

ARTICLES

MEASURED INFLATION AND INFLATION PERCEPTIONS IN THE EURO AREA



The Harmonised Index of Consumer Prices (HICP) for the euro area is an objective and methodologically well founded quantitative measure of price changes. The HICP and the European Commission's survey results on inflation as perceived by consumers are different in nature and cannot be directly compared. Yet, it is striking that a frequently used summary statistic from this survey on perceived inflation, having increased strongly in 2002 following the euro cash changeover, is still above the level recorded in 2001, whereas HICP inflation has remained broadly unchanged over this entire period.

Perceptions are a qualitative expression of an individual's complex assessment of a given issue. Inflation perceptions may be influenced by quite a number of economic and psychological factors, which may not all be directly related to the overall average change in consumer prices. It appears that notably the euro cash changeover has had a longer-lasting impact on consumers' inflation perceptions. Differences in the evolution of measures of inflation perceptions compared with developments in the HICP should not be interpreted as reflecting inaccuracy in consumer price statistics. Even so, protracted divergences in the evolution of these two variables warrant close examination, given that inflation perceptions might have an impact on inflation expectations and other macroeconomic variables. The significant increase in perceived inflation that followed the euro cash changeover has partly reversed since 2003. Convergence towards the evolution of measured inflation should continue.

1 INTRODUCTION

The ECB defines price stability in the euro area in terms of the HICP, a harmonised and high quality statistic designed according to international standards.¹ Following the euro cash changeover in 2002, there was no significant increase in euro area HICP inflation. By contrast, summary statistics on perceived inflation derived from surveys of the general public in the euro area rose significantly in the course of the introduction of the euro banknotes and coins in 2002. In particular, the European Commission's Consumer Survey showed a significant increase in the derived measure of inflation perceptions after the cash changeover. Although the results from the Commission survey decreased again in 2003 and 2004, they have remained at elevated levels.

This article aims to provide a comprehensive overview of the possible reasons behind the divergent evolution of indicators of measured and perceived inflation in the euro area, focusing on their respective characteristics and properties. Section 2 summarises the most recent developments in the HICP and in perceived inflation in the euro area and across its member countries. Section 3 highlights the

qualitative and subjective nature of individuals' inflation perceptions and explores the likely impact of the euro cash changeover. Section 4 details key features of the HICP and explains why it differs from aggregated individual inflation perceptions. Section 5 concludes.

2 DEVELOPMENTS IN MEASURED AND PERCEIVED INFLATION

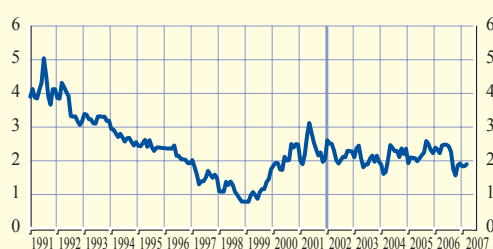
The results of the European Commission's survey of euro area consumers' inflation perceptions are summarised by a balance statistic, i.e. the shares of the different response categories are weighted together (see Box 1). As this measure is different in nature from HICP inflation, a direct comparison between the two cannot be made. However, the evolution of the two variables over time is often compared (see Chart 1). From 1991 to the end of 2001, developments in the balance statistic were broadly in line with those in HICP inflation, with both measures decreasing from 1991 to 1999 and then increasing from 1999 to the end of 2001. From January 2002, however,

¹ See the article entitled "The Harmonised Index of Consumer Prices: concept, properties and experience to date" in the July 2005 issue of the Monthly Bulletin.

