



SEMINAR

Inflation Measures: Too High - Too Low - Internationally Comparable? Paris, 21-22 June 2005

16. Official CPI and users: recent developments in Istat strategy

Brunetti A., De Gregorio C., Monducci R., Nuccitelli A.,
Polidoro F., Ricci R.
(Istat - Directorate of price statistics and External trade)

Official CPI and users: recent developments in Istat strategy

BRUNETTI A., DE GREGORIO C., MONDUCCI R., NUCCITELLI A., POLIDORO F., RICCI R.

(ISTAT - DIRECTORATE OF PRICE STATISTICS AND EXTERNAL TRADE)

DRAFT

1. Introduction.....	2
2. Media and price statistics.....	3
3. The “gap” between official CPI and individual perceptions: some facts waiting for a theoretical explanation	4
<i>3.1 The “gap” as a result of Istat’s underestimates.....</i>	5
<i>3.2 Relative price variability and consumer perceptions</i>	9
4. What Istat did to improve its relationships with CPI information users	14
<i>4.1 Improving processes.....</i>	14
<i>4.2 Delivering more statistical information.....</i>	15
<i>4.2.1 Timely and detailed information on price dynamics.....</i>	15
<i>4.2.2 Price information for national and local observatories</i>	16
<i>4.2.3 Experimental price dynamics impact indicators on specific sub-populations.....</i>	18
<i>4.3 The involvement of users in innovative processes</i>	23
References	25

Official CPI and users: recent developments in Istat strategy

BRUNETTI A., DE GREGORIO C., MONDUCCI R., NUCCITELLI A., POLIDORO F., RICCI R.

* * *

1. Introduction

In recent years, information on official CPI has become a critical matter in Italy. A combination of factors was responsible for that. The adoption of the euro has certainly spurred general attention on price monitoring, and has implied a sharp increase in users' information needs. The effect of the enduring stagnation of the economy on the economic conditions of households made choice of price inflation a sort of neutral battlefield, and contributed to determine a widespread scepticism on the reliability of official CPI. Moreover, a few and limited, but still remarkable, blunders induced Istat to revise its provisional CPI estimates and hit dramatically the degree of confidence in official inflation.

These factors have emphasized the peculiarities of the information on price statistics. The number of final users is in fact very large, ranging from academics and analysts to unskilled citizens: reaching them and targeting their heterogeneous needs is not a trivial task. In this critical context, most intermediate users (media and newspapers) moved towards a political and distorted use of the information on the official CPI. A parallel unofficial and uncontrolled market of “inflation estimates” has usually been credited and induced, lowering the boundaries of a “statistically correct” use of the data: checks on sources, their citation, and methodology certification are very often disregarded.

As a matter of fact, methodological topics are by far the most difficult piece of information on official CPI to be delivered and assimilated. Although their range is quite wide - from the single price survey to the construction of the general index – these difficulties (and the ensuing scepticism) are actually centered on a limited, general, and indeed fundamental, set of topics. They concern the identification of the consumption aggregates used to evaluate CPI, the construction of the weighting structure of the basket and the choice of the basket itself.

In such a critical context, Istat has recently reacted adopting a strategy based on a set of complementary moves. The pace of innovation has been strengthened, and has involved the methodological, organisational and technological aspects that lay behind the monthly production of CPI figures. These measures have been accompanied by a sharp increase of the basic information freely available on the web site. More than 200 price indices are in fact disseminated on the web fifteen days after the end of the reference month: all elementary indices (more than 500) can be freely obtained on request with the same delay.

Value added information has also been increased and differently targeted. Information on price surveys and CPI methodologies has been increased, with a new emphasis on the construction of elementary price indices. The monthly news releases have been enriched with detailed analytical reports on the behaviour of price indices, supplying interpretative efforts based on the examination of a set of sub-indices defined according to different economic criteria. A monthly focus on “hot” themes is also offered, in order to meet “up-to-date” short-term information demand. All along with the introduction of these innovations, the management of CPI news releases has been rationalised and centralised. The aim was to avoid any official information gap in occasion of data delivery and to strengthen Istat presidium in driving comments and interpretations: in particular, the anticipated release of provisional data by each regional capitals' statistical offices has thus been abolished.

Moreover, Istat supported the start up of a national observatory on consumer prices in agreement with the municipalities in charge of data collection. This brought to the delivery of price level data regarding a short list of products of large consumption: data are freely disseminated on line on a dedicated web site. Istat is also supporting the start up of local observatories, managed by several municipalities and regions, providing them with a methodological and regulatory framework coherent with the national observatory.

Finally, a special effort has been dedicated to evaluate and analyse the different consumption patterns resulting from the yearly household expenditure survey, for the production of sub-population indices.

From a more general point of view, it is important to mention the establishment of a CPI Commission, representing a wide range of users, whose task is to collect and evaluate the proposals for a revision of the set of different indexes produced by Istat, within the general framework of the international rules actually followed by Istat.

2. Media and price statistics

In last decades, CPI represented a typical example of a “market mover” indicator. In recent years the credibility of this piece of statistical information has been at the center of hard disputes. These disputes have been systematically fed by mass media, who have had (and obviously still have) an active role as intermediaries of statistical information. Often, this role has been played distorting and giving a biased interpretation of CPI data. Information biases took place with a particular emphasis in the months which followed the euro changeover, in an economic environment characterised by a modest economic growth, increasing difficulties registered by large portions of Italian households as a consequence of real incomes weakness, a stronger increase in the prices of the more largely consumed products, whose rate of growth has been often much higher than CPI average.

On one side, all these economic factors mined the public opinion trust in official statistics, and this has been favoured by some errors made by Istat in CPI computation. On the other side, they induced confusion in the information delivered on these subject and, as a result, consumers and some groups of economic agents have been disoriented.

In this context, the relationship between mass media and official statistics has been characterised and conditioned by at least three aspects.

First, the information content of CPI is often overvalued, with respect to the complexity of the phenomena that it synthesizes, from the point of view of both commodity and geographical breakdown.

Second, even very small movements in inflation figures are very often overemphasized, although they are below the limits of statistical significance. Third, quantitative information is frequently manipulated and a sort of unrequested *par condicio* applies to Istat and other non-official sources: newspapers usually compare Istat official estimates with those delivered by the association X or with those of the institute Y. This may lead readers and users to think that a sort of competition exists not only among sources but also among data, and that users can choose which estimate to trust in according to one’s own tastes or political ideas. Media usually treat the official statistical information and the news coming from other uncontrolled and unofficial sources as if they were the same thing, without taking into account the rigorous methodological principles that official statistics has to respect (Biggeri, 2004).

One more aspect must be considered, and it has to do with the comparison which is often proposed between official inflation figures and consumers’ opinion surveys. In most cases the quantitative measures delivered by Istat are uncorrectly compared to the qualitative measurements of consumers’ perceptions.

The role played by media explains anyway only a part of the critical relationship between official CPI and public opinion. Another critical aspect can be found in the difficulties that people generally meet in comparing general macro economic indicators with their own experience: the tendency to generalise one's own experience usually undermines this comparison. The statistical approach to the measurement of macroeconomic variables clearly requires a reduction of the complexity and variability which exists at microeconomic level. Wide differences can exist between the rate of change of official CPI and the individual perceptions and evaluations, that probably are strongly influenced by the price increases registered among the most consumed goods.

CPI is computed monthly by Istat (and by other NSIs) in order to measure the rate of change of the prices of a basket of goods and services representative of Italian consumers' yearly expenditures: the content of the basket ranges from pasta to cars, from cooking gas to intercontinental air travels. It is the result of complex data collections and computations whose aim is to measure a reality which is not immediately perceivable and that cannot be precisely measured by means of shortcuts.

Traditionally, the relationship between public opinion and official statistics is not the best example of a good relationship. The ground of price statistics is even more critical, since the difficulty of reconciling it with individual balances and economic situations makes people indifferent and not interested to understand the concepts which lay behind the statistical measurement of a macroeconomic variable.

Paraphrasing Henry Bergson "The eye sees only what the mind is prepared to understand": that is to say that everybody tends to generalise his own experiences.

3. The "gap" between official CPI and individual perceptions: some facts waiting for a theoretical explanation

Despite the intensity and harshness which marked the debate on the "gap" between official CPI's figures and households' perceptions of price increases, this issue has rarely occupied the pages of the Italian journals of economics and generally has not been at the center of a structured theoretical and empirical debate¹. This scarce attention to the CPI and to its background has not helped to raise the qualitative level of the general debate on the "gap" issues, as it would have been indeed necessary: the low level of the dispute mirrors this lack of a proper attention and analysis. It is not among the purposes of this paper to investigate the reasons of this lack of attention. It can be remarked, anyway, that these years have been full of stimuli on these subjects. The legacy of the Boskin report has been, and is still, extremely influential on the mainstream economic literature, and has been spurring since the second half of the nineties a great amount of articles on international journals. The process of harmonisation following the introduction and evolution of HICP has also raised the attention on all the matters involved in the production of a consumer price index but, at least in Italy, this attention has remained internal to the official institutions involved (mainly Istat and Bank of Italy).

