Methodological Notes of the Historical Statistical Series: Prices and Inflation

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Consumer Price Index (CPI)

The Consumer Price Index (CPI) is a measure of price changes of a market basket of goods and services representative of household final consumption. Inflation is defined as the percentage change in the CPI between two periods.

The CPI in Colombia is calculated monthly by the National Administrative Department of Statistics (*Departamento Nacional de Estadística-DANE* in Spanish).

The series presented in this repository includes the price indexes for low- and middle-income for the period between 1923 and 1997, and the total national price index from 1954 to the present, as well as disaggregation by city, other sub-baskets that respond to thematic disaggregation, and measures of underlying inflation such as food, non-food and nonregulated, core 15, non-food, goods, and services.

Precedents for the CPI include the design and production of a price index carried out by *Banco de la República* (the Central Bank of Colombia) in 1923 and the calculated index of the Office of the Comptroller General of Colombia (CGC), which assumed the functions of structuring the country's official statistics, which was built from the survey of working class expenditures in Santafé de Bogotá (1937), and later expanded its coverage with surveys in Medellín (May 1938), Bucaramanga (September 1945), Barranquilla (October 1946), and Manizales (October 1947).

Then, since 1954, the design and production of the CPI was entrusted to DANE. However, it was not until 1968 when, through Decree 3167 of December 26, it was explicitly ordered that DANE should "establish price indexes at the producer, distributor, and consumer levels, of the main goods and services, carry out the survey and periodically publish the summary of the results obtained" (Chapter I, Article 2, paragraph J).

Since then, the CPI has been calculated by DANE with regular methodological updates, which have been carried out every 10 years since 1979. This ensures that its production complies with international recommendations and standards and seeks to keep the basket of goods and services on which prices are taken updated in accordance with the consumption pattern of households.

The following is a summary of the different methodological updates implemented by DANE, the survey with which the base basket was constructed, and the coverage of the statistical operation:

Period: July 1954 to December 1978

Base: July 1954 - June 1955 = 100

Baseline survey: Household Income and Expenditure Surveys (Encuestas de Ingresos y Gastos - EIG, in Spanish), conducted in August 1953 in Bogotá, and in October 1953 in Medellín, Cali, Barranquilla,

Bucaramanga, Manizales, and Pasto

Coverage:

a) Geographical: the population of seven cities was included: Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, Manizales, and Pasto. The criteria used to select these cities were: income level, population density, climate, and location.

b) Socioeconomic: the households in the cities surveyed were stratified into two major occupational categories: those whose head of household was an employee and those whose head of household was a worker.

The socioeconomic classification considered: the occupational category of individuals, the occupational position of family members determined by the presence of physical or intellectual work, the training required to perform the position, functions, and the standard of living measured by housing conditions. The following were excluded from the measurement: self-employed workers, non-family groups, and households composed only of adults.

Period: from January 1979 to December 1988

Base: December 1978 = 100

Baseline survey: Income and Expenditure Survey (EIG) conducted in 1970 for the country's seven major cities.

Cobertura:

a) Geographical: the information is representative of the population of seven cities: Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, Manizales, and Pasto.

b) Socioeconomic: the 1970 EIG revealed that expenditure structures depended to a greater degree on the household income level than on occupational categories, which is why the previous classification of worker and employee was replaced by the classification into low- and middle-income, without including high-income households in the index.

Single-person, collective, and high-income households were excluded from the reference population.

Period: from January 1989 to December 1998

Base: December 1988 = 100

Baseline survey: Income and Expenditure Survey (EIG) conducted between March 1984 and February 1985.

Coverage:

a) Geographical: the population of thirteen cities and their respective metropolitan areas or zones of influence was included: Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, Manizales, Pasto, Pereira, Cucuta, Monteria, Neiva, Cartagena, and Villavicencio.

b) Socioeconomic: the reference population was defined as all private households located in the urban areas of the thirteen cities included in the basic survey. Single-person, collective, and high-income households were excluded.

Considering that household income is the determining variable of the expenditure structure, the CPI continued to use two distinct groups between low- and middle-income.

Period: from January 1999 to December 2008

Base: December 1998 = 100

Baseline survey: National Income and Expenditure Survey (ENIG in Spanish) of 1994-1995, collected between March 1994 and February 1995.