Chart 1 Measured HICP inflation and inflation perceptions in the euro area

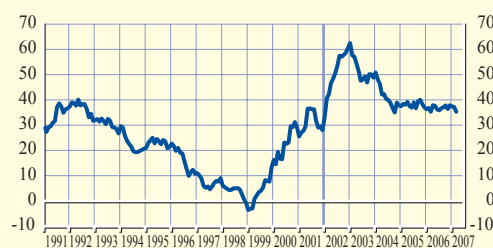
(annual percentage changes)

HICP inflation



(percentage balances; seasonally adjusted)

Inflation perceptions



Sources: Eurostat and European Commission Consumer Survey.
Note: Estimates for the HICP over the period 1991-95 are not fully comparable with HICP data from 1996 onwards.

perceived inflation continued to increase strongly, peaking in January 2003. Over the

course of 2003 and 2004, this indicator declined gradually, but since late 2004 it has broadly stabilised around a level somewhat higher than that of 2001.² At the same time, HICP inflation fluctuated within a narrow range over the period from December 2001 to March 2007, averaging 2.1%.³

Developments in inflation perceptions at the euro area level mask some cross-country diversity. In all euro area countries, perceived inflation increased with the introduction of the euro banknotes and coins in January 2002. Thereafter, it decreased gradually in several countries, particularly in Germany, Ireland, Italy and the Netherlands. This notwithstanding, in most euro area countries there was still, on balance, a larger share of consumers during the period 2005-06 than during the period 1999-2001 who had the impression that inflation had been high (see Table).

2 See the box entitled “Consumers’ inflation perceptions: still at odds with official statistics?” in the April 2005 issue of the Monthly Bulletin.

3 Annual HICP inflation averaged 2.2% over the period from December 2001 to January 2003, and 2.0% from January 1999 to March 2007.

Table HICP and inflation perceptions across euro area countries

	HICP inflation			Perceptions of price changes over the last 12 months		
	Average annual percentage changes			Percentage balances, seasonally adjusted		
	1999-2001	2002-2004	2005-2006	1999-2001	2002-2004	2005-2006
Belgium	2.1	1.6	2.4	29	44	53
Germany	1.3	1.4	1.9	23	48	27
Ireland	3.9	3.7	2.4	40	53	38
Greece	2.9	3.5	3.4	18	57	66
Spain	2.8	3.2	3.5	20	52	52
France	1.4	2.1	1.9	5	45	47
Italy	2.2	2.6	2.2	25	52	37
Luxembourg	2.4	2.6	3.4	-	38	41
Netherlands	3.2	2.5	1.6	28	61	25
Austria	1.6	1.6	1.9	-1	36	35
Portugal	3.1	3.1	2.6	29	46	42
Finland	2.3	1.2	1.0	-11	-5	-4

Sources: Eurostat and European Commission Consumer Survey.
Note: Data on inflation perceptions for Luxembourg are only available from January 2002 onwards.

Box I

THE EUROPEAN COMMISSION'S SURVEY OF CONSUMERS' INFLATION PERCEPTIONS

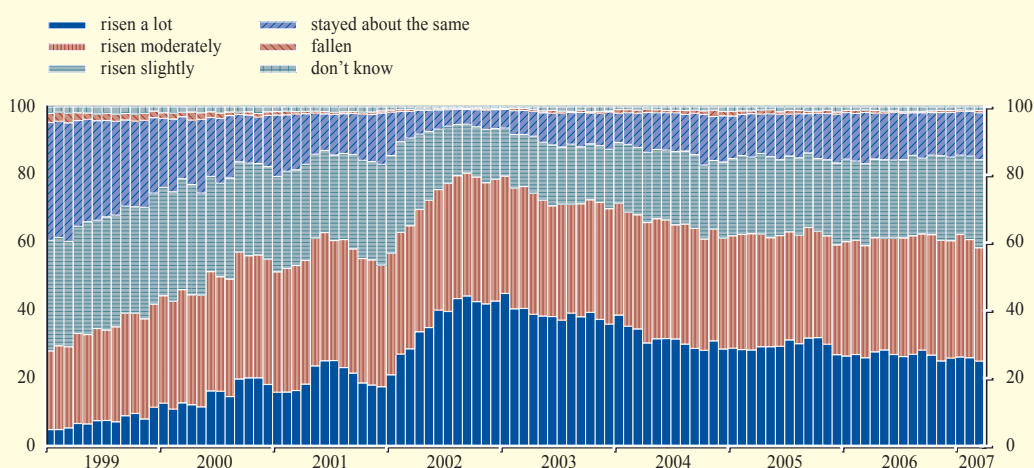
Consumer opinions on inflation are collected through the Consumer Survey of the European Commission (Directorate General for Economic and Financial Affairs). As the indicator derived from this survey differs in nature from the HICP, it is not possible to make a direct comparison between the two measures. In order to interpret its developments, it is important to gain a better understanding of the methodology used to calculate the European Commission indicator. This box takes a look at the survey and the development of the respective shares of the response categories.

