

ECONOMIC STATISTICS

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Module 2

Price Indices and Measuring Inflation

Lecture 3

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Topic

Measuring Inflation

“Consumer price inflation is the persistent increase, over time, in the general level of prices of goods and services purchased by households, typically measured by the Consumer Price Index (CPI)”.

Economic and monetary policy authorities need an indicator that is updated frequently (monthly).

International practice is to measure the inflation rate (the percentage change in the price level from one period to the next) on the basis of the Consumer Price Index.

The index measures strictly speaking, the price dynamics of households’ final consumption arising from monetary transactions.

At present, Italy has three consumer price indices produced by ISTAT: the National Index for the Whole Community (NIC), the Index for Households of Manual Workers and Employees (FOI), and the EU 'harmonised' index (HICP).

NIC measures inflation for the economy as a whole; FOI refers to the consumption of households whose reference person is an employee (manual worker/employee); and IPCA (HICP) was developed to ensure an internationally comparable measure of inflation at European level and is used for the conduct of European monetary policy.

All three indices (calculated using the Laspeyres formula with December of the previous year as base period, and published with the reference base 2025=100) are built from a single survey of elementary prices, but they differ in coverage, calculation methodology and weighting structure.

NIC and IPCA (HICP) refer to the total population, whereas FOI refers only to households whose reference person is a manual worker or an employee.

IPCA differs from the other two indices because, on the basis of an EU agreement, its basket of products excludes certain items that are not very comparable across Europe (for example, lotteries and services related to life insurance).

NIC and FOI always consider the full list (selling) price, whereas IPCA refers to the price actually paid by the consumer (for example, in the case of medicines). In addition, IPCA also takes account of temporary price reductions (sales and promotions).

These indicators are released in provisional form at the end of the reference month and in final form 15 days later.

The so-called ‘basket’—the list of products whose prices are collected for consumer price measurement—is updated every year, alongside improvements in survey techniques and revisions to the weights. (chain index)

In the 2024 basket used to calculate the NIC and FOI indices there are 1,915 elementary products (1,855 in 2023), grouped into 1,045 homogeneous products, which are in turn collected into 425 aggregates.

For the calculation of IPCA (HICP), the basket includes 1,936 elementary products (1,906 in 2023), grouped into 1,064 homogeneous products and 429 aggregates.

The system of consumer price statistics makes it possible to calculate not only indices that measure inflation, but also indicators that capture other important aspects of inflationary processes, which are highly relevant for monetary policy.

For example, the monthly publication of specific indices on the price movements of high-frequency purchases (food, fuels, etc.), representative of the consumption of households with different spending capacity (from the least well-off to the most well-off), makes it possible to assess the differing impact of inflation on specific product categories and across different types of household.

The overall rise in consumer prices—measured by IPCA (HICP)—observed between 2019 and 2023 amounted to 21.7% for the first group (low consumption capacity) and 15.7% for the fifth group (high spending capacity) — year-on-year percentage change.

This is a useful indicator of the social effects of inflation depending on the cyclical phase experienced by the economic system.

Consumer price indices can be affected by “anomalous” movements in some prices, which are sometimes due to occasional factors and may have only a temporary effect.

Core inflation indicators are also important. They are obtained by excluding the most volatile components (food and energy products). Core inflation makes it possible to measure the impact of short term factors and/or the build up of pressures that point to inflation becoming more persistent.

Comparing the overall index with the core component (core inflation) highlights the role played by volatile items (energy and food).

For example, after the late 2022 peak triggered by the energy crisis linked to the conflict between Russia and Ukraine, the overall HICP (IPCA) index rose by 0.9% compared with the previous year, while the core component increased by 3.1%—a sign of inertia in the inflation process, due to lagged effects on service prices, following the earlier sharp rise in energy prices.

Specific indices are also used to explain the phenomenon of so-called ‘perceived inflation’, which in some phases of the cycle can differ markedly from the officially measured rate.

The gap between actual and perceived inflation appears largely due to changes in the prices of products purchased more frequently versus those with a high unit value and more subject to technological innovation (cars, phones, computers, etc.), whose prices tend to fall over the long run. The availability of specific indices for different product types can therefore help to explain this phenomenon.

Prices increased in different ways in the period immediately following the introduction of the euro between 2001 and 2015; more recently, in 2023, with an 8.1% change in the overall NIC index, the prices of high-frequency purchases rose by 7.3%, those of medium-frequency purchases by 11.8%, and those of low-frequency purchases by 3.0%.

Deflation

Inflation is a factor that makes the unit of account non-homogeneous over time and prevents comparisons over time of economic aggregates (GDP, output, consumption, turnover) expressed in current money and therefore with different purchasing power.

One solution is to strip current monetary aggregates observed at different times of the effects arising from changes in prices. This operation is called 'deflation'. Price and production indices perform this function and can be used for this purpose.

At the end of the operation, monetary aggregates are expressed at constant prices after selecting the reference base year.

To compare the values of an economic aggregate at two points in time, it is therefore necessary to remove the changes due to price movements.

Suppose we want to deflate monetary amounts representing flows of goods and services that can be expressed as the sum of products of unit prices and quantities (output, consumption, turnover, investment). The procedure can be direct or indirect.

If we want to deflate an aggregate that can be expressed as the product of a quantity (produced, consumed, labour input, etc.) and a unit price,

$$\sum p_t q_t$$

we can proceed directly: multiply current quantities by the prices of the chosen reference year (base year), obtaining the value of the aggregate at constant prices.

$$\sum p_0 q_t$$

If we do not have information on quantities, we can proceed indirectly by dividing the aggregate valued at current prices by a measure of the change in prices between the base period and the current period. This measure is given by an appropriate price index for the period considered.

The index number can therefore be thought of as a temporal exchange rate that allows money in the base period to be converted into money in the current period.

Example: comparing values across different years.

In general, if V_t denotes the value of a good at time t and V_s its equivalent value at time s , and if the corresponding price indices at times t and s are expressed on the same reference base b (I^b_t and I^b_s), then the value expressed at constant prices (base year) is obtained as:

$$V_s = V_t \frac{I^b_s}{I^b_t}$$

The reliability of constant-price (i.e. real) valuations of the deflated aggregate depends on the reliability of the measure of price change, which is not the same for different goods and economic aggregates.

To choose the most appropriate index for deflation, it is necessary to assess which price statistic is available.

ISTAT publishes producer price indices for around one hundred 'homogeneous groups', consumer price indices by expenditure division, and indices linked to the labour force survey (wage indices, labour cost indices).

Example: In September 2008, Mario's net monthly wage amounts to €1,000 and has remained unchanged since January 2005.

How has his purchasing power changed?

Mario's net wage of €1,000 in September 2008 is equivalent to €908.83 in January 2005 prices,

$$1000 \frac{125,6}{138,2} = 908,83$$

where 125.6 is the NIC value in January 2005 and 138.2 is the NIC value in August 2009.

In real terms, his monthly wage has fallen by €91.17, corresponding to a 9.1% decrease in his purchasing power.