Why does consumers' perceived inflation differ so much from actual inflation?

Samu Kurri, Economist, Monetary Policy and Research

Survey results suggest that, since the changeover to euro notes and coins in 2002, consumers' perceptions of inflation have differed substantially from actual inflation[1] (Chart 1). Earlier, from the end of the 1990s until 2001, consumers had a fairly accurate perception of inflation and misperceptions tended to be short-lived. But since the start of 2002 consumers' perceived inflation has been considerably higher than measured inflation.

The gap between perceived and actual inflation rates has been quite persistent. In June 2006, after four and a half years of euro cash, the gap was still in the region of a full percentage point. Moreover, there are similar differences between perceived and actual inflation in many other countries that have changed over to euro notes and coins.

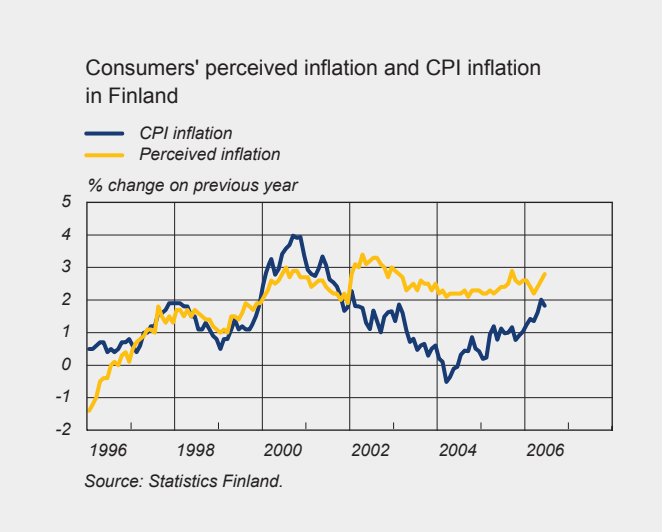
The statistics show that there was no notable change in Finnish inflation with the changeover to euro cash. In fact, the rate of increase in consumer prices in 2002 was slightly lower than in 2001. This is scarcely surprising, since there were no major changes at the time in key underlying factors such as the rise in production costs and competitive conditions. While it is true that many product prices were rounded upward at the time of the changeover, the impact on overall inflation was modest and short-lived. Statistics Finland estimated the changeover effect on Finnish inflation in January 2002 as small and noticeable mainly in gaming and some services. According to Eurostat, the price-rise effect of the changeover for the whole euro area in 2002 was about 0.1–0.3 percentage points.

Because of the size and notable persistence of the gap between perceived and actual inflation much research has been done on the issue, using data from both the euro area and Finland[2]. According to published studies, there are several possibilities for explaining the gap. Firstly, it seems that consumers form price perceptions on the basis of much smaller composites of goods and services than that included in the CPI. Secondly, the changeover to euro cash has obscured the comparison of prices, and consumers are now apparently less informed than before about price developments. Sellers' pricing practices have also changed: 'psychological prices', eg

[1] The euro was introduced as account money on 1 January 1999 and as notes and coins at the start of 2002.

[2] See eg ECB (2002a, 2002b, 2003), Aalto-Setälä and Nikkilä (2005) and Kangassalo and Takala (2005).

Chart 1.



those ending in the digits 5–9, now account for a smaller proportion of nominal prices as a result of the euro-cash changeover. Moreover, the fact that consumers have generally used an even six as the euro-to-markka conversion coefficient has resulted in a slight (0.9%) overestimation of prices.

Table 1.

Weights of CPI commodity groups in 1995 and 2005 CPIs

Heading	*2005 = 100*	*1995 = 100*
Food and non-alcoholic beverages	*13.3*	*15.8*
Alcoholic beverages and tobacco	*5.2*	*6.2*
Clothing and footwear	*5*	*4.6*
Housing, heat and light	*21.3*	*22.1*
Furnishing, household equipment and routine maintenance of the house	*5.5*	*4.7*
Health and medical care	*4.8*	*4.2*
Transport	*14.6*	*13.6*
Communications	*3.5*	*2.2*
Recreation and culture	*12*	*11.9*
Education	*0.5*	*0.2*
Hotels, cafes and restaurants	*6.9*	*6.5*
Miscellaneous goods and services	*7.3*	*8.2*
Total	*100*	*100*

Source: Statistics Finland.

Table 2.