All these elements will anyway induce - the sooner the better - a more structured theoretical and empirical debate on CPI issues. For this perspective, Istat role will be extremely important. In recent years, information delivered on a regular basis concerning methodological matters, detailed CPI

¹ Del Giovane and Sabbatini (2004) provide up to now the most complete survey of that debate: they cite 35 works on this subject. Only two of them were published on Italian journals of economics; 14 were documents from official institutions (i.e.: Istat, Bank of Italy and Ecb) but only 9 of them publicly available; 4 were researches from independent institutes; 14 were articles published on a web site dedicated to the discussion over economic subjects. As a matter of fact there is not a strong evidence in Italy of a systematic treatment of the theoretical subjects related to the definition and estimation of a consumer price index, neither on the general theme of the "economics of a price index" nor on more specific related subjects, such as the methodological tools for the estimates of elementary price indices. In the after-Boskin years, and in the middle of the credibility dispute over the CPI, between 2000 and first quarter 2005, the number of articles written on major Italian journals of economics and related to CPI can be counted in the fingers of one hand.

time series and microdata has sharply increased: the possibility for scholars, economists and data crunchers is much wider with respect to the last decade.

As a result, actually the questions put by the “gap” have not still received well founded and independent explanations, neither favourable to official CPI nor contrary to it.

The starting point of the dispute over Istat CPI credibility, relies in the asserted existence of a “gap” between CPI and individual perceived inflation. How can it be measured? How can it be explained? Where does it come from? Three different approaches can be identified:

- The gap is generated by the existence of a bias (that is a systematic error) in Istat CPI. This approach tries to detect the existence of the gap through a comparison between official CPI and proxies of individual perceptions. In this approach the causes of the gap lie primarily in CPI underestimates: no explanation is provided of the deeper reasons why of these underestimates;
- The gap is generated by the growing difficulties which characterise the process of individual perceptions formation, in an environment recently characterised by a greater relative prices variability and by a general downturn in the economic situation. The information set available to each individual is thus extremely complicate and difficult to be evaluated, and euro changeover could have played an important role.
- The gap has been determined, or at least favoured, by some methodological features of the Italian CPI. These features are mostly extremely specific and sequentially involve the transmission of signals from the NSI that, as long as they conflict with consumer perceptions, feed the gap between official and perceived CPI. This approach has been treated only rarely and occasionally.

Obviously, these explanations can be more conveniently viewed as complementary: it is anyway necessary an evaluation on their effective role in explaining Istat credibility gap. This section will provide a short overview of the first two approaches and of the empirical evidence on which they are built, with an original contribution concerning an analysis of the evolution of relative price variability in the Italian CPI.

3.1 The “gap” as a result of Istat’s underestimates

The proof of the existence of the gap between official CPI and consumer perception has been usually searched in the data from the Eu monthly consumer surveys. These surveys are co-ordinated by the European Commission and are conducted separately in each country in order to build an Eu consumer confidence indicator². In Italy the survey is conducted by Isae (a state-owned economic research institute), who interviews monthly a sample of two thousands individuals. The questionnaire includes twelve qualitative questions³, and most of them can be answered choosing among five scaled items (such as, for example, “very high”, “high”, ”medium”, “low”, “very low”) plus a “don’t know”. The results are delivered, for each country and for each question, in terms of a

² Consumer surveys are part of the harmonised surveys conducted by the EU Directorate General for Economic and Financial Affairs in the framework of the joint harmonised EU programme of business and consumer surveys (see Eu (2004)).

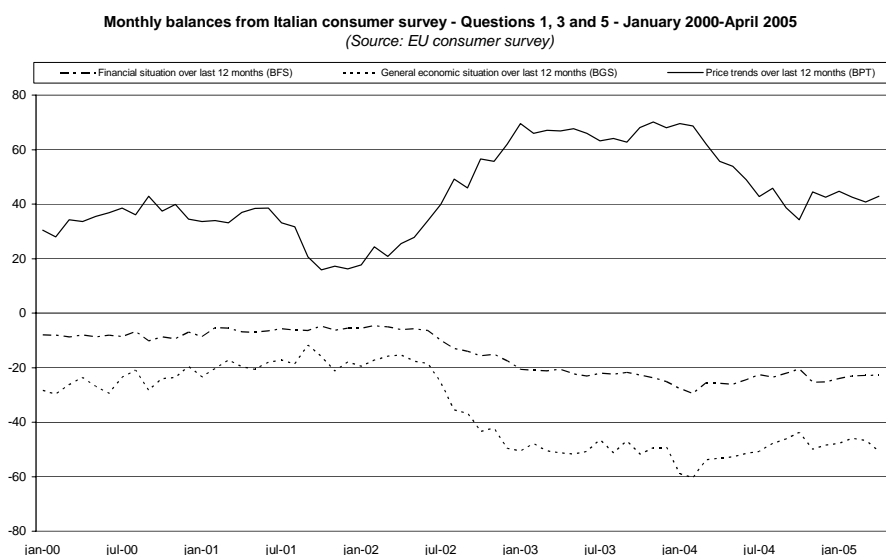
³ The complete list of the consumers survey questions is the following: Financial situation over last 12 months, Financial situation over next 12 months, General economic situation over last 12 months, General economic situation over next 12 months, Price trends over last 12 months, Price trends over next 12 months, Unemployment expectations over next 12 months, Major purchases at present, Major purchases over next 12 months, Savings at present, Savings over next 12 months, Statement on financial situation of household.

synthetic balance. It is calculated as the difference between the weighted share of the top scale answers minus the weighted share of the bottom scale ones⁴.

The data concerning three questions are highlighted here: Financial situation over last 12 months (whose balance will be from now on abbreviated with BFS); General economic situation over last 12 months (BGS); Price trends over last 12 month (BPT)⁵. The evolution of these three indicators in Italy is plotted in Graph 1.

All three indicators show a sharp worsening in consumer confidence from the second quarter of year 2002. BPT starts its growth from October 2001, accelerates from March 2002, reaches its peak at the beginning of year 2003, holds that higher level for almost one year and then turns back to mid-2002 levels. BFS appears relatively more stable. It reaches its minimum at the start of year 2004, and then maintains that level. The drop in BGS is much sharper, and the recovery from the minimum recorded in January 2004 appears feeble.

Graph 1



BPT time series have often been used in order to detect the distance between consumer perceptions and official CPI. Since from the beginning of year 2002 there is not correspondence between the shape of BPT and that of the official inflation rate (as measured by HICP: see Graph 2), this difference has been interpreted as a demonstration of Istat underestimates in the months of euro

⁴ The weights are 1 for the extremes of the scale (e.g.: “very high” and “very low”) and 0,5 for the intermediate items (e.g.: “high” and “low”). As reported in the consumer and business surveys user's guide, in the case of questions with six options, “(...) the balances are calculated on the basis of weighted averages: $B = (PP + \frac{1}{2}P) - (\frac{1}{2}M + MM)$. It is clear from the expressions above that balance values range from -100, when all respondents choose the negative option (or the most negative one in the case of five-option questions) to +100, when all respondents choose the positive (or the most positive) option”.

⁵ They correspond to questions 1, 3 and 5 of Eu's consumer survey. Here it is reported the exact wording of each question. *Question 1.* How has the financial situation of your household changed over the last 12 months? 1- got a lot better; 2- got a little better; 3- stayed the same; 4- got a little worse; 5- got a lot worse; 6- don't know. *Question 3.* How do you think the general economic situation in the country has changed over the past 12 months? 1- got a lot better; 2- got a little better; 3- stayed the same; 4- got a little worse; 5- got a lot worse; 6- don't know. *Question 5.* How do you think that consumer prices have developed over the last 12 months? 1- risen a lot; 2- risen moderately; 3- risen slightly; 4- stayed about the same; 5- fallen; 6- don't know.

changeover. Others use an indirect approach, and detect the underestimate from the difference in the shapes of the financial situation indicator and the median real income⁶. Is that enough?

Two kinds of perplexities arise in the evaluation of these proofs⁷. One has to do with the correctness of the comparison between standard economic indicators and Eu's indicators. The latter are weighted differences among percentages and their nature is completely different from CPI. They express subjective evaluations, and can be influenced by perceptions on other variables connected with consumer confidence. Major influences can come from general events, and we know very well that from the last quarter of 2001 these events have not been missing. Finally, respondents do not necessarily use the same model to evaluate price trends, nor use the NSI's methodology.

Incidentally, it is worthwhile to notice that the financial situation indicator is not entirely founded on an income flow concept, since it involves also an evaluation of individual real assets. Many factors are capable to influence the evaluation of one's own stock of wealth, and many of them were at work between 2001 and 2003. For example, the stock exchange dynamics has experienced from mid 2001 up to 2004 a dramatic downturn⁸; moreover, real estate market has seen a correspondingly strong price surge⁹.

A second set of perplexities has to do with the fact that Italy is not an isolated case.

European countries can be roughly divided into two subsets. Some of them (e.g.: United Kingdom, Sweden and Finland) show a high stability in all the three Eu's indicators we are considering. On the contrary, most of the other countries (e.g.: France, Germany, Netherlands, Spain) show trends very similar to those recorded in Italy (see Graph 3). French BPT started to grow in the first months of year 2001, accelerated from the beginning of 2002, reached its maximum level one year later, and then maintained that level. In the Netherlands, the growth has started well before year 2002, accelerated from 2002, peaked at the beginning of 2003 and then decreased rapidly to pre-2001 levels. Something similar happened in Germany.

The behaviour of Italian BPT is then common to the one registered in most of the Euro-zone countries: they have all experienced a sharp worsening of this indicator in the neighbourhood of the changeover.

