Inflation perceived by consumers in the Eurozone and proxy exchange rates against euro

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REVISED VERSION

INFLATION PERCEIVED BY CONSUMERS IN THE EUROZONE AND PROXY EXCHANGE RATES AGAINST EURO

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ABSTRACT

During 2002, the discrepancy between the official inflation rate and that perceived by consumers picked up to an all time record in the Eurozone. A measure of this misperception is provided by the results of the monthly qualitative consumer surveys carried out by the European Commission. Of course, many reasons may explain the misperception by part of consumers. Here the latter is related to the fact that almost everybody in Eurozone still tends to evaluate prices by using former national currencies and, what is more, adopts proxy exchange rates against euro instead of the official ones, that are computationally too demanding. By accident, in almost every Eurozone countries the use of a feasible proxy of exchange rate against euro implies some overestimation of price changes between 2001 and 2002 (1.4% on average in the Eurozone). The impact of this effect is confirmed by the evidence that in most countries inflation misperception is positively related to the discrepancy between proxy and official conversion rates of euro against the former national currencies.

1. Background [(*)]

Many evidences tend to confirm that, during 2002, the discrepancy between actual inflation (as measured by Eurostat and NSIs) and that perceived by households in the Eurozone picked up to an all time record (see graph 1). Specifically, both consumers' association complaints, and estimation based on the data collected in the framework of the Joint Harmonised EU Programme of Business and Consumer Surveys of the Commission support this opinion.

Of course, there are many possible explanations for inflation misperception. For instance, consumers might have based their estimates only on the dynamics of prices of frequently purchased goods and services (such as fuel, fruit and vegetables which actually rose faster during 2002). In addition, households may not be concerned on "inflation", as defined by statisticians, but on the "cost of living", which possibly takes into account various factors not affecting HICP. Particularly, during 2002 consumers may have experienced huge preferences shifts, for instance from hi-tech appliances (with falling prices) to basic goods and services with fast rising prices, as it is usual during an economic slowdown, as the one occurred in 2002. This shift cannot be fully taken into account in the HICP weighting, since it is necessarily based on 2001 structure of consumption expenditure. Furthermore, the geometric mean of prices – utilised in HICPs – rises less than individual cost of living when substitution among outlets and product offers is actually very low (by the way, rising cost of transportation in 2002 made it less convenient to search for cheaper shops). Finally, consumers tend (erroneously) to regard as inflation also increase in taxes (whose ratio to the disposable income rose almost everywhere in Europe, due to the economic slowdown and budget consolidation).

2. A complementary explanation of inflation misperception

An additional reason for consumers misperception could be far less sophisticated. It relates to the fact that everybody in Eurozone still tends to evaluate prices by using former national currencies. Nevertheless, in everyday transactions, everybody is inclined to use proxy exchange rates of euro against the former national currencies. For instance, the Germans keep on compare one euro to 2 marks (instead of 1.956 marks), and the Italians take one euro as the same as 2,000 liras (instead of 1,936.27 liras). Thus, even if prices did not change from 2001 to 2002, the Germans would have perceived a 2.3% increase in prices and the Italians a 3.3% rise. This fact could partly explain the discrepancy between official figures and consumers' misperception of inflation in those countries.

Generally, simplified conversion rules adopted by European consumers are simple multiplication or division by rounded numbers, possibly complemented by simple percentage adjustment of the result. For instance, in France the proxy exchange rate of euro against Franc is 6 augmented by 10%; in Spain one euro is usually compared to 1000/6 Pesetas. A causal survey in the 12 countries belonging in the Eurozone confirmed the intuition. By accident, it happens that in almost every country in Eurozone the use of a feasible proxy of the exchange rate against euro implies some overestimation of price changes from 2001 to 2002. The figures reported in table 1 validate this hypothesis. On average, it is easy to verify that in the Eurozone, the effect of proxy exchange rate should "justifies" a 1,4% overestimation of inflation. The effect is much stronger in Austria, Germany and Italy (above

[(*)] This paper took great advantage form comments and suggestions of the participants to the meeting of the HICP working group of Eurostat, held in Luxembourg, April 2003.

1.7%). It is moderate in Finland and Ireland (0.9-1.5%), while it is negligible or negative in Belgium, France, Greece, Netherlands, Portugal, and Spain.

What is more, by using an estimation of inflation perceived by consumers, based on the data collected by the European Commission (see Annex), it is possible to verify that countries where misperception is higher are usually the same where the proxy exchange rate effect is larger (see graph 2 and the first column of data in table 2). This fact seems a first evidence in favour of the (apparently bizarre) hypothesis that one of the reasons for consumers misperception is related to the use of such proxies.