Coverage:

a) Geographical: included the population of 13 departmental capital cities, adding the municipalities of some metropolitan areas: Bogotá; Medellín with Bello; Envigado and Itagüí; Cali and Yumbo; Barranquilla and Soledad; Bucaramanga with Floridablanca and Girón; Manizales and Villa María; Pasto; Pereira and Dosquebradas; Cúcuta; Los Patios; El Zulia and Villa del Rosario; Cartagena; Montería; Neiva and Villavicencio.

b) Socioeconomic: the reference population was defined as all households located in the urban area of thirteen cities; single-person and collective households were excluded. The CPI-98 defined three distinct income groups: middle, low, and high.

The methodological revision applied since 1999 stands out for the change in the production and dissemination system of the index (including a fixed and a flexible level that enables faster updating of the basket for price monitoring), the calculation method (using the geometric average), and the use of models to define implicit quality adjustment.

Period: from January 2009 to December 2018

Base: December 2008 = 100

Baseline survey: National Income and Expenditure Survey (ENIG), collected between October 2006 and September 2007.

Coverage:

a) Geographical: included the population of 24 departmental capital cities, adding some municipalities of influence: Bogotá; Medellín with Bello, Caldas, Sabaneta, Envigado, and Itagüí; Cali and Yumbo; Barranquilla and Soledad; Bucaramanga with Floridablanca, Piedecuesta, and Girón; Manizales and Villa María; Pasto; Pereira and Dosquebradas; Cúcuta, Los Patios, El Zulia, and Villa del Rosario; Montería; Neiva; Cartagena; Villavicencio; Riohacha; Armenia; Quibdó; Sincelejo; Valledupar; Popayán; Ibagué; San Andrés; Santa Marta; Tunja and Florencia.

b) Socioeconomic: the reference population was defined by the group of households located in the urban area of 24 cities; single-person and collective households were excluded. The CPI-08 continued to define three distinct income groups: middle, low, and high.

Period: from January 2019 to date

Base: December 2018 = 100

Baseline survey: National Household Budget Survey (ENPH in Spanish), collected between July 2016 and July 2017.

Coverage:

a) Geographical: Thirty-two departmental capital cities and twenty-four municipalities of influence.

Capital cities: Medellín, Barranquilla, Bogotá, Cartagena, Tunja, Manizales, Florencia, Popayán, Valledupar, Montería, Quibdó, Neiva, Riohacha, Santa Marta, Villavicencio, Pasto, Cúcuta, Armenia, Pereira, Bucaramanga, Sincelejo, Ibagué, Cali, Arauca, Yopal, Mocoa, San Andrés, Leticia, Inírida, San José del Guaviare, Mitú, and Puerto Carreño.

Municipalities of influence: Bello, Barbosa, Caldas, Copacabana, Envigado, Girardota, Itagüí, La Estrella, Sabaneta, Villa María, El Zulia, Los Patios, Villa del Rosario, Floridablanca, Girón, Piedecuesta, Dosquebradas, La Virginia, Rionegro, Soledad, Tumaco, Barrancabermeja, Buenaventura, and Yumbo.

Source: General methodology Consumer Price Index (CPI), DANE; construction, *Banco de la República*.

In 2019, the latest update includes the implementation of the classification of individual consumption by purpose (COICOP), the inclusion of expenditures of single-person households, the expansion of coverage to 32 departmental capitals and 24 municipalities of influence, and the updating of weightings of the goods and services that comprise the monitoring basket.

Since the CPI seeks to explain the change in the price level exclusively, for the calculation of the publishable indexes, it uses an index of fixed weights called the Laspeyres, which basically, as mentioned by DANE in the CPI methodology, seeks to answer the question "By how much does the purchase value of a basket of goods and services increase or decrease, if the purchase amounts of the first period are fixed?", and thus, "The changes that may occur in the purchase value are assumed as effective price variations."

At this point, it should be clarified that the CPI has two levels of aggregation: the fixed level and the flexible level.

The fixed level corresponds to the publishable indexes, that is, those corresponding to geographical domains, by income levels, and to the aggregation structure of goods and services in subclass, class, group, division, and total; on the other hand, the level of flexible weights applies to the items and varieties that comprise the subclasses and that are not public.

For more information, please refer to the CPI methodology.

References

National Administrative Department of Statistics (DANE), 2019. General methodology consumer price index (CPI).

Inflation target

Monetary policy in Colombia aims to keep inflation low and stable and to reach the maximum sustainable level of output and employment. In this way, monetary policy complies with the Constitution's mandate to maintain the peso's purchasing power and contributes to improving the population's welfare.