CPI commodity-group price changes, 1996–2006

Heading	*2006 price level relative to 1996 price level*	*Average of annual inflation rates 1996–2006*	*Average inflation in 2002*
Total	*115.4*	*1.4*	*1.6*
Food and non-alcoholic beverages	*115.3*	*1.1*	*2.9*
Alcoholic beverages and tobacco	*100.5*	*0.3*	*1.8*
Clothing and footwear	*96.4*	*–0.3*	*–0.9*
Housing, heat and light	*124.9*	*2.1*	*0.4*
Furnishing, household equipment and routine maintenance of the house	*108.4*	*0.8*	*1.5*
Health and medical care	*130.5*	*2.6*	*4.9*
Transport	*118.1*	*1.9*	*1.2*
Communications	*75.1*	*–2.8*	*0.6*
Recreation and culture	*114.5*	*1.4*	*2.2*
Education	*147.0*	*3.7*	*3.2*
Hotels, cafes and restaurants	*126.2*	*2.2*	*2.3*
Miscellaneous goods and services	*114.8*	*1.2*	*1.0*

The figures for 2006 are based on data for January–June.
The comparison between 1996 and the first half of 2006 is based in respect of the CPI commodity groups on chained time series of the indices from the base years 1995, 2000 and 2005. The annual inflation figures for 2001 and 2002 are based on data from the CPI base year 2000.
Source: Statistics Finland.

Structure of the CPI and changes in inflation

Statistics Finland calculates the CPI as a broad measure of changes in prices of goods and services purchased by households residing in Finland. More precisely, it measures the change in the cost of a basket of commodities that reflects the consumption of the average household. The CPI is fixed-weighted, meaning that the consumption basket and commodity weights are fixed throughout the index-calculation period. Because consumption habits change over time, the contents of the basket must be adjusted from time to time, in line with actual consumption of the average household. When prices change, the true cost of the consumption basket changes in two ways: directly as a result of the price changes and because the amounts of the commodities change. The composition of the Finnish CPI is updated roughly every five years.[3]

The biggest changes between 1995 and 2005 in CPI weights (Table 1) are in the decrease in the share of food in total consumption expenditures and the increase in the share of transport and communications. The consumption-share of alcohol and tobacco also decreased, by about one percentage point, during the same ten-year period.

According to the CPI, the price level in the first half of 2006 was about 15% higher than in 1996 (Table 2). Of the main commodity groups, the most extreme price changes were in education and communications. The

[3] For more details on the CPI see Statistics Finland (2006a).

groups in which prices rose most were education, and health and medical care. Education ranked first with a price rise of 47% between 1996 and the first half of 2006. Other above-average price rises occurred in the housing, heating, and lighting group and the hotels, cafes and restaurants group. On the other hand, prices in communication products and services were on average nearly 25% lower in the first half of 2006 than in 1996. Other product groups in which prices rose by less than the average were clothing and footwear, where prices have actually declined since 1996, and alcohol and tobacco, which was affected by a reduction in alcohol taxes in 2004. Furniture prices also rose by less than the average.

Of individual products, one of the biggest price rises was in transport fuels (Chart 2). These prices were over 50% higher in June 2006 than at the start of 1996. But one can also find individual examples of falling prices. Prices of mobile phones (quality-corrected) were only a tenth as high as at the start of 1996.

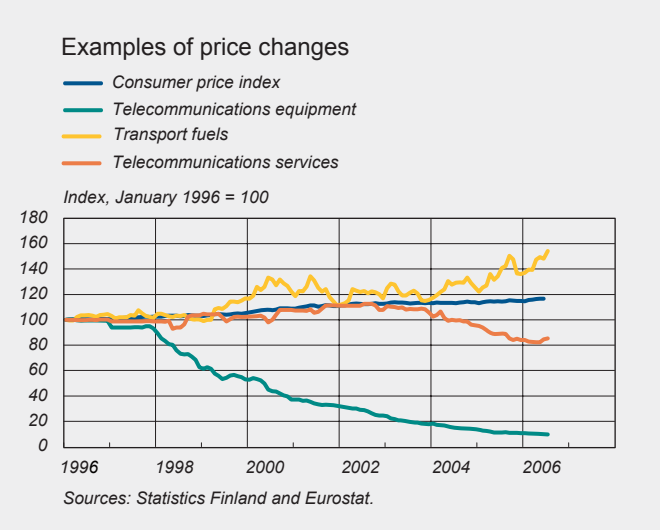
Table 2 also shows the actual inflation connected with the euro-cash changeover, ie the amount (1.6%) by which prices in 2002 exceeded on average those in 2001. Again, the commodity groups in which prices rose most were health and medical care (+4.9%) and education (+3.2%). Food prices also rose (+2.9%) by almost double the overall inflation rate. The only product group that posted a price decline was clothing and footwear (–0.9%). Of individual products, transport fuel prices fell on average by 2½% in 2002.