The combined plot on two separate vertical axes of BPT and the official inflation rate (as measured by HICP) also shows what happened in Italy, Germany, France and Uk (Graph 2).

With respect to Italy, the difference in the shape between the two series appears stronger in Germany, where from the second quarter 2002 a growth in BPT has been accompanied by a decrease in the inflation rate. In France BPT's growth started earlier and was not associated with a clear growing trend in the inflation rate. Completely different is obviously the case for Uk, the only country where BPT and official inflation rate shapes appear, from the end of 2001, very similar: before 2001, instead, they appear remarkably different.

The Italian case is not an isolated one: the behaviour of BPT requires then an explanation for most Euro-zone countries. The relevance of BPT as a proxy for individual perceptions of CPI's rate of

⁶ Marini-Piergallini-Scaramozzino (2004) tried to emulate a Nordhaus (1998) influential work, noting the absence of median real income downturns in correspondence with the decline in consumer perceptions as measured by BFS. This evidence has been offered as a proof of the inadequacy of the CPI in deflating monetary incomes. They reach this conclusion for Istat's CPI by means of a comparison with the same data for United Kingdom. For a detailed critical evaluation of their results, and in particular, of the econometric model they use see Gallo-Velucchi (2005).

⁷ See, for example, Guiso (2003) and Gallo and Velucchi (2005).

⁸ Milan stock exchange Mib30 index lost 30% between January and September 2001. After a small recovery in the last quarter of 2001, it has reached its minimum levels between September 2002 and March 2003 (ranging from 40% and to 50% of the January 2001 value).

⁹ This is supposed to have generated opposite effects in the evaluation of real assets on house owners and non-owners.

change appears then weakened, and it implies the search for HICP underestimate biases all along most Euro-zone in the months situated in the surroundings of the changeover.

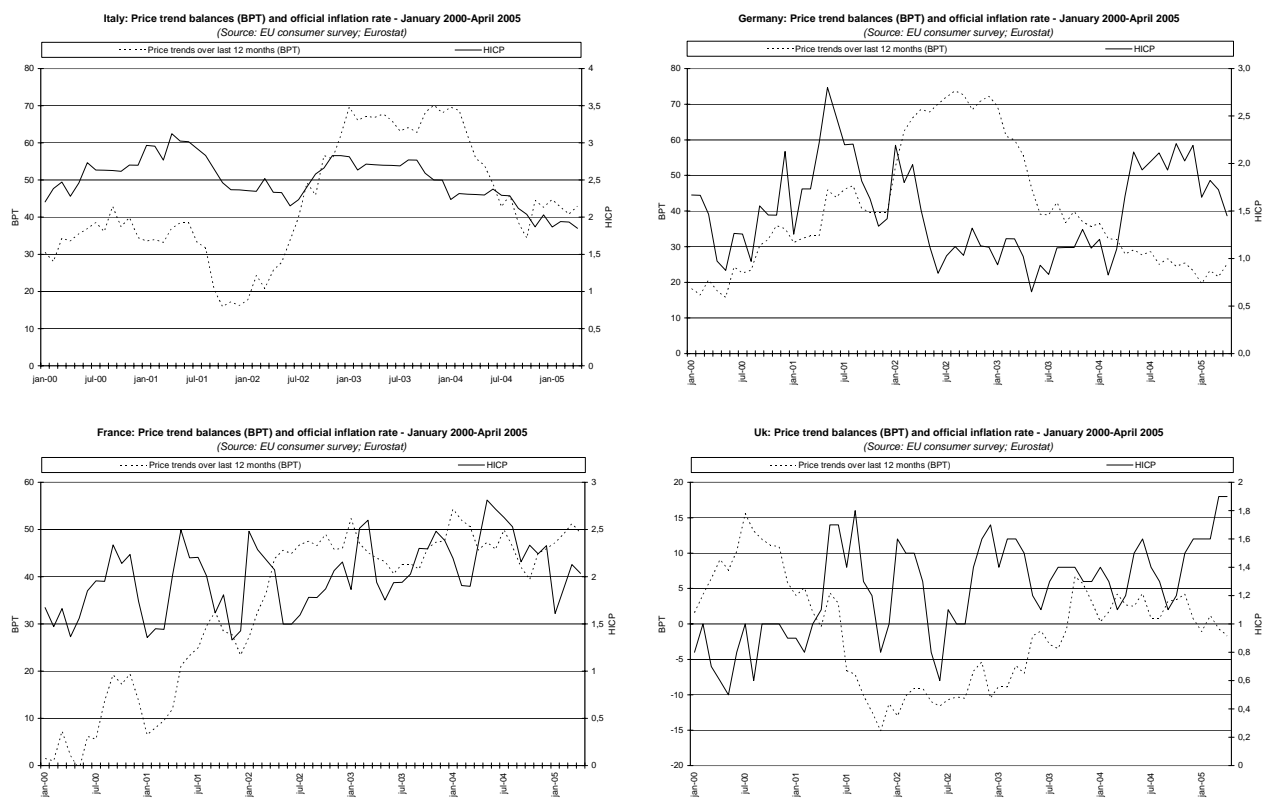
As a matter of fact, Eu's consumer indicators suggest the presence of a sort of turning point in consumers' confidence corresponding to the introduction of the euro (Graph 3).

In the Euro-zone BFS starts to decrease from November 2001, reaches a minimum (-20) in February 2003 and then slowly rises. Germany starts its decrease in March 2001, touches -30 in December 2002 and then recovers near the Italian levels. In the Netherlands the fall has been remarkable. France starts its long monotonous decrease in January 2002. Spain behaves like France. For what concerns BGS, in Italy it decreases from mid-2002, in France and Germany the fall had started one year before, in the Netherlands at the end of the nineties. In all these country the decline of BGS halted during 2003, but no significative recovery took place from then on. Finland and Uk figures are instead relatively stable from the second half of year 2001.

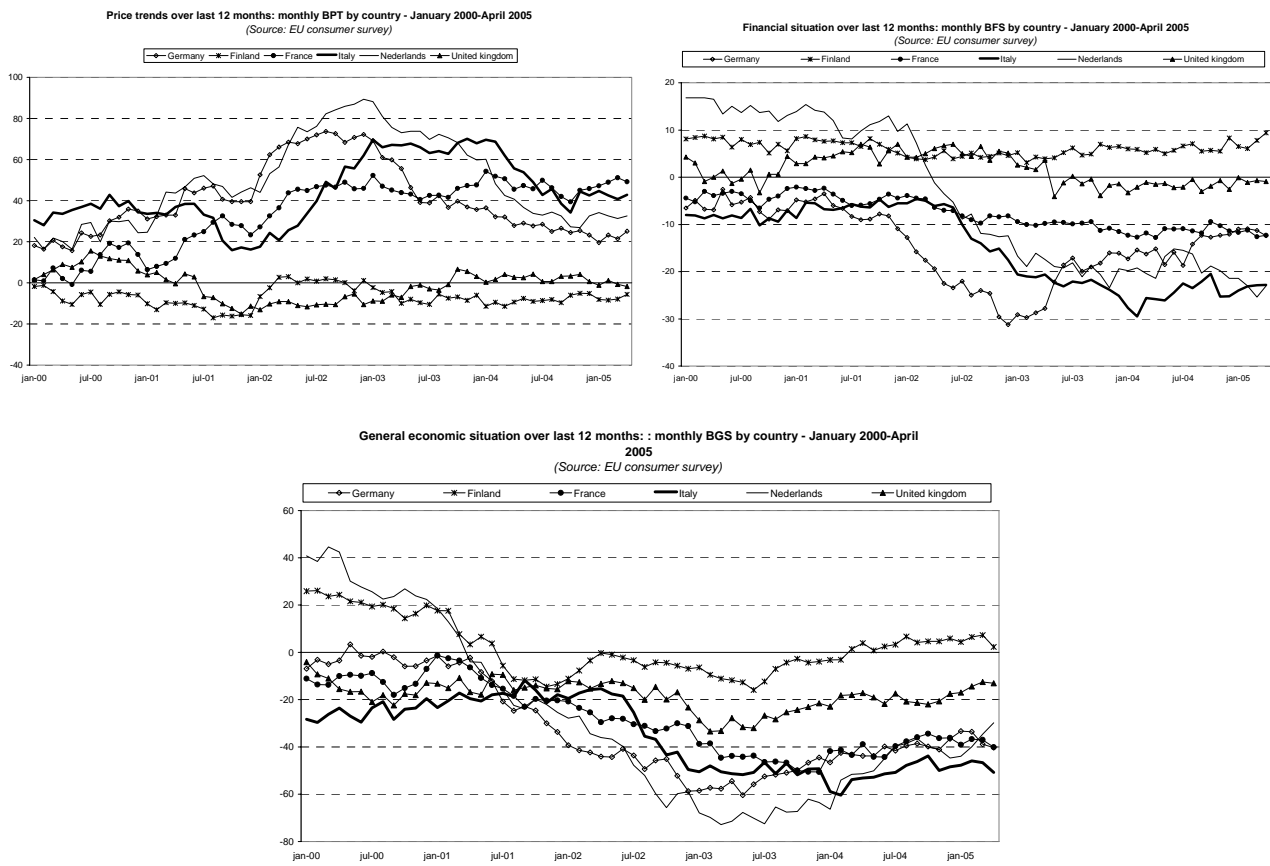
The examination of Eu's indicators shows similar clusters of countries, with Finland and Uk characterised by quite plain trends in consumer perceptions, while in the remaining four euro-zone countries consumer confidence starts dropping immediately before or after the changeover date.