Banco de la República follows an inflation targeting scheme in a flexible exchange rate regime to achieve its objectives. Under this scheme, monetary policy actions aim to bring future inflation within the target set in the policy horizon. In Colombia, since 1993, per the provisions of Law 31 of 1992, the Board of Directors of *Banco de la República* (BDBR) sets the inflation target. As of 2003, a specific value is defined as an inflation target and an admissible range.

This target refers to consumer price inflation, which is statistically measured as the annual variation of the Consumer Price Index (CPI).

In this repository, you will find a historical series of the inflation target that BDBR has set since January 1993.

For more information, please visit our website on the inflation target strategy.

Producer Price Index (PPI)
The Producer Price Index (PPI) is an indicator of the evolution of the producer's sales prices, corresponding to the first channel of commercialization or distribution of goods traded in the economy.

This indicator aims to study the performance of product prices from the moment they enter the commercialization channels within the country's productive structure. This helps to detect potential inflationary pressures and track the evolution of prices in the country's economic activities, excluding the services sector.

The PPI information included in *Banco de la República*'s 100-year anniversary publication corresponds to that published by the National Administrative Department of Statistics (DANE) with the latest methodology in force since 2015. This index has national coverage, is based on December 2014 = 100, and presents several disaggregations.

On the one hand, there is the PPI of Domestic Supply, which exhibits the evolution of the prices of both produced and imported goods that are part of the country's domestic supply. Moreover, this is the most widely used index for analyzing the behavior of product prices within the country's economy.

In addition to the PPI for Domestic Supply, DANE calculates the PPI for domestic production, exhibiting the evolution of the prices of goods produced in the country for both domestic consumption and exports. The PPI can be analyzed by economic activity (agriculture, forestry, and fishing; mining and manufacturing industry), by the origin of goods (produced and consumed, imported, exported, exported without coffee), and by economic destination (intermediate consumption, final consumption, capital goods, and construction materials).

To calculate the PPI, DANE monitors the prices of a representative set of products to be traded when the first exchange of such product occurs in the production chain. For this purpose, DANE obtains information from producing and trading establishments engaged in the economic activities of agriculture, livestock, hunting, forestry, fishing, mining, and industrial activities located within the national territory. These companies are selected according to the products they produce or market and their ability to provide clear and timely information.

Currently, the PPI is calculated and published by DANE, however, this was not always the case. In 1948, *Banco de la República* constructed the wholesale price index for general commerce (WPI), which aimed to study the behavior of wholesale commerce prices for the city of Bogotá and a group of articles representative of the agricultural, forestry, mining, manufacturing, and energy sectors. From 1951 on, the coverage expanded to include 9 cities and more articles, according to SITC (Standard International Trade Classification). From 1970 to 1990, *Banco de la República* calculated the WPI, base 1970=100, with national coverage, including 14 cities, using the ISIC (International Standard Industrial Classification of All Economic Activities), SITC, and Foreign Trade Classification by Economic Use or Destination (CUODE in Spanish). In 1990, the WPI was replaced by

the PPI. This new index included the prices of products sold by producers and wholesale distributors and aimed to study the evolution of prices of a basket of goods representative of the domestic supply of the economy in the first stage of commercialization.

In 1999, the PPI was redesigned to monitor the evolution of product prices on the supply side, thus excluding intermediate demand in the calculation of the aggregate index. The basket of items was updated, and the December 1999=100 base index was published. As of 2007, DANE assumed responsibility for the preparation of the PPI to provide continuity to the figures and make technical improvements in its calculation. From then on, the base index Dec2006=100 was published.

In January 2015, DANE published a new PPI with other characteristics, a new base period for comparison (December 2014=100), a new basket of economic activities, inclusion of flexible weightings at the subclass level, and improvements in the calculation methodology. Finally, DANE determined that as of January 2021, the current monthly PPI will be published as provisional data because some information sources cannot report prices for the entire month. The final figures for the previous month will be published the following month.

Information on total PPI (only in Spanish) (domestic supply and domestic production) and disaggregated by ISIC, origin, and CUODE since January 1970 is available at *Banco de la República*'s website. For the domestic supply PPI, backward splicing was performed using the annual variations of the total PPI calculated from January 1952, using the variations of the WPI until 1990.

For more information, please refer to the PPI calculation methodology. There, you will find the methodological guide, the methodological sheet, the instructions for splicing the series, the correlations and weightings used to calculate the PPI.

Real Value Unit (UVR)
The Real Value Unit (UVR in Spanish) is a daily unit of account created by Law 546 of 1999 to update the value of housing loan balances1, cin order to maintain the purchasing power of the money lent and thus ensure the sustainability of the housing credit system. This indicator is updated only with the monthly behavior of