In the context of the European Commission's Consumer Survey, approximately 23,000 randomly selected consumers in the euro area are surveyed on a monthly basis by means of a harmonised questionnaire, mostly via telephone. Among other qualitative questions on how they perceive their household's financial situation or the overall economic situation for example, survey participants are asked the following question: "How do you think that consumer prices have developed over the last 12 months?" The possible response categories are: (1) "risen a lot", (2) "risen moderately", (3) "risen slightly", (4) "stayed about the same", (5) "fallen" and (6) "don't know".

An aggregate measure of consumers' opinions – the "balance statistic" – is calculated as the difference between the proportion of respondents saying that consumer prices have either "risen a lot" or "risen moderately" and the proportion of respondents saying that consumer prices have "fallen" or "stayed about the same". In order to differentiate between the more "moderate" and more "extreme" answer categories, the European Commission attributes half the weight of the extreme answers (1) and (5) to responses (2) and (4); the middle response (3) and the "don't know" response (6) are not explicitly taken into account.

Perceptions of price changes over the last 12 months in the euro area – evolution of response categories

(percentages; not seasonally adjusted)



Source: European Commission Consumer Survey.

The balance statistic is thus computed as $P_{[1]} + (0.5 P_{[2]}) - (0.5 P_{[4]}) - P_{[5]}$, where $P_{[1]}$ is the percentage of respondents having answered (1) etc. The values for the balance statistic range between -100 and +100.

The increase in the balance statistic during the period from 2002 to early 2003 was due mainly to an increase in the share of consumers replying that prices have “risen a lot” (see Chart), which rose from an average of 14% during the period 1999-2001 to 38% during the period 2002-03. Since the euro cash changeover, this average has stood at 32%. The shift in this response category was mainly at the expense of the shares of the answers “risen slightly” and “stayed about the same”. The distribution of answers across categories has remained almost stable since early 2005.

In general, qualitative opinion surveys are subject to several methodological difficulties. First, the response categories used may be interpreted differently by respondents and their interpretation may vary over time. Second, the weighting scheme applied inevitably involves a certain degree of arbitrariness but determines the evolution of the balance statistic. For example, it remains unclear whether it is justified that the replies in the category “risen a lot” receive exactly double weight compared with those consumers saying that prices have “risen moderately”. Moreover, consumers assessing that prices have “risen slightly” represent the third largest group of replies (24% on average over the period since January 1999) but are not explicitly taken into consideration for the compilation of the balances.

3 UNDERSTANDING CONSUMERS' INFLATION PERCEPTIONS

In addition to the above-mentioned methodological features of the European Commission's aggregated measure of consumers' opinions, a number of factors may influence the formation of consumers' individual inflation perceptions and therefore determine their answers to the survey, as well as the possible interpretation thereof.

THE QUALITATIVE NATURE OF INFLATION PERCEPTIONS

The European Commission's questionnaire asks consumers to classify inflation as they perceive it into six given categories of a qualitative nature (see Box 1). The resulting balance statistic does not give any indication of the magnitude of the perceived inflation rate.⁴ Although respondents may implicitly associate each qualitative category with a certain numeric range of values, such values are likely to vary among individuals and, possibly, over time. It

cannot be ruled out that a certain proportion of the consumers reporting that prices have “risen a lot” may do so on account of an increased sensitivity to inflation. For example, although, in several countries, inflation is today significantly lower than it was in the early 1990s, a better awareness of monetary policy in the euro area may have brought consumers' implicit quantitative reference more into line with the ECB's definition of price stability. It may also very well be that an increased sensitivity to inflation stemming from the public debate on this issue since the euro cash changeover has also influenced, and is still influencing, perceptions of price developments. In addition, the regular publication of indicators of perceived inflation may itself have reinforced perceptions.