What seems more important in evaluating the informational content of Eu's indicators is also the fact that, like in the case of Italy (see Graph 1), all three indicators show similar shapes within the same country, as if they were influenced by a common, and partly country-specific, general state of perceptions and expectations. These evidence casts new severe doubts on the use of BPT series for official CPI monitoring purposes.

Graph 2



Graph 3



3.2 Relative price variability and consumer perceptions

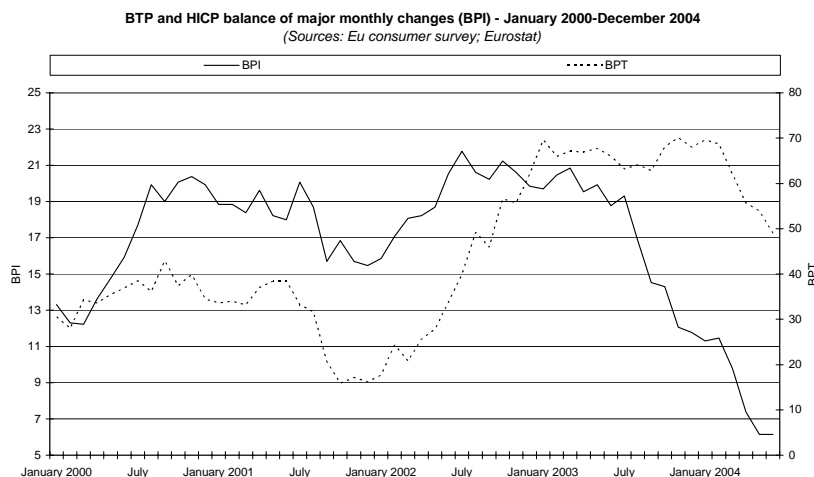
Defining perceptions is not an easy task. Defining individual perceptions over CPI's rate of change appears even more difficult. Measuring these perceptions would require a complicate monthly survey and a detailed survey questionnaire.

Moreover, CPI perceptions are not a well established economic concept at all: it has been introduced as a rhetorical tool, to give a name to the evident fact that people formulate hypothesis on prices' yearly rate of change that do not match official figures. But how this hypothesis is formulated, and how it should be compared to the official figures, is a quite tricky and unresolved subject. Also assuming that individuals correctly calculate the inflation rate they experience, the distribution of individual estimates around the official one is influenced by a large number of factors: for example, income and consumption expenditure distribution, degree of heterogeneity of individual baskets, individual weighting structures, variability of elementary indices. Part of these aspects relate to the difference between a macro indicator, such as the CPI, and its micro (that is individual) components. All of them suggest the concrete possibility that the distribution of individual perceptions of the inflation rate, also when they are correctly formulated, can be dispersed and highly skewed.

Quite obviously, an increase in elementary price indices variability can have meaningful effects on consumer perceptions. As a sort of counter-exercise, Italian BPT time series have been compared with a rough variability indicator whose computation is similar to the one used for BPT. Using all 570 elementary indices which constitute Italian CPI, it has been derived a balance of larger price increase (BPI) as the difference between the number of indices with monthly increases above 2%

and the number of those who monthly decrease by more than 2%¹⁰. The results of this comparison show a good similarity between the shapes of the two time series; it seems to suggest that BPT evolution may be influenced by a growth in the complexity of the signals coming from the prices (Graph 4).

Graph 4



Is it possible to attribute the Italian “gap” between consumer perception and official inflation to the mechanism of “perception formation”, that is to a growth in the complexity of the signals coming from the price system which has complicated the information set of consumers? If so, is it possible to detect it?, and what has been the role of euro change over?

In order to study this last issue, merely technical analyses have been performed on a large subset of Istat CPI microdata, whose results are surveyed by Istat (2002, 2003). The study of price setting behaviour (rounding effects, change in psychological and attractive pricing, etc.) brought to the conclusion that from December 2001 to October 2002 the strictly defined changeover contribution to the inflation rate was comprised between 0,2 and 0,8 percentage points¹¹.

The recent analyses produced within the ECB’s Inflation Persistence Network (IPN), based on a huge set of price microdata from a large number of EU countries, have acknowledged that increases in the frequency of price changes were related to the euro-cash changeover (Angeloni et al. (2004), Dhyne et al. (2004)). In particular, referring to Italian experience, Veronese et al. (2004) show that the euro cash changeover implied an increase of the frequency of price changes in the months across the conversion to the euro. The aim of IPN was anyway monetary policy oriented and the gap between consumer perception and official inflation rate was not at stake. This notwithstanding, IPN works paved the way for a deeper analysis of microdata and elementary indices.

In their survey of the Italian gap issues, Del Giovane and Sabbatini (2004) underline two sets of factors which can in part justify misperceptions. On one side, they notice the higher growth rate from year 2001 of the prices of the products more frequently bought by consumers with respects to the rest of CPI basket. On the other side they highlight the increase in relative price variability that took place in coincidence with the changeover. In their analysis, the authors use an almost complete

¹⁰ This exercise reproduces with reference to monthly changes, the methodology used recently in Indis (2004), where yearly rates of change are used in order to demonstrate the sensitiveness of BPT indicator to elementary indices’ variability. In our version, the monthly values of BPI have been roughly seasonally adjusted with a 13 terms moving average, centred on the reference month.

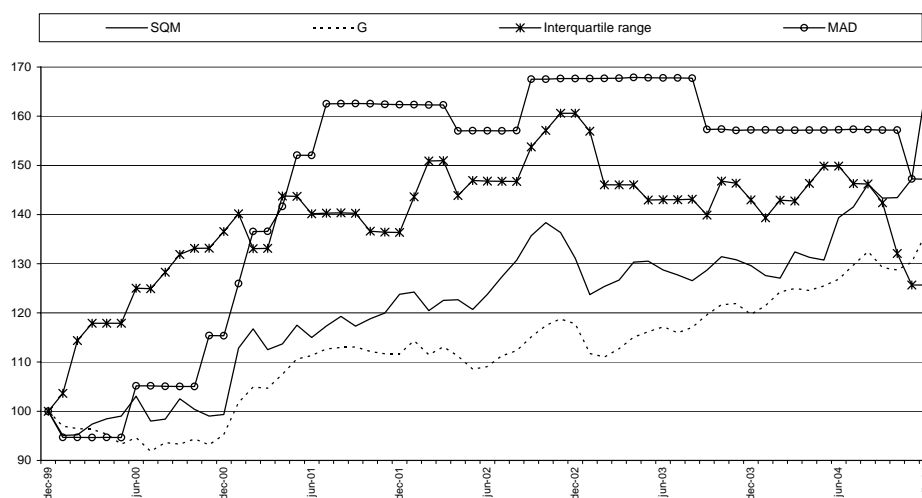
¹¹ Other studies have used independently collected price quotations related to a limited number of sectors (e.g. restaurants) in order to focus on the effects induced by the changeover on pricing behaviour in imperfectly competitive markets. See for example Gaiotti and Lippi (2004).

set of Istat's CPI elementary indices and a subset of price quotations concerning 48 goods and services. The authors identify a sharp increase in the dispersion of the inflation rates of elementary indices in the first quarter of year 2002 and at the end of year 2003, while the general inflation rate has been extremely stable across that period.

In Istat (2005) it is argued that the increase in relative price variability took place at the beginning of year 2001. That change appears somewhat structural, since a higher variability (with respect to year 2000 and before) continued to characterise elementary price indices during all year 2004. A wide set of variability indicators has been applied to the whole set of Istat elementary indices from 1999 to 2004, and to their monthly changes. All of them show a sharp increase in the first months of year 2001, and Graph 5 reports some results obtained examining monthly rates of change.

Graph 5

Variability indicators of elementary index monthly rates of change - Years 1999-2004 (Weighted values. 12 terms moving averages. Index numbers. Base: average 1999=100)
(Source: Istat, Consumer price survey)



The indicators based on the measurement of average deviations from the mean (standard error) or among observations (G index) grow steadily in all the period considered: after a first variability level shift at the beginning of 2001, they show a relative peak in the third quarter of 2002. The one based on median average differences (MAD) records a stronger increase in variability during 2001, and a slow decline in 2004.

Something similar happens to the indicator based on the interquartile range, which records an increase in variability since 2000, reaching a peak at the end of year 2002. According to all these indicators the increase in variability is remarkable, and its maximums range between a 20% to 70% increase with respect to 1999 averages. In particular, the stronger increase in the median absolute differences and in the interquartile range suggests a remarkable diffusion of price increases among products situated in the central classes of the monthly changes distribution.

Other evidences emerge from a deeper analysis of elementary price index behaviour. In 1999 and 2000, elementary price indices moved on average seven month out of twelve (Table 1)¹². From year 2001, the average number of movements has increased to eight months out of twelve, marking thus

¹² In this work, the yearly cycles of unchained elementary indices have been considered. Each index in year t is based on December year t-1. All such elementary indices are rounded by Istat at the first decimal point. This means that all the movements of elementary indices are discrete movements, and correspond to a natural number multiple of the minimum step (that is 0,1). The identification of an index movement takes place thus on the basis of this discrete step, with a 0,1% sensibility for an index whose starting value is 100.

a discontinuity with respect to preceding years which has been maintained until year 2004. From 1999 to 2004 the probability for an elementary index to show a monthly change increased from 59,7% to 65,1%.

