measured by the euro area HICP. The price and cost indicators currently available are generally sufficient to provide an analysis for the euro area as a whole. Nonetheless, urgent improvements are necessary in the field of import price and labour cost statistics for the euro area.