A second (indirect) evidence is provided by the last lines of table 2, that show how no misperception virtually occurred in the countries not belonging to the Eurozone and having kept their national currencies in 2002, such as Sweden, Denmark, and United Kingdom. This evidence further supports the view that the overestimation of price changes by part of consumers has been strictly related to the changeover. In fact, European consumers keep on charging the changeover for a strong upturn of inflation in the last year, although many studies tend to assess a negligible effect of changeover on national inflation rates.

It is worth noticing that the size of misperception occurred in 2002 in the Eurozone is unusually large, compared to what happened in the previous three years. The second and third columns of figures in table 2 show that almost everywhere the mean absolute deviation (MAE) between actual and perceived inflation tripled, or even grew almost by 10 times, passing from the period 1999-2001 to 2002. On average, MAE raised from 0.3 to 1.4 in the Eurozone. Even if MAE increase is largely expected comparing in-sample results to out-of-sample simulation outcome, the observed one is impressive. Quite the reverse, the MAE dropped or rose only slightly in the three countries outside the Eurozone. This may be another indirect evidence that the changeover has played some role in changing the consumers understanding of inflation.

Of course, the hypothesis that using of proxy exchange rates is one of the main reasons for inflation misperception in 2002 allows for some relevant exceptions. For instance, Belgian, Dutch, Greek, Portuguese and Spanish consumers have tended to overestimate inflation even if the exchange rate effect is about null on negative in these countries. Quite the reverse, proxy conversion rules do not seem to have affected too much the opinions of the Irish and Italians, even if the latter should have experienced largest proxy effect. In addition, the size of misperception is almost the same as the one predicted by the proxy exchange rate hypothesis only in few cases (Finland, France, Germany, and the Eurozone average).

Table 1 – Official and proxy exchange rate against euro

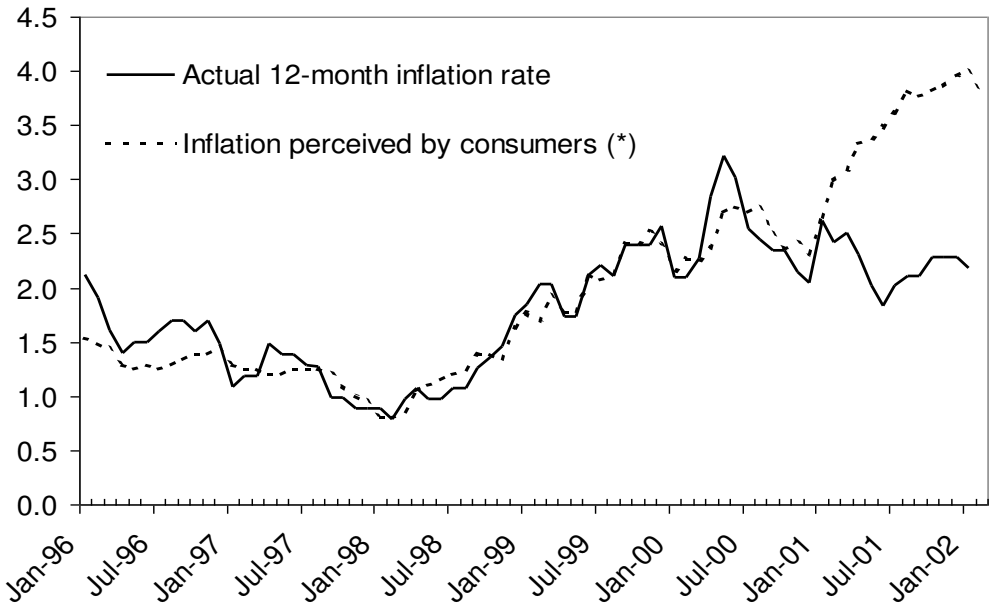
Country	Official exchange rate (*) (A)	Proxy exchange rate (*) (B)	Resulting overestimation of prices in euro (C)=((B)-(A))/(A)x100
Austria	13.760	14	1.74
Belgium	40.340	40	-0.84
Finland	5.946	6	0.91
France	6.560	6.6 (a)	0.61
Germany	1.956	2	2.25
Greece	340.750	333.3 (b)	-2.27
Ireland	0.788	0.8 (c)	1.52
Italy	1936.270	2000	3.29
Netherlands	2.204	2.2 (d)	-0.18
Portugal	200.482	200	-0.24
Spain	166.386	166.67 (e)	0.17
Eurozone (average)			*1.44*

(*) Units of former national currencies for one euro.
(a) It equals 6 plus 10%. (b) It equals 1000/3. (c) It equals 1 minus 20%. (d) It equals 2 plus 10%. (e) It equals 1000/6.
Source: Survey among members of HICP working group.