Table 1

Frequency and amount of elementary price index monthly absolute changes, by year and type of change - Years 1999-2004 (Total annual average values, weighted and unweighted) (a)

YEAR	TYPE OF CHANGE (d)					
	Total		Increases		Reductions	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
<i>FREQUENCY (b)</i>						
1999	7,0	6,6	5,6	5,4	1,4	1,2
2000	7,2	6,8	6,4	6,0	0,9	0,7
2001	8,0	7,3	7,2	6,3	0,9	1,1
2002	8,1	7,4	7,2	6,5	0,9	0,9
2003	7,9	7,3	6,9	6,4	0,9	0,9
2004	7,8	7,6	6,2	6,0	1,6	1,6
<i>AMOUNT (c)</i>						
1999	3,6	3,9	2,6	3,0	1,0	0,9
2000	3,7	4,2	2,9	3,5	0,8	0,7
2001	4,5	4,9	3,6	3,7	0,8	1,3
2002	4,7	5,0	3,7	3,9	1,0	1,1
2003	4,7	4,9	3,6	3,7	1,1	1,2
2004	4,9	5,4	3,3	3,7	1,6	1,7

Source: Istat, Consumer price survey, Years 1999-2004

(a) For each year they have been considered all elementary indices based on december of the preceding year. Indices and weighing are those used in the computation of the NIC index.

(b) Average number of the months in which indices showed a monthly absolute change of at least 0,1 points.

(c) Average of the yearly sum of the absolute values of elementary indices monthly change.

(d) Total changes correspond to the average of the sum of the absolute monthly changes recorded in the twelve months of each year. Increases (reductions) indicator are computed with reference only to the cases of monthly increase (reduction). The difference between the weighted values of increases and reductions give the yearly rate of change computed in the month of december.

The frequency of index increases has experienced a remarkable growth in 2000 continuing until the peak reached in 2001 and 2002 and then decreased in the last two years. The frequency of decreases, which remained stable from 2000 to 2003, jumped in 2004, accompanying the recent deceleration of CPI.

This framework is confirmed if we examine the intensity of elementary indices' movements. The weighted average of the total yearly absolute amount of the monthly changes has passed from 3,9 points in 1999 to 4,9 in 2001, has remained stable for the next two years and then it has newly increased in 2004¹³.

It is worthwhile noticing that weighted and unweighted variability indicators show different behaviours. The unweighted average of change frequencies is systematically higher than the weighted one. Particularly from 2001 to 2003, this can be attributed to the higher propensity to move of the products with a lower individual weight, which are generally included in the Coicop divisions of food products and beverages, hotels and restaurants, recreation and culture¹⁴.

On the contrary, if we consider the absolute amount of changes, weighted averages deliver higher values: this can be explained by the presence of large price changes that take place only occasionally and that characterise products and services with higher weights, such as those included in transportations and housing Coicop categories.

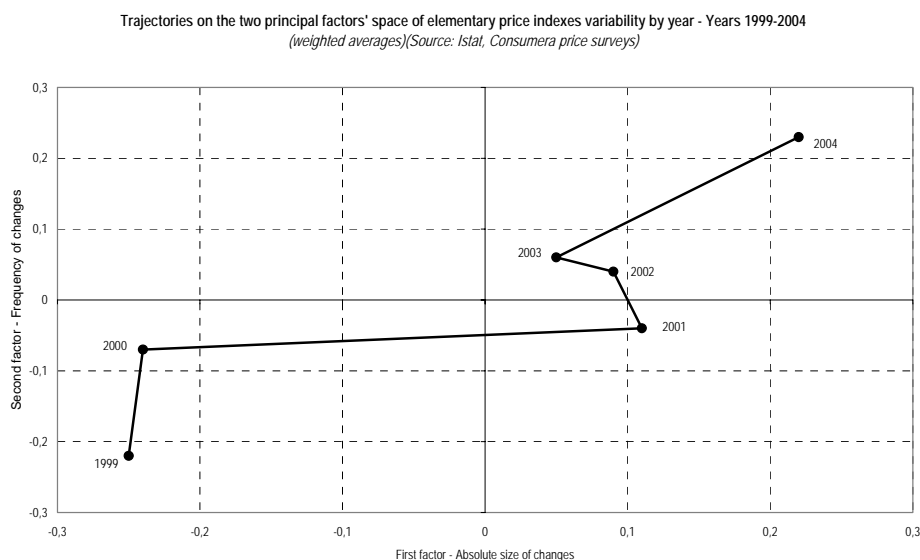
¹³ Year 2004 increase mainly concerned indices' reductions.

¹⁴ These categories are represented in CPI baskets by a relatively high number of products with relatively lower individual weights.

Principal component analysis has been used in order to synthesize all the computed variability measures¹⁵. Two principal factors have been identified, collecting two thirds of total inertia. The first represents the “absolute size of changes”, and it is positively correlated with variability measures and with the distance from the general index. The second represents the “frequency of change events” and is correlated with the frequency of monthly changes and, negatively, with the time concentration of absolute changes.

Graph 6 plots the trajectory of yearly averages on the two principal factors’ space. The passage from 1999 to 2000 is characterised by a marked movement along the second factor, and thus by an increase in the index propension to change. In 2001 it takes place a strong movement along the first factor, which can be interpreted as an increase in the absolute index variability. The following two years do not show major changes in indices’ behaviour, while 2004 records a new appreciable movement along both factors, with an increase in frequency and amount of their changes.

Graph 6



Although the increase of the relative price variability appears a good explanation of the “gap” between households’ perceptions and official CPI, it doesn’t seem to be a complete one. Methodological issues have also been considered, and they have to do with the core business of producing a good CPI. In fact, some aspects of CPI methodology may have helped the surge of the “gap” between consumer perceptions and official figures, throughout the transmissions of signals difficult to be understood and appreciated. Two cases are here briefly summarized.

The use of single references to monitor price changes of largely consumed products in each outlet ignores the supply structure of these products, and this is a drawback especially when demand is not concentrated in a few references¹⁶. Moreover, the use of the geometric mean has been introduced often without a critical evaluation, and has often been used to aggregate prices of products which are not affected by elasticity of substitution effects. Critics on this subject have underlined the possible biases induced by this procedure in elementary indices computation, especially in an environment characterised by a higher price volatility: this appears probably true, although the value of the bias does not appear necessarily positive. This critique implies the collection of larger samples for each product and new, more articulated and market-specific, sample designs, in order to detect and evaluate pricing policies’ effects. As a consequence, stratification and weighting needs to

¹⁵ That is frequency and absolute intensity of index movements, longitudinal and cross section variability measures, distance from the general index. The total data set used for this analysis contains 20 variables and more than 3.600 records.

¹⁶ Campiglio (2004)

be more widely used in the computation of elementary price indices, while actually they are usually absent.

The statistical treatment of the most volatile components, such as for example unprocessed food, has also been an other difficult ground for the comparison between perceptions and official figures. This procedures have usually conflicted with consumer perceptions, especially in the central months of 2002, characterised by exceptional price changes in agricultural products (Poggi, 2002).

4. What Istat did to improve its relationships with CPI information users

In this context, Istat has increased its efforts in order to improve the quality of the statistical information it disseminates: these efforts concerned the processes, the products, and the relationships with users.

4.1 Improving processes

In last years important improvements have been introduced in production processes. The HICP EC regulations and the ensuing internal debate have both inspired and addressed this innovative activity, suggesting the strategic lines of intervention within the framework represented by the new price indices' system introduced in 1999. The actions had the objective to improve the quality standards of the indicators, and were designed in order to respect the sustainability constraints posed by the general structure of the survey.

Istat CPI surveys are performed in two different ways. Centralised surveys are directly conducted by Istat, while territorial surveys are carried out by the statistical offices of almost ninety provincial capitals. Centralised surveys concern products having a uniform price across the country (such as tobacco, medicines, magazines, some tariffs) or subject to a continuous technological change (such as cellular phones and personal computers) or consumed independently by their location (such as a large part of tourism and transport-related services). For all the other goods, every year Istat transmits to the municipalities' statistical offices (from now on, MSO) a list of goods and services, accompanied by a precise description of the references (for example, in terms of weight and packaging characteristics). For each product, each MSO collects a number of monthly price quotes which varies according to the importance of the products, the width of the varieties offered, the population and the geographical extension of the municipality, the local characteristics of retailing, and consumer expenditure habits.

Both centralised and local surveys have been strengthened.

The first have undergone important changes, concerning organisational and technical matters, such as the sources, the number of price quotes collected, the methodologies to compute price indices. The price quotes have been increased, by means of a growth both in the number of the products surveyed and in the number of quotes per product. This improvement has been accompanied by an extension of the use of internal weighting and segmentation, and by a complete redesign of check and correction procedures. Moreover, sector-specific deepening have improved the examination of markets and products' life cycle, and contributed to improve the definition of products and the methodologies applied in specific sectors, such as cellular phones and air transportation.

For what concerns local surveys, the technological endowments of MSO have been improved, the number of municipalities involved in the survey has been enlarged, the activities of formation and control have been increased, the descriptions of the products to be surveyed have been improved, the process of data check and correction has been made more efficient.