4 Various techniques have been developed to “translate” qualitative estimates of inflation sentiment into quantitative values. However, all approaches have to rely on particular technical assumptions and their results are considerably influenced by the method chosen. For a detailed summary and a critical review of each technique, see, for instance, E. D'Elia, “Using the results of qualitative surveys in quantitative analysis”, Istituto di Studi e Analisi Economica (ISAE) Working Paper No 56, September 2005.

Finally, consumers may have become acutely aware of price changes after the cash changeover because of the need to interpret new prices by converting them into the former national currency and comparing them with the former prices. Consequently, the uncertainty surrounding the intertemporal comparability of survey results calls for caution when interpreting both the level and the development of the qualitative indicators.

A REFLECTION OF A SUBJECTIVE EVALUATION

Perceptions, as collected in opinion surveys, are an expression of an individual's complex assessment of a given issue. There is little knowledge of what perceptions truly are and how they are formed. In psychology and cognitive sciences, perception is defined as "the process of acquiring, interpreting, selecting and organising sensory information".⁵ In forming their inflation perceptions, consumers may not use information on prices in isolation but may process it in relation to other elements of their personal situation. The European Commission survey does not apply any techniques to "frame" consumers' responses, for instance by providing the most recent change in consumer prices as a reference. Consequently, the survey results could be influenced by the evolution of other variables related to the consumers' economic situation,

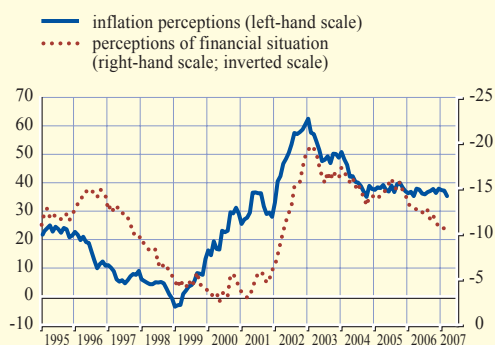
such as changes in disposable income or purchasing power.

More broadly, although consumers are asked about perceived price changes, their responses may also be influenced by more general sentiments about their financial situation or the overall economic situation. Indeed, as available survey data suggests, the increase in perceived inflation in 2002 seems to have coincided with a surge in a negative perception on the part of consumers as regards their financial situation (see Chart 2a) and the general economic situation (see Chart 2b). This more pessimistic consumer sentiment could be seen as an expression of the high degree of uncertainty relating to the economic slowdown and the bursting of the equity bubble in 2000, as well as of the geopolitical uncertainty in the aftermath of the terrorist attacks in the United States on 11 September 2001. At the same time, this pessimism seems to have receded since mid-2005, in particular with regard to perceptions of the economic situation, whereas the indicator of consumers' inflation perceptions has not fallen.

5 "Communication and perception: which world do statistics live in?", Federal Statistical Office of Germany, United Nations Economic Commission for Europe work session on statistical dissemination and communication, 12-14 September 2006 (www.unece.org/stats/documents/ece/ces/ge.45/2006/wp.14.e.pdf).

Chart 2a Euro area consumers' perception of inflation and of their own financial situation

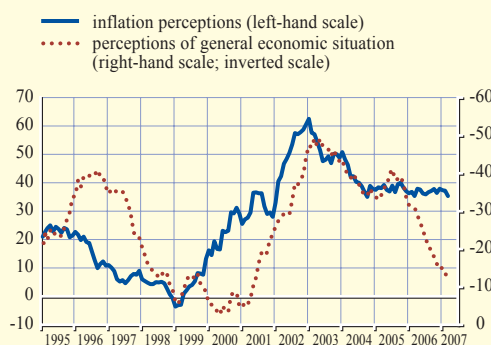
(percentage balances; seasonally adjusted)



Source: European Commission Consumer Survey.

Chart 2b Euro area consumers' perception of inflation and of the general economic situation

(percentage balances; seasonally adjusted)



Source: European Commission Consumer Survey.