Table 2 – The accuracy of inflation perceived by consumers

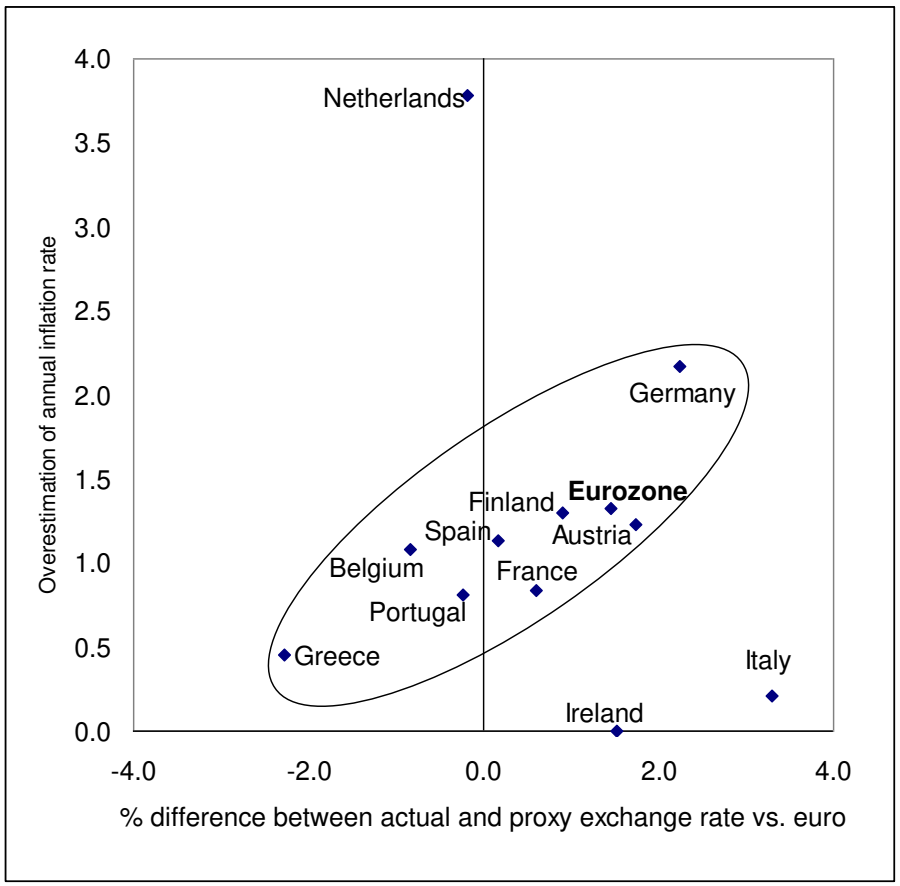
Country	Average misperception during 2002	MAE of perception	
		2002	1999-2001
Austria	1.233	1.233	0.294
Belgium	1.078	1.267	0.408
Germany	2.171	2.171	0.231
Spain	1.134	1.134	0.185
Finland	1.297	1.297	0.529
France	0.837	0.837	0.279
Greece	0.453	0.829	0.380
Ireland	0.004	0.724	0.668
Italy	0.207	0.386	0.169
Netherlands	3.780	3.792	0.484
Portugal	0.811	0.825	0.449
Eurozone (average)	*1.327*	*1.386*	*0.264*
Denmark	0.017	0.177	0.253
Sweden	0.102	0.484	0.345
United Kingdom	0.117	0.270	0.256
EU (average)	*0.774*	*0.813*	*0.307*

Graph 1 – Inflation in the Eurozone



(*) Estimated by using the methodology described in the annex.