Euro changeover and consumers' perceived inflation

Using survey data, the European Commission and the Finnish National Consumer Research Centre studied changes in consumers' price perceptions since the euro-cash changeover. One of the things explained in the Commission's yearly Eurobarometer survey is the change that occurred in connection with the euro-cash changeover in how consumers think about prices. The National Consumer Research Centre studied the public's price awareness at that time by interviewing individuals about changes that had occurred in prices of certain basic foods. The results[4] indicated that consumers' price awareness – ie whether they have any idea about the selected prices and how accurate they are – had notably diminished with the changeover. Perhaps the most surprising finding was that price awareness had not noticeably

[4] See eg Aalto-Setälä and Nikkilä (2005).

Chart 2.



improved by 2005, three years after the changeover.

In its consumer survey, Statistics Finland has been asking consumers about their inflation perceptions for over ten years.[5] Generally speaking, up to January 2002 (euro-cash changeover), consumers' perceptions were reasonably close to measured inflation and the gaps between perceived and measured inflation were generally short-lived (Chart 1). Average perceived inflation in 1996 was negative, as consumers apparently sensed a general decline in prices when Finnish food prices fell in connection with EU membership. On the other hand, in 2000–2001, costs of fuel and housing pushed up overall inflation by more than consumers' perceptions. Since the euro-cash changeover, consumers have continuously perceived inflation to be higher than CPI inflation.

It seems that consumers form their perceptions of general inflation on the basis of a much smaller commodity basket than that of the CPI. It has been argued[6] that consumers pay most attention to prices of goods and services that they buy often and ignore prices of items purchased less often. Thus inflation perceptions may be formed on daily food purchases, petrol and cafe services while eg descending prices of home electronics products elude the radar screen.

Table 3 presents correlation coefficients to illustrate the connection in Finland between CPI inflation for different commodity groups and perceived overall inflation. A similar comparison is presented for one individual item – fuels and lubricants for transport equipment. For the period January 1996 to June 2006, the highest correlations with CPI inflation were for the following product groups: foods and non-alcoholic beverages, health and medical care, and hotels, cafes and restaurants. When the markka and euro eras are examined separately, the correlations for many of the subgroups are rather unstable . The connection between the rate of price rise for transport fuels and lubricants and perceived inflation is surprisingly weak – actually negative since 2001.

The correlation coefficients shown in Table 3 do not tell the whole story about average changes in the relationship between actual and perceived

[5] For more details on the consumer survey see Statistics Finland (2006b).

[6] ECB (2002a, 2002b, 2003); Koskimäki (2004); Kangassalo and Takala (2005); Aalto-Setälä (2006).

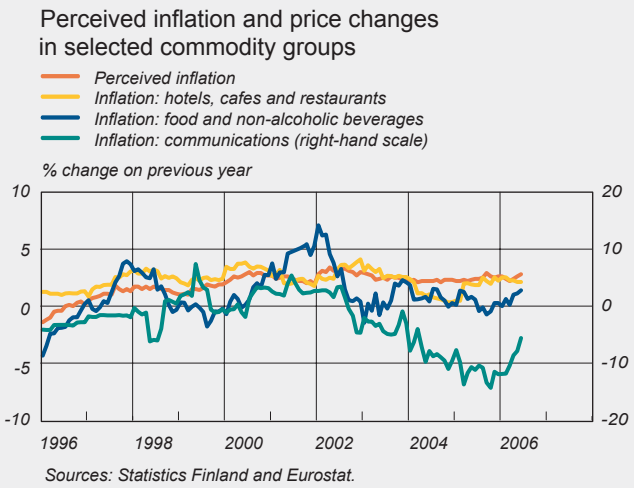
Table 3.