THE IMPACT OF THE EURO CASH CHANGEOVER

It is likely that the introduction of the euro banknotes and coins contributed to consumers' perception of stronger price increases in 2002 and thereafter. Such perceptions were probably linked to actual price increases for some items such as food, petrol and some personal services such as restaurants. Some of these increases may have been due to the practices of retailers and firms, which may have sought to raise profit margins at the time of the introduction of the euro banknotes and coins. In addition, since retailers knew they had to change their posted prices in January 2002, they may have postponed some price increases that would otherwise have taken place earlier.⁶ Nevertheless, for a number of products, upward price pressures were caused by factors unrelated to the euro cash changeover, such as the strong increase in oil prices (by about 35% in euro terms between December 2001 and April 2002) and crop failures caused by cold winter weather across Europe. The same factors also caused upward price pressures in non-euro area EU countries, e.g. the United Kingdom, around the time of the euro cash changeover. The overall effect of price increases induced by the euro cash changeover on measured euro area HICP inflation was limited. Eurostat estimated the contribution of the cash changeover to euro area overall HICP inflation in 2002 to lie within a range of 0.12 and 0.29 percentage point.

However, the cash changeover appears to have had a significant impact on perceptions, as shown by the European Commission's latest survey of public opinion on euro-related issues, which was published in November 2006.⁷ A large majority of survey respondents (93%) thought that the introduction of the euro added to the increase in prices. This suggests that the impact of the cash changeover on consumer prices was probably magnified in the eyes of the general public for several reasons.

First, the survey results may reflect the fact that the price increases that did occur were concentrated on the most frequently purchased

goods and services, such as food, petrol, coffee and hairdressing. Durable goods, such as cars and computers, and other infrequently purchased items are less likely to have had a strong impact on consumer perceptions, unless the individual concerned happened to have recently purchased such an item. Since all respondents carry an equal weight, this may have led to a lower representation of such items in aggregated consumer perceptions, despite the fact that every year they account for a sizeable proportion of actual aggregated household expenditure.

Second, different payment methods may also have had different implications for inflation perceptions. For example, products normally paid for in cash (such as a cup of coffee or a haircut) may have a greater implicit weight in perceptions than items that are typically paid for via an automatic bank transfer (e.g. rent, electricity and phone charges). Section 4 and Chart 3 illustrate this point further.

Third, other psychological factors may also have played a role. For example, it has been argued that consumers may have a more vivid memory of price rises than of price declines.⁸ Since the number of price changes around the time of the euro cash changeover was exceptionally large,⁹ consumers may have been more sensitive to the price increases than to the price reductions that took place at the same time. Extreme, but unrepresentative, changes in the prices of individual products may have attracted considerable attention from consumers and the media and may therefore have played

6 See, for instance, B. Hobijn, F. Ravenna and A. Tambalotti, "Menu costs at work: restaurant prices and the introduction of the euro" in *Quarterly Journal of Economics*, Vol. 121(3), August 2006, MIT Press, pp. 1103-31.

7 The Flash Eurobarometer survey is conducted by Gallup on behalf of the European Commission. See "The eurozone, 5 years after the introduction of euro coins and banknotes", Flash Eurobarometer 193, European Commission, November 2006.

8 See, for example, H. W. Brachinger, "Euro or 'Teuro'?: the euro-induced perceived inflation in Germany", Department of Quantitative Economics, University of Freiburg/Fribourg Switzerland, Working Paper No 5.

9 See E. Dhyne, L. J. Alvarez, H. Le Bihan, G. Veronese, D. Dias, J. Hoffmann, N. Jonker, P. Lünemann, F. Rumler and J. Vilmunen, "Price setting in the euro area: some stylized facts from individual consumer price data", ECB Working Paper No 524, September 2005.

an important role in the formation of average inflation perceptions. In addition, there is evidence that the number of different prices put on an individual product rose significantly following the euro cash changeover,¹⁰ and it is likely that this greater price diversity and the temporary lack of “attractive” euro prices (convenient or threshold prices) generated some degree of uncertainty among consumers.