Finally, annual re-basement activities for the production of chained indices have been particularly strengthened in all their phases, such as the revision of the basket, of the weighting system and of the sampling design. This activity regarded both centralised and local surveys.

4.2 Delivering more statistical information

As a complement to the process innovations just described, product innovations have also been introduced, whose aim has been that of increasing the supply and utility of the CPI information delivered by Istat. These innovations concern mainly three aspects: first, the increase in quantitative and analytical information monthly delivered referred to national data; second, the increase in the information delivered with reference to local data; third, the articulation of price indicators according to sub-populations.

4.2.1 Timely and detailed information on price dynamics

Istat communication policy has been directed toward the achievement of three strictly interconnected goals:

- the improvement of the completeness of the information on consumer price statistics delivered on Istat web site;
- the improvement of the accessibility by potential users to the information released;
- its timeliness.

Specifically, an area devoted to consumer price indices has been created on the web site permitting direct access to price indices of approximately 200 products that constitute the reference basket of the Italian CPI (while more than 500 elementary indices relating to basic headings can be freely obtained on request). On the same area, a link to price indices at a higher level of aggregation can be found.

In order to allow a proper use of the indices, information on price surveys and CPI methodologies has been provided with a new emphasis on the construction of elementary price indices. Besides a more technical report on the methodologies adopted by Istat, an enlarged section of “frequently asked questions” supplies basic information to potential unspecialized users.

Value added information has also been increased and differently targeted. The monthly news releases have been enriched with detailed analytical reports on the behaviour of price indices, supplying interpretative efforts based on the examination of a set of sub-indices defined according to different economic criteria. The set of sub-indices includes consumer price indexes of goods and services as well as indices calculated at a more refined level of aggregation. In particular, as far as the prices of goods are concerned, the analysis highlights the evolution of the prices of food (with reference to the distinction between processed and unprocessed goods), of energy (divided in energy goods subject to the control by local or national authority and non regulated energy goods), of tobacco and of other goods (divided into durable, other non durable and semi-durable goods). Moreover, an alternative decomposition of the aggregate of goods into grocery and non grocery goods provides a useful and complementary key to an understanding of the inflationary process. Regarding services, the distinction in regulated services and non regulated services is also considered.

Finally, to complete the set of sub-indices, an indicator of core inflation is obtained excluding by the calculation of the consumer price index its more volatile components, i.e. unprocessed food and energy goods.

For each of the sub-indices, data referring to the monthly and the annual rates of change are provided together with the moving twelve-months average rate of change and other specific measures of the evolution of prices, such as the so-called “acquired inflation” (defined as the monthly estimate of the average rate of inflation of the current year under the hypothesis that no change in the index will occur in the remaining part of the year). The analysis also supplies an estimate of the inflationary contribution of the different sub-components, defined in terms of an

additive decomposition of the annual rate of change of the all items index (see table 2 for an example).

More recently, a monthly focus on different and specific themes is also offered, in order to meet “up-to-date” short-term information demand and to improve the effectiveness of the suggested analysis of inflation.

The framework provided by the large set of data referring to the envisaged sub-indices proved to be properly suited to describe the phenomenon of the high variability of the prices of different sub-components of the consumer price index that seem to have characterised the deflationary process experienced by the Italian economy in the last two years.

Due to its timeliness, the report represents a useful source of interpretative hints. As a result, in the recent past it has been successfully feeding the economic debate on the Italian inflation on specialized and unspecialized press and on the other mass media. The statistics of accesses to the Istat web-site show that more than 3,000 connections to the report occurred in the second half of January 2005, while the peak was reached in the same period of January 2004, when the connections were more than 4,500.

Table 2

Consumer price indices for the whole population.

Base 1995 = 100. April 2005

(percentage rate of change and the effects of sub-components on the aggregate index).

sub-components	weights	apr-05 mar-05	apr-05 dic-04	apr-05 apr-04	mar-05 mar-04	effect on the annual rate of change of the aggregate index	apr-05 : may-04 apr-04 : may-03	acquired inflation
Food	166192	0,2	0,7	0,1	-0,1	-0,017	0,9	0,2
Processed food	100445	0,0	0,1	0,7	0,8	0,076	1,6	0,5
Unprocessed food	65747	0,3	1,5	-1,3	-1,5	-0,093	-0,3	-0,5
Energy goods	59776	2,7	5,0	9,7	6,9	0,543	5,0	6,5
Regulated energy goods	25643	1,3	3,8	5,2	2,6	0,132	-0,6	4,2
Other energy goods	34133	3,5	5,9	13,1	10,4	0,411	9,8	8,1
Tobacco	20830	0,1	0,1	6,9	7,1	0,145	9,7	7,3
Other goods	338943	0,1	0,1	0,4	0,3	0,132	0,5	0,3
Durable goods	111057	-0,2	-0,1	-0,1	-0,2	-0,005	-1,0	0,0
Other non durable goods	84134	0,2	-0,2	-1,2	-1,3	-0,107	0,1	-1,1
Semi-durable goods	143752	0,2	0,5	1,7	1,6	0,244	1,9	1,3
Goods	585741	0,4	0,8	1,4	1,1	0,804	1,4	1,1
Services	414259	0,1	0,9	2,6	3,0	1,112	3,0	1,8
All items ex energy and unproc. food	874477	0,1	0,5	1,6	1,8	1,464	2,1	1,2
All items	1000000	0,2	0,8	1,9	1,9		2,1	1,4

Source: Istat, CPI survey

4.2.2 Price information for national and local observatories

The impulse coming from the users and the autonomous analysis by Istat management, have contributed to set up a coherent renewing of the dissemination strategy integrated at national and local level. The local aspect of a dissemination strategy of CPI in Italy is crucial for the peculiarities of the survey that is mostly carried out by MSO. Not only data collection is carried out by MSO but also, for the time being, 30 of them disseminate autonomously inflation indices referred to local situation.

The renewed dissemination strategy by Istat consists mainly of three mainstreams:

- Widening the availability of indices on Istat web site, either at level of more disaggregated indices or at geographical level;
- Providing a common framework for the dissemination of local indices and information concerning consumer prices by MSO;
- Starting, in agreement with MSO, the dissemination of information on price levels(it is on the way, after the starting of the National Observatory, the provision Regional Observatories with data on level of prices coming from Istat survey).

Common framework for the dissemination of information by MSO

At the beginning of 2004, Istat fixed (after a previous attempt in 1998) the main rules (updated in 2005) for the direct dissemination of statistical data concerning consumer prices by MSO. The rules are resumed in a document transmitted to MSO. The document distinguishes two situations:

- MSO that disseminated autonomously local indices of consumer prices;
- MSO that do not disseminate autonomously local indices of consumer prices.

For the time being, the municipalities that disseminate local indices of consumer prices are 30: 18 in the northern regions, seven in the centre and five in the south and islands. These MSO are allowed to disseminate local indices contemporaneously with the delivery by Istat of national level flash estimates. After the release of definitive data by Istat, they are allowed to disseminate more detailed information either for indices or for prices (average, minimum and maximum price together with number of observations).

The municipalities that do not disseminate autonomously local indices, after the definitive release, are allowed to disseminate a set of them on the basis of Istat authorization, possibly also with information on price levels.

For each municipality that carries out the consumer price data collection, CPI indices at a COICOP division breakdown are published on Istat web site. Moreover, municipal indices will be disseminated only after the approval of the data by the local control commission for the consumer price survey¹⁷. If the commission does not approve the data of the current month, the indices aren't diffused and Istat will exclude the municipality from the calculation of the definitive national indices.

Dissemination of information about price levels

As far as users' needs of more detailed information on consumer prices have increased, attention has been focused on the information concerning price levels. In particular this attention has increased for the impulse of the consumers association and the government in order to monitor the evolution of consumer prices' rates of change and to adopt economic measures to dampen inflationary shocks. This growing attention has driven the setting up in January 2003 of a National Observatory (from now on referred to as NO) nearby the Ministry of productive activities to monitor prices of goods and services of large consumption.

The first step of NO activity has been the identification of a list of goods and services of large consumption (about 80), included in Istat CPI basket. Then a web site (www.maposserva.it) has been implemented in order to make available to the users a large spectrum of information coming from different sources (Istat, Nielsen, Infomercati and others).

Istat participates in the NO and, in agreement with MSO, at the end of 2004, it has made available, for about 60 of the 80 products identified by NO, the following information on price levels derived from CPI survey:

¹⁷ The activity of this commission is disciplined by the article 4 and 5 of the Italian state law n. 2421/1927.

- geometric mean of the price quotes collected;
- minimum and maximum price.

These data regard 19 regional capitals and Reggio Calabria. In order to make available an accurate information, price level data are disseminated only if they are calculated on the basis of minimum standard in terms of number of elementary observations collected for each product.

As a matter of fact, providing these data has represented an absolute innovation in the dissemination strategy of CPI information by Istat. On one hand it has increased a lot the level of transparency of Istat and MSO work in the field. On the other hand it has been necessary to avoid any misunderstanding about the data disseminated. Istat has clarified, on NO web site, that the average prices provide accurate and relevant information about each month and each town, warning that the temporal or spatial comparison has to be carried out using indices calculated by Istat. In fact information on the level of prices in one month can be referred to different brands, varieties or packaging with respect to the previous month.