Correlation between perceived and CPI inflation in CPI commodity groups and transport fuels

Heading	*1996–2006*	*1996–2001*	*2002–2006*
Total	*0.4*	*0.84*	*0.67*
Food and non-alcoholic beverages	*0.5*	*0.65*	*0.42*
Alcoholic beverages and tobacco	*–0.13*	*0*	*0.56*
Clothing and footwear	*–0.15*	*0.07*	*–0.3*
Housing, heat and light	*0.37*	*0.72*	*–0.27*
Furnishing, household equipment and routine maintenance of the house	*0.19*	*0.24*	*0.64*
Health and medical care	*0.48*	*0.58*	*0.67*
Transport	*–0.05*	*0.16*	*–0.04*
Communications	*–0.01*	*0.6*	*0.67*
Recreation and culture	*0.23*	*0.52*	*0.37*
Education	*0.32*	*0.33*	*–0.45*
Hotels, cafes and restaurants	*0.5*	*0.8*	*0.66*
Miscellaneous goods and services	*0.63*	*0.79*	*–0.1*
Fuels and lubricants for transport equipment	*0.21*	*0.49*	*–0.24*

The correlations are calculated from monthly data. The figures for 2006 cover only January–June.
For transport fuels and lubricants the first observation is from January 1997.
Sources: Statistics Finland and calculations by the Bank of Finland.

Chart 3.



inflation. For example, while the correlation between actual furniture price increases and perceived inflation is quite high for the euro era, the group's price movements diverge substantially from the path of perceived inflation. While perceived inflation rose by nearly a percentage point between the end of 2001 and the end of 2002, the average price of furniture fell by 1.3 percentage points. Looking at the overall inflation situation since the euro-cash changeover, one sees that, except for the last year, movements in perceived inflation have broadly tracked only two groups: hotels, cafes and restaurants, and health and medical care (Chart 3).

At least one explanation for the jump in perceived inflation in 2002 would seem to be the sharp rise in food prices, especially unprocessed foods, which occurred prior to the euro-cash changeover and peaked precisely in January 2002.[7] But even the switch of food inflation to the negative side in 2003 was not enough to lower perceived inflation.

Distributions of consumers' perceived inflation

Chart 4 shows the distributions of consumers' perceived inflation for January of every second year over the period 1996–2006. The responses in each graph are split into ½ percentage point intervals and limited to the range of –11% to +11%. Only a small portion of responses breached the limits. Overall, the perceptions were fairly accurate, most falling in the range of 0 to 5%.

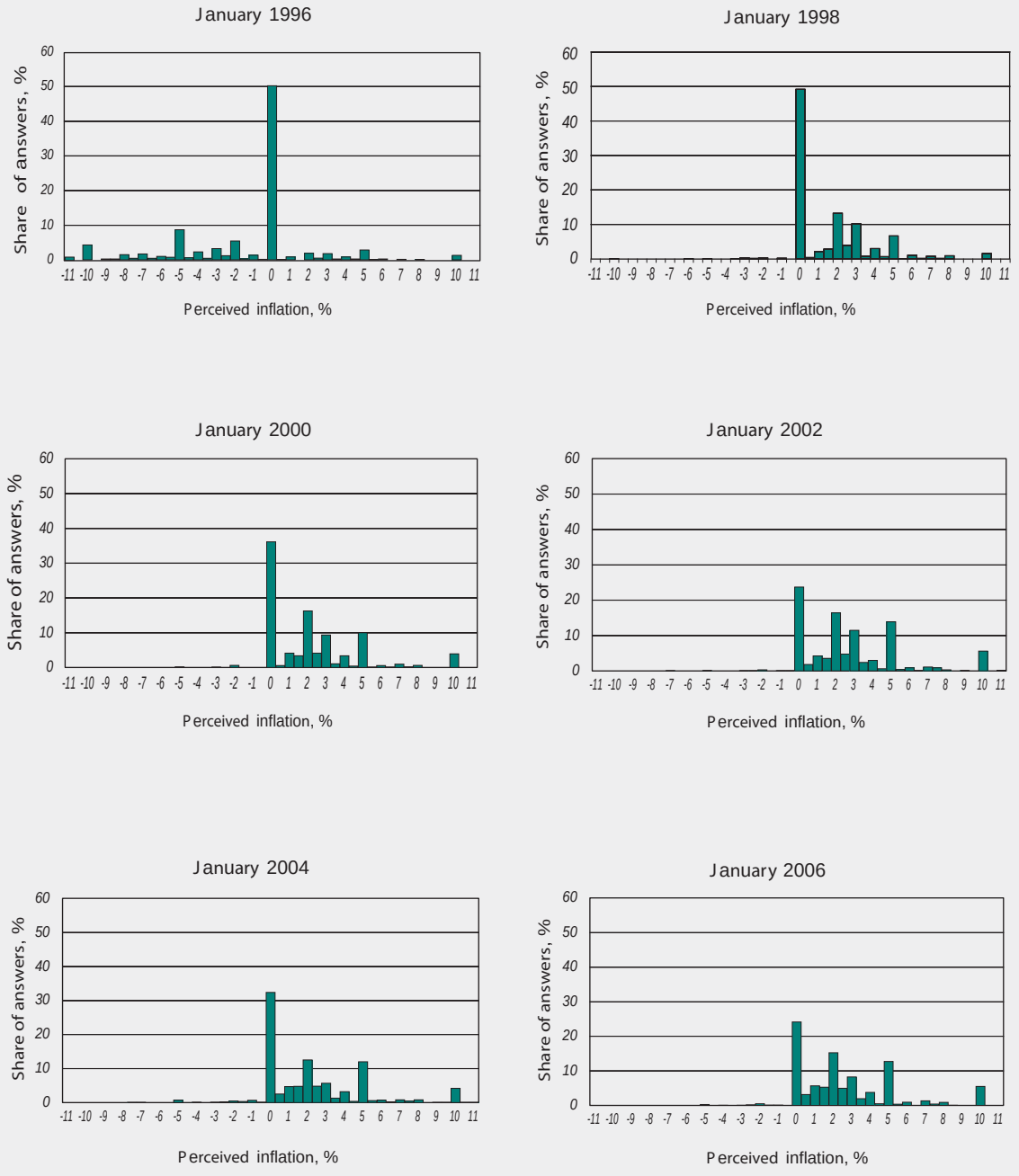
Every graph peaks sharply at the zero interval, meaning that many responders perceived the general price level as unchanged from a year earlier. In fact, in January 1996 about half of the responders saw the price level as unchanged. However, since 2000 zero-responses have been considerably less frequent.