Furthermore, many euro area citizens continue to calculate in their former national currency, especially for major purchases. According to the results of the November 2006 Flash Eurobarometer survey, euro area consumers are increasingly using the euro as a mental benchmark when evaluating the prices of small purchases (in 2006, only 22% reported that they calculate prices most often in their former national currency, compared with 30% in 2003). However, in the case of major purchases, the adjustment appears to be slower, with 40% of euro area consumers still making price comparisons most often in their former national currencies in 2006 (compared with 54% in 2003). Consequently, instead of comparing the current price level with that of one year ago, consumers may be implicitly using the national currency price prevailing before the euro cash changeover (a price “frozen in time”) as a basis for comparison. This would result, over time, in an increasingly unfavourable comparison of perceptions with annual consumer price developments, as it would be equivalent to consumers incorporating several years of inflation into their survey replies (the overall HICP inflation from January 2002 to March 2007 was around 11%). In some cases, this problem has been found to be compounded by distortions in memory of past prices, with prices recalled as prevailing before the changeover being significantly outdated.¹¹

Finally, psychological experiments have shown that a priori expectations can play an important role.¹² If consumers were already convinced before the euro cash changeover that prices would generally increase, such increases were also more likely to be perceived afterwards,

even if only a few price rises had actually occurred. This effect may have been reinforced by the extensive media coverage before and immediately after the euro cash changeover.

While there may be factors other than the euro cash changeover to explain the divergent developments in the indicator of perceived inflation and actual inflation, the introduction of the euro banknotes and coins is likely to have played an important role, notably because it has most likely heightened consumers’ price awareness.

4 FEATURES OF THE HICP WHICH MAY EXPLAIN DIFFERENCES WITH INFLATION PERCEPTIONS

When consumers form their perceptions of inflation, that which they associate with the term “inflation” may not be completely identical to the measurement concept on which official price statistics such as the HICP are based. This section highlights several of the key methodological features of the HICP that are important to bear in mind when assessing differences with perceived inflation.

THE HICP’S BROAD BASKET OF GOODS AND SERVICES

The HICP aims to measure price changes in the full range of goods and services purchased by all types of households. These are weighted to reflect their relative importance in aggregate consumption expenditure in the economy as a whole. On average, statistical institutes in the euro area countries track prices for over 700 representative goods and services, which

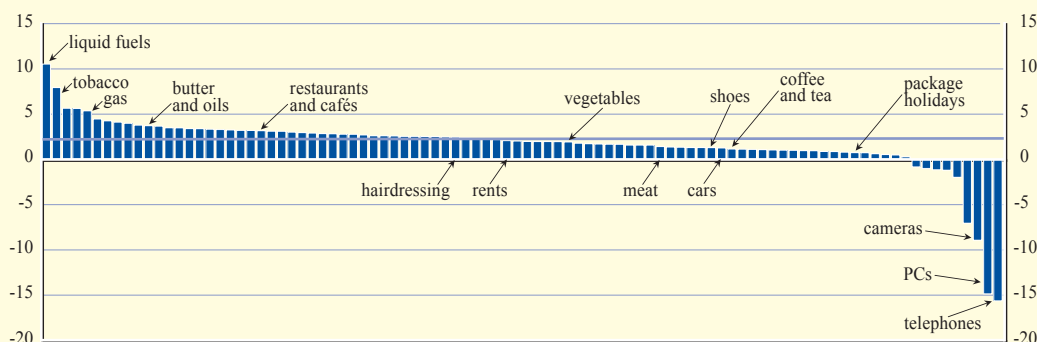
10 See, for example, J. Hoffmann and J.-R. Kurz-Kim, “Consumer price adjustment under the microscope: Germany in a period of low inflation”, ECB Working Paper No 652, July 2006.

11 See V. Cestari, P. Del Giovane and C. Rossi-Arnaud, “Memory for prices and the euro cash changeover: an analysis for cinema prices in Italy”, Banca d’Italia Temi di discussione del Servizio Studi No 619, February 2007.

12 See E. Traut-Mattausch, S. Schulz-Hardt, T. Greitemeyer and D. Frey, “Expectancy confirmation in spite of disconfirming evidence: the case of price increases due to the introduction of the euro”, in *European Journal of Social Psychology*, Vol. 34, No 6, 2004, pp. 739-760.