Graph 2 – Inflation misperception and proxy exchange rate inaccuracy in 2002



ANNEX: The consumer survey of European Commission and the estimation of inflation perceived by the consumers

The data

Since the sixties, the Commission has carried out a survey among consumers in the framework of the Joint Harmonised EU Programme of Business and Consumer Surveys.[1] Surveys are mainly qualitative and are intended for short-term economic analysis. Nowadays the Programme includes 14 member States of the European Union (Luxembourg is excluded) and 11 accession countries (Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia). The sample size of the survey varies between 1,000 and 2,800 units, other methodological details are provided in "The joint harmonised EU programme of business and consumer surveys: User guide 2002", European Commission, Ecfin, Brussels, 2002, also available at the following address: http://europa.eu.int/comm/economy_finance/indicators/businessandconsumersurveys_en.htm

In each country the survey is carried out by public and private institutes (ISAE among the others), following methods as similar as possible across countries. Specifically, the questions are harmonised following EU guidelines, even if the exact wording may differ slightly across countries, and additional questions may be added. The questionnaire for consumers includes many questions, notably on financial position, income, saving and purchasing intention of the households, and their expectations on prices, unemployment and general economic trend. All the questions admit qualitative answers.

Specifically, consumers are prompted with the following question and related options:[2]

> Compared with what it was 12 months ago, do you think the prices:
>
> (A) have risen a lot?
> (B) have risen moderately?
> (C) have risen slightly?
> (D) have hardly changed?
> (E) fallen slightly?
> (F) I don't know.

[1] The Programme was initially set up by the Commission decision of 15 November 1961 and confirmed later by a Council decision on 15 September 1970. These were updated on 15 July 1997 by a new Commission decision (E/97/1419-C(97)2241), where the Programme was formally adopted. The Commission adopted a Communication to the European Parliament and the Social and Economic Committee on the Programme in November 2000 (COM (2000) 770), which integrated into the Programme the surveys carried out in the accession countries.

[2] A revision of question is planned for the next years. The new question and related options should be:
How do you think that consumer prices have developed over the last 12 months? They have
(A) risen a lot
(B) risen moderately
(C) risen slightly
(D) stayed about the same
(E) fallen
(F) I don't know.
In addition, if the answer is (A), (B), (C) or (E), the interviewed person is asked:
By how many per cent do you think that consumer prices have gone up/down over the past 12 months?

Quantifying consumers' opinions

Every month, the collaborating institutes collect (and usually make available to the public) the percentage of answers to each option. Of course such data can be hardly analysed as they are, and possibly included in standard econometric models. Thus, a number of methods have been developed to synthesise every set of six percentages in a summary indicator. The most widely used "quantification" method is the one utilised by the Commission, that is the "balance" between the percentage of positive and negative options. In the case of questions with more than 3 options, the balances are calculated on the basis of a weighted average of percentages, namely

$$W = (A) + ½(B) - ½(D) - (E)$$

The Commission disseminates monthly the time series of W for each country, seasonal adjusted by using the Dainties algorithm (also sketched in Annex H of "The joint harmonised EU programme of business and consumer surveys: User guide 2002"). The main advantage of this procedure, claimed by the Commission, is that adjusted time series are not revised backward when adding new data. In fact, revisions of the historical data do not seem to be acceptable as consumer survey data are economic agents' opinion expressed at a certain point in time.

It can be assumed that the inflation perceived by consumers rises as the percentages of options (A) and (B) increase, while it declines as the percentage of options (D) and (E) goes up. Thus, the time series of the summary indicator W can be used directly to estimate the dynamics, but not the level, of inflation rate perceived by the consumers. In order to measure also the amount of price changes estimated by the consumers, some assumptions are needed. Specifically, it can be hold that on average, over a reasonable period of time, consumers are able to estimate inflation rate correctly. That is their feeling about price changes may be wrong in each particular month, but consumers cannot be mistaken for several years in a row. Notice that this assumption is far weaker than the "rationality" of consumer perception and expectations, since, for instance, consumers mistakes are allowed to be correlated over time.

Specifically, assuming that, on average, the consumers had been able to estimate the inflation rate correctly since 1999 until 2001 (that is before the changeover), it is possible to apply the standard regression techniques to the model

$$P_{c,t} = \alpha_c + \beta_c W_{c,t} + u_{c,t}$$

where $P_{c,t}$ is the 12-month percentage change of HICP in country c at time t; α_c and β_c are unknown parameters; $W_{c,t}$ is the aforementioned "balance"; $u_{c,t}$ is a random disturbance with the usual properties. The sample estimates of α_c and β_c, together with the "balances" collected during 2002 can be used to get an estimate of the inflation perceived by consumers, conditioned to the assumption that they did not change completely their attitude in answering to the question about the price trend over the last 12 months.

It is worth noticing that the estimate of the perceived inflation obtained by using the model above can be considered the outcome of a genuine out-of-sample simulation, since no information about the relationship between "balance" and inflation in 2002 is included either in the model specification, or in the estimation procedure.