Following the zero response, the next most frequent responses for perceived inflation were (except for 1996) 2%, 3% and 5%; for January 1996 the most frequent nonzero responses were –2 and –5%. The most frequent response above +5% was 10%. The widest variations in average perceived inflation frequencies seem to be at zero, 2% and 5%, as well as the changes in relative frequency of 3%. The decrease in the portion of zero responses implies that consumers have demonstrated a keener price awareness

[7] The factors lying behind the rise in food prices were animal diseases and the poor weather conditions in southern Europe.

Chart 4.

Distribution of consumers' perceived inflation in selected years



Source: Statistics Finland.

since 2000.[8] Extreme observations, on the other hand, had a very minor impact on average perceived inflation during the period studied. These extreme responses – removed from Statistics Finland's data – were mainly round figures such as 20%, 25% and 30%; higher responses were extremely rare.

Conclusions

It is not easy to give an airtight explanation for the gap between consumers' perceived inflation and measured inflation. The perhaps most usual explanation, that consumers pay attention only to certain groups of goods and services (eg daily food purchases), seems to hold only in part at the commodity-group level. Nor do movements in transport fuel prices appear to explain changes in perceived inflation. It is also worth noting that price developments in products whose prices are declining, eg mobile phones and phone calls, do not correlate closely with consumers' perceived inflation.

A reason for this might be that the CPI measures the price of consumption using fixed commodity weights whereas a consumer's spending on a given commodity may remain constant from year to year even while actual quantities are changing. For example, it is possible that many consumers will buy a new telephone of roughly the same price every few years but fail to notice the periodic quality improvements. In contrast, measurements of consumer prices attempt to take such quality improvements into account. Another example is where a consumer's telephone bill remains roughly constant from month to month despite a declining price per minute. The consumer fails to perceive the fall in price because, with the help of expanding phone conversations, her telephone bills hardly change at all.

An explanation that has been offered for the rise in perceived inflation in 2002[9] – based on consumer psychology – receives tentative support in this study. The idea is that consumers had advance beliefs that the euro-cash changeover would raise prices and paid most attention to prices of goods and services that did in fact rise, while ignoring commodities whose prices declined then or later. One can readily find products whose prices rose in connection with the euro-cash changeover, whereas it is difficult to find product groups where easing inflation had a dampening influence on consumers' perceived inflation.

[8] The difference may also be due to changes in survey procedures effected in 2000.

[9] See eg Aalto-Setälä (2006) and ECB (2005).

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