Together with the NO, also Regional Observatories (RO) have been set up. In particular these activities have been implemented in Umbria, Lombardia, Toscana, Emilia Romagna, Campania and, partially, Liguria. For the time being, Istat has started providing price level data, relative to 20 provincial capitals and 11 regional capitals, to RO through its Istat's regional offices and through the NO. In the future, Istat will make available information for other municipalities (those that disseminate autonomously local indices) and will produce an effort to provide data for the same basket of NO to all the local observatories that have been set up to match consumers' requirements.

4.2.3 *Experimental price dynamics impact indicators on specific sub-populations*

Most official measures of inflation, like the Italian CPI, are aggregate indices which are based on data reflecting some representative or average household. Recently, the measurement of inflation in Italy has been at the centre of a lively debate, regarding both its size and its distributive effects over households with different consumption expenditure structure. One important issue is about the effects that inflation might have on households' standard of living.

In the face of variability in price changes, inflation as commonly measured by a Laspeyres-type consumer price index might have different effects on households with different consumption expenditure structure, for two main reasons.

There are differences in the basket of goods and services consumed. These differences may consist of

- i) a different composition of consumption at a certain level of classification - *e.g.* the twelve-division breakdown, typically used by Statistical Institutes (COICOP), or the 562 elementary aggregates of the Italian CPI basket;
- ii) different specific products¹⁸ bought by various types of households.

To exemplify, households in the upper tail of the equivalent consumption expenditure¹⁹ distribution will devote a lower fraction of their expenses to basic goods - such as food - with respect to households in the lower tail of the distribution. Moreover, the specific products purchased by high-consumption households would generally differ from the ones purchased by low-consumption households.

¹⁸ By *specific product* we denote a specific variety and brand, sold in a specific outlet in a given town.

¹⁹ The *equivalent consumption expenditure* is obtained by dividing the consumption expenditure of each household by a coefficient depending on the number of members in the household. The set of coefficients here used is called Carbonaro's equivalence scale (Carbonaro, 1985) and allows to take into account scale economies which can be made when the household size increases.

The prices at which various types of households buy the very same specific products may differ, largely as the consequence of the different outlets where purchases take place.

The identification and estimation of the impact of all these factors on the dynamics of a fixed-basket expenditure of households with different consumption structure is patently problematic (Biggeri and Leoni, 2003). It would require fresh data by means of *ad hoc* surveys.

At present in Italy, the only possible exercise with the available data is to construct consumer price indices by using different weighting systems deriving from the current Household Expenditure Survey (HES) conducted by Istat; differences in the level of these re-calculated indices for various sub-populations can be traced back to the different consumption expenditure patterns. This exercise detects the effect of different consumption structures of the kind i) above, while it forcedly neglects the role of the other potential factors just mentioned. Otherwise stated, we assume that all types of households buy the same specific products at the very same prices. It is worth pointing out that *a priori* it is unclear whether this simplifying assumption would lessen or increase the “true”, unobserved differential impact of inflation. (For instance, the propensity of low-consumption households to buy low-quality goods with lower price increase might be contrasted by their lower geographical mobility, as for the case of old people).

Issues related to the selection of sub-populations of interest are discussed in next subsection; with reference to the coverage of the HICP²⁰, weighting structures specific to some types of households are presented in the last subsection.

Selecting sub-populations

In the CPI the weights are meant to reflect the relative importance of the elementary aggregates in the total consumption expenditure of the reference population; in Italy, the weights are mainly derived from the National Accounts estimates for households’ final consumption expenditures²¹.

In order to calculate weights relating to specific sub-sectors of the whole population, the only available source is the HES, since the National Accounts do not enable to distinguish spending carried out by various types of households.

The HES is an annual survey based on a monthly random sample of approximately 2,330 households distributed over 482 municipalities. The survey is representative of all the private (non-institutional) households resident in the country and its purpose is the collection on detailed information about consumption expenditure and other demographic and socio-economic characteristics of the households. Expenditure information is recorded mainly by the household members keeping a diary record of what they spend over one week; in a final face-to-face interview the household is asked about large expenditure items, as well as housing conditions, ownership of durable goods, etc. (Further details on the sampling design and the data collection process can be found in Istat, 2004).

In order to select reference sub-populations for specific consumer price indices, it would be advisable to perform a preliminary analysis of the variability of the consumption expenditure structures. For example, a cluster analysis²² on spending data can be useful to identify the number and the characteristics of different groupings of households within the whole population. On the other hand, sub-populations of interest can be defined *a priori* to meet specific users’ requirements (*e.g.*, monitoring the elderly consumers).

²⁰ The coverage of HICP is delimited by the *Household Final Monetary Consumption Expenditure* (for further details on concepts and definitions, see Eurostat, 2001).

²¹ Additional information from production and trade statistics, government departments, producers, marketing bodies and individual enterprises are used for estimating weights at the most detailed level. Detailed HES data are used to break down the National Accounts expenditures for estimating regional weights.

²² The purpose of cluster analysis is to place objects into groups suggested by the data, not defined *a priori*, such that objects in a given cluster tend to be similar to each other in some sense, and objects in different clusters tend to be dissimilar.

Preliminary analysis of the HES data reveals that most of the variability of the household spending structures is accounted for by differences in their level of either consumption expenditure or equivalent consumption expenditure. Other important explicative, and sometimes interacting, factors are the household spending power, the employment status of the reference person²³, the household composition and size, the age of the household members. Moreover, rental for housing makes up a large proportion of total expenditure for tenant households (in Italy, approximately 18% of resident households are tenants); this suggests to calculate distinct weighting structures for tenant and owner-occupier households.

Table 4 shows some household characteristics for various sub-populations selected from the HES data. As the HES is a sample survey, the expenditure estimates are bound to be subject to sampling errors which may be relatively large for too small sub-populations.

Determining the weighting structure for a specific sub-population

To derive the weighting structure for a specific sub-population, the Consumer Price Survey and the HES are exploited at the most detailed level of classification allowed by their combined utilization.

Preliminarily, some harmonization between the two data sets is required, as the HES include payments that are outside the scope of the CPI: for example, payments related to life insurance, games of chance, owner-occupier's imputed rents, holidays abroad, etc.. These expenditure are excluded from the total used to calculate the expenditure shares that serve as the basis for estimating the HICP weights.

Next, since the HES uses a classification for types of expenditure not consistent with COICOP, it is necessary to establish a mapping between the 249 HES categories (after harmonization) and the elementary aggregates of the HICP basket.

Table 3 allows to compare, at the division level, the official HICP weights, based on the National Accounts estimates, with the weights derived from the HES data.

²³ The *reference person* is the person to whom the relationship of other people in the household is recorded.

Table 3

Weighting structure for the HICP at the division level of the *Classification of Individual Consumption for Purpose* by data source
Year 2003 (percentage composition)

division	data source	
	National Accounts	HES
Food and non-alcoholic beverages	16.60	24.14
Alcoholic beverages, tobacco	2.80	2.18
Clothing and footwear	11.22	9.09
Housing, water, electricity, gas and other fuels	9.57	12.71
Furnishings, household equipment, routine maintenance of the house	10.66	7.24
Health	3.61	4.87
Transport	13.82	13.68
Communication	3.33	2.69
Recreation and culture	7.57	6.71
Education	1.11	1.01
Restaurants and hotels	11.41	5.87
Miscellaneous goods and services	8.28	9.81
total	100.00	100.00

Some observable discrepancies between weights can be traced back partly to differences in:

- a) the reference population of households;
- b) the method of measuring certain consumption expenditures (*e.g.*, payments for insurance services).

As regards point a), the HES does not measure spending by persons living permanently in institutional households (such as retirement homes or religious institutions) and by foreign tourists - this largely explains the divergence relating to the *Restaurants and hotels* division - while includes expenditures abroad by resident households.

On the other hand, the quality of the HES estimates might suffer from non-response and from the under-reporting of some types of consumption. Some expenditures may be not reported because the products have a social stigma (*e.g.* alcohol and tobacco) or because the purchases are small or exceptional and therefore easy to forget. Moreover, although larger, estimates of expenditures on durable goods may be problematic, since they are purchased very infrequently²⁴.

²⁴ For further details on inconsistencies between the HES and National Accounts estimates see Istat (2000).

Clearly, we cannot properly compare the weights for sub-populations with the official HICP weights. Sensible comparisons can be made, instead, with the weights reported in the last column of table 3.

Table 5 gives the weighting structures, at the division level, for the sub-populations proposed in table 4.

In comparison with the whole HES reference population, all the groupings of households have lower weights for *Clothing and footwear, Transport, Recreation and culture, Education, Restaurants and hotels, Miscellaneous goods and services*, while the expenditure shares for necessities - largely included in *Food and non-alcoholic beverages* and *Housing, water, electricity, gas and other fuels* - are higher (with the exception of the *tenant households* spending a lower share of their budget for food). The weight for *Food and non-alcoholic beverages* reaches the highest level for the *one-member households with reference person aged 65 years or older not in employment*, while the weight for *Housing, water, electricity, gas and other fuels* is around 30% for the *tenant households without employed persons and with retired reference person*.