Chart 3 Average annual price changes in 93 HICP sub-indices, with selected products marked (2002-06)

(average annual percentage changes)



Source: ECB calculations based on Eurostat data.

Note: The solid line shows the average annual increase in the HICP, which was 2.2% between 2002 and 2006.

amounts to a total of around 1.7 million price observations each month. The average annual price developments of the 93 sub-indices published by Eurostat since 2002 are shown in Chart 3.

However, it is conceivable that, when individual consumers are asked about their inflation perceptions, their answers are based on a narrower sample of goods and services. This sample might vary over time, but, as noted above, it is likely to give more weight to items bought on a frequent basis (such as food or petrol). According to ECB estimates, around half of the HICP basket (in terms of the expenditure shares) is composed of items generally purchased at least on a monthly basis. A further third consists of items normally purchased at least on an annual basis and the remaining sixth comprises items generally purchased on less than an annual basis.

The fact that the HICP averages price developments in a broad basket of goods and services in many outlets and locations (see Box 2) implies that individual price observations have an extremely small weight in the overall index, as opposed to the potentially strong impact of extreme changes in the prices of individual products on consumers' inflation perceptions. The HICP is an average of a large number of components that have shown, in many cases, quite divergent developments over the past five

years. As can be seen from Chart 3, since 2002 most items normally purchased at a higher frequency have tended to have larger price changes than those purchased less frequently.

THE HICP'S ADJUSTMENT FOR CHANGES IN QUALITY

In a dynamic economy, the specifications of many consumer goods and services purchased by households are constantly changing. The HICP is designed in such a way that price changes are isolated from other changes in the product's features. The adjustment of observed prices to take account of all such changes is referred to as "quality adjustment". For some items, such as high-tech consumer electronic products and cars, quality and functionality tend to improve considerably on a frequent basis, so that the quality adjustment effects are significant. For example, a car manufacturer may add additional safety features, such as passenger airbags, to the new model of a car without increasing its price. This would be recorded as a price decrease in the index. Such adjustments are essential for a properly calculated price index but can lead to substantial differences between the nominal price changes as observed by consumers and the quality-adjusted price changes that should be reflected in the HICP. When forming their inflation perceptions, it is possible that consumers focus on changes in the price tags of products, taking the improvements in quality for granted. The expenditure weight of

items which typically improve significantly in quality on a frequent basis is estimated at around 8-9% of the overall HICP.¹³

THE TREATMENT OF HOUSING COSTS IN THE HICP

Since 2002 residential property prices have been increasing at rates well above those of the HICP in many euro area countries (the annual rate of house price inflation in the euro area was on average 7.2% during the period 2002-06) and this has attracted much attention in the countries concerned. It is plausible to assume that house prices also play a part in the formation of consumers' inflation perceptions.

While the expenditure of tenants is included in the HICP, most of the expenditure of owner-occupiers is currently excluded, in line with the current definition of the HICP.¹⁴ However, at the euro area level the impact of including owner-occupied housing on the overall HICP is assessed to be relatively limited.¹⁵

¹³ Based on ECB calculations.

¹⁴ Eurostat is currently conducting a pilot project to investigate an approach to appropriately account for the expenditure of owner-occupiers in the HICP. For further details, see the article entitled "The Harmonised Index of Consumer Prices: concept, properties and experience to date" in the July 2005 issue of the Monthly Bulletin.

¹⁵ See M. Eiglsperger, "The treatment of owner-occupied housing in the harmonised index of consumer prices" in *ifc Bulletin* No 24, August 2006, pp. 68-79.

Box 2

THE HICP: A HIGH QUALITY STATISTIC

The divergence in the developments of perceived and measured inflation since 2002 has led, in some countries, to speculation on the accuracy and relevance of official consumer price statistics. It may therefore be useful to recall the facts regarding the measurement of inflation.

HICPs are compiled in 30 European countries (the US Bureau of Labor Statistics also publishes a proxy HICP on an experimental basis). The HICP has been developed according to international standards and benefits from the wealth of experience of all EU countries in consumer price statistics. The harmonisation process led by the European Commission (Eurostat) began in 1995 and has focused on ensuring high standards in terms of quality and comparability across countries. It is supported by a set of legally binding regulations that cover the essential aspects of the index, including coverage, formulae for aggregation, frequency of updates to the basket, treatment of specific items (such as insurance, tariff prices, health and education) and minimum standards for quality adjustment. The European Commission has a programme of compliance monitoring visits during which the compilation practices of individual countries are scrutinised.¹

The euro area HICP is compiled as a weighted average of the HICPs of the euro area countries. The monthly compilation of the euro area results is a very large-scale undertaking, with an approximate total of 1.7 million prices being observed by price collectors in more than 180,000 shopping outlets in nearly 1,000 towns and cities across the euro area. Prices are collected in each country for, on average, over 700 representative goods and services. The HICP is representative of all household monetary consumption expenditure, including non-durable and durable goods and services (excluding owner-occupied housing). It has occasionally been suggested that alternative measures be used that cover only sub-sets of consumer expenditure (such as indices of essential purchases, indices of frequent purchases or indices for low-income households). However, unlike a general consumer price index, these would be biased measures, since they would exclude items that form part of the actual consumption expenditure of households.

¹ The results of these compliance monitoring exercises are summarised on Eurostat's HICP website. See http://epp.eurostat.ec.europa.eu/pls/portal/url/page/PGP_DS_HICP for further details.

Research on the accuracy of consumer price indices² has identified four primary measurement issues. These relate to a substitution bias (since consumers may substitute goods that have become relatively more expensive with those that have become relatively cheaper), a bias due to the delay in including new products, problems in performing quality adjustment and a bias due to the delay in including new outlets in the sample. While several measures have already been taken during the process of developing the HICP to minimise such biases (e.g. the annual updating to include significant changes in expenditure shares), some degree of bias cannot be ruled out. These four measurement issues can have different effects at different times and under different conditions. However, it is expected that, overall, they may lead to actual price changes being slightly overestimated in the HICP, contrary to the current public perception.³

In conclusion, the official euro area HICP, as published by the European Commission (Eurostat), is an accurate measure of consumer price inflation in the euro area which conforms to international standards. There is no evidence that the HICP underestimates actual average price changes, as may be suggested by some media reports.

2 See, for example, C. Mackie and C. Schultze, *At what price? Conceptualizing and measuring cost-of-living and price indexes*, National Academy Press, 2002 and R. Gordon, "The Boskin Commission Report: a retrospective one decade later", Working Paper No 12311, National Bureau of Economic Research, 2006. Both of these articles concern the US CPI.

3 Research using alternative techniques for consumer price compilation has typically led to overestimates in the region of a few tenths of a percentage point.

5 CONCLUSION

The HICP and the European Commission's survey of perceived inflation do not measure the same thing; this reflects the difference between the macroeconomic concept of inflation and the aggregation of surveyed subjective inflation perceptions. Consequently, the fact that developments in the latter diverge from developments in annual inflation, as measured by official statistics, should not be considered as evidence of a measurement error in consumer price statistics.

The results of surveys on inflation perceptions capture a qualitative and subjective sentiment on the part of consumers. They do not provide an indication of the magnitude of the inflation rate perceived and may be influenced by various economic and psychological factors that can vary over time, notably related to the euro cash changeover. Indeed, there seems to be some evidence that the cash changeover may have heightened consumers' price awareness but at the same time blurred somewhat their price references, as consumers may still be comparing

current prices in euro with pre-2002 prices in national currencies or focusing on the price increases of frequently purchased items only.

The HICP, as the best objective measure of the average change in consumer prices, is based on an up-to-date and comprehensive basket of goods and services that is representative of aggregate consumer expenditure. It is adjusted for product quality changes and is comparable over time. Differences between the HICP and the European Commission's survey of perceived inflation therefore do not provide grounds to doubt the quality of the HICP.

Notwithstanding the accuracy of the HICP as a measure of consumer price inflation, protracted divergences in the evolution of measured and perceived inflation warrant close examination, given that perceived inflation might have an impact on inflation expectations and other macroeconomic variables. The significant increase in perceived inflation that followed the euro cash changeover has partly reversed since 2003. Convergence towards the evolution of measured inflation should continue.