Table 4

Household characteristics by sub-population
Household Expenditure Survey - Year 2003

characteristic	1	2	3	4	5	6	all households
households in the sample	4,920	7,694	1,072	6,303	3,392	7,047	28,006
households in the universe	4,117,821	6,286,459	912,013	5,663,430	3,047,556	5,867,237	22,270,165
average monthly consumption expenditure per household (in euro)	1,704.97	1,184.83	1,198.50	1,507.38	774.20	1,049.12	1,781.98
average monthly equivalent consumption expenditure per household (in euro)	995.12	833.84	913.71	1,057.38	774.20	774.03	949.34
average number of household members	2.41	1.68	1.55	1.00	1.00	1.55	2.58
average surface per dwelling (in m ²)	77.29	91.98	71.19	81.50	81.78	89.16	99.15
average number of income receivers per household	1.39	1.34	1.23	0.98	0.99	1.31	1.57
average number of income receivers per number of household members	0.70	0.87	0.87	0.98	0.99	0.89	0.71

sub-population:

- 1 Tenant households
- 2 Households without employed persons and with retired reference person
- 3 Tenant households without employed persons and with retired reference person
- 4 One-member households
- 5 One-member households with reference person aged 65 years or older not in employment
- 6 Households without employed persons and with reference person aged 65 years or older

Table 5

Weighting structure at the division level of the Classification of Individual Consumption for Purpose by sub-population
Household Expenditure Survey - Year 2003 (percentage composition)

division	1	2	3	4	5	6	all households
Food and non-alcoholic beverages	22.68	29.57	26.13	24.72	33.15	31.40	24.14
Alcoholic beverages, tobacco	2.51	2.10	2.04	2.16	1.61	1.95	2.18
Clothing and footwear	7.29	6.68	5.14	7.82	5.82	6.08	9.09
Housing, water, electricity, gas and other fuels	24.72	15.56	30.11	18.36	20.06	16.60	12.71
Furnishings, household equipment, routine maintenance of the house	6.01	7.29	5.92	7.26	7.60	7.26	7.24
Health	3.74	7.51	6.14	5.18	7.97	7.96	4.87
Transport	11.60	9.92	7.52	10.27	4.48	8.60	13.68
Communication	2.51	2.90	2.76	2.96	3.34	2.97	2.69
Recreation and culture	5.41	5.48	4.04	6.24	4.80	5.00	6.71
Education	0.53	0.30	0.15	0.26	0.01	0.12	1.01
Restaurants and hotels	5.00	3.82	3.00	5.85	2.83	3.39	5.87
Miscellaneous goods and services	7.98	8.89	7.05	8.91	8.34	8.67	9.81
total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

sub-population:

- 1 Tenant households
- 2 Households without employed persons and with retired reference person
- 3 Tenant households without employed persons and with retired reference person
- 4 One-member households
- 5 One-member households with reference person aged 65 years or older not in employment
- 6 Households without employed persons and with reference person aged 65 years or older

4.3 The involvement of users in innovative processes

Traditionally, NSIs periodically revise their surveys and the indicators they produce, and sometimes these revisions are extremely deep. The objective is to update the indicators, in order to follow and monitor adequately the changes that take place in the economic and social system. In the case of CPI it appears necessary a revision of Istat system of indices, and this should be interpreted all along the developments oriented at obtaining a higher quality of processes and products.

The revision should concern definitions, classifications, survey design, data collection, data processing, the methodologies by which elementary indices are derived, and the choice of the indicators. All this in order to adequate price statistics to the demand for statistical information coming from international organisations and national users.

The reasons why of this revision can be attributed in part to general aspects and in part to specific needs which emerged in the last years. In particular, they concern:

- the acceleration of the European harmonisation process in price statistics;
- the evolution of the national demand for statistical information on CPI;
- the evolution of the methodologies and the development in the use of sources for the construction of CPI.

In order to involve in the evaluation of these deep innovations all the principal entities and the experts on CPI matters, a CPI Commission has been recently formed, whose membership has been enlarged to representatives of universities, ministries, social stakeholders and consumer associations.

This Commission is actually examining two principal groups of problems.

Types, characteristics and objectives of a CPI.

Satisfying a growing demand of CPI information implies the need to evaluate a wide set of aspects connected with a redefinition of the system of the indices. This evaluation is constrained by the need to respect HICP criteria, as defined in EC regulations. This calls for a change in the national laws that in Italy regulate CPI production and use: these laws regulate the use of the CPI for specific purposes, such as indexing specific incomes. Moreover, it seems necessary to evaluate the opportunity and the feasibility of the production of indices able to satisfy the information needs of users and social stakeholders. It is necessary then to examine some conceptual and methodological aspects which lay behind the definition of particular indices, such as those concerning subsets of products, sub-populations and geographical areas (both time and spatial indices).

Statistical methods adopted for data collection and indices' computation

A wide set of aspects are concerned here. In particular they have to do with the methodologies to select sampling units, the treatment of the data collected, the aggregation of elementary data, and so on.

This activity is extremely important. Istat purpose is to discuss and share with users all the choices concerning the future of all those pieces of statistical information, such as CPI, that appear extremely important for a democracy.

References

- Angeloni I., Aucremanne L., Ehrmann M., Gali J., Levin A., Smets F., (2004), Inflation persistence in the euro area: Preliminary summary of findings. *ECB Conference Inflation Persistence in the Euro Area*, Frankfurt am Main 10-11 December.
- Biggeri L., Leoni L. (2003). "Families of indices for different purposes", *Joint UNECE/ILO Meeting on Consumer Price Indices*, Geneva, december 2003.
- Biggeri L. (2004). "Principi e caratteristiche della statistica ufficiale tra passato e futuro", VII Conferenza nazionale di statistica, Roma, novembre 2004.
- Campiglio, L. (2004), Il differenziale d'inflazione dell'Italia e la spirale prezzi-prezzi, in *Prezzi, reddito reale e qualità della vita*, Collana Sintesi 34, IRER, luglio.
- Carbonaro G. (1985). "Nota sulle scale di equivalenza", in Commissione di indagine sulla povertà e sull'emarginazione, (1985). *Primo rapporto sulla povertà in Italia*. Istituto Poligrafico e Zecca dello Stato, Roma.
- Chiti M. P. (2004). "Istituzioni e regole della statistica ufficiale", VII Conferenza nazionale di statistica, Roma, novembre 2004.
- Del Giovane P., Sabbatini R., (2004), L'introduzione dell'euro e la divergenza tra inflazione rilevata e percepita. *Temi di discussione*, n.532, Banca d'Italia.
- Dhyne E., Álvarez L.J., Le Bihan H., Veronese G., Dias D., Hoffman J., Jonker N., Lünemann P., Rumler F., Vilmunen J., (2004), Price setting in the euro area: Some stylised facts from individual consumer price data. *ECB Conference Inflation Persistence in the Euro Area*, Frankfurt am Main 10-11 December.
- ECB, (2003), Recent developments in euro area inflation perceptions. *Monthly bulletin*, October.
- EU, (2004), *The joint harmonised eu programme of business and consumer surveys user guide*, European Commission Directorate general economic and financial affairs, Economic studies and research, Business surveys
- Eurostat (2001). *Compendium of HICP reference documents, Working documents 2/2001/B/5*, Office for Official Publications of the European Communities, Luxembourg.
- Gaiotti E., Lippi F., (2004), L'introduzione dell'euro e le politiche di prezzo: un'analisi su un campione di dati individuali nel settore della ristorazione. To be published on *Temi di discussione*, Banca d'Italia.
- Gallo G. M., Velucchi M., (2005), Percezioni e fondamentali: strabismo? Qualche considerazione (critica) sul paper Marini, G., A. Piergallini e P. Scaramozzino (2004), www.lavoce.info, 18 aprile
- Guiso L., (2003), Inflazione percepita e rilevata, www.lavoce.info, 16 ottobre.
- Indis, (2004), Come si forma la percezione di inflazione: una rassegna delle interpretazioni. *Tendenze dei prezzi*, n.84-85 (dicembre), p.13-15
- Istat (2000). *Le nuove stime dei consumi finali delle famiglie secondo il Sistema europeo dei conti SEC95, Metodi e Norme*, n° 7, Istituto Nazionale di Statistica, Roma.
- Istat (2002), Il comportamento dei prezzi nella fase di transizione dalla lira all'euro. *Rapporto annuale 2001*, pagg. 32-33.
- Istat (2003), Caratteristiche del processo inflazionistico nell'anno dell'introduzione dell'euro. *Rapporto annuale 2002*, pagg. 64-79.

- Istat (2004). *I consumi delle famiglie – Anno 2002, Annuario, n° 9*, Istituto Nazionale di Statistica, Roma.
- Istat (2005), La variabilità degli indici elementari dei prezzi al consumo dal 1999 al 2004. *Rapporto annuale 2004*, pagg. 42-44.
- Marini G., Piergallini A., Scaramozzino P., (2004), Inflation Bias after the Euro: Evidence from the UK and Italy. *Research paper DP50*, Cefim, University of London.
- Nordhaus, W. D., (1998), Quality Changes in Price Indices. *Journal of Economic Perspectives*, Winter, 59–68.
- Poggi P., (2002), Perché l'inflazione percepita dai cittadini a partire dai mesi estivi è risultata molto più alta di quella reale?. In: *L'euro tra inflazione percepita e politiche di pricing*. Ufficio di statistica del Comune di Milano.
- Veronese G., Fabiani S., Gattulli A., Sabbatini R., (2004) Consumer price behaviour in italy: Evidence from micro cpi data. *ECB Conference Inflation Persistence in the Euro Area*, Frankfurt am Main 10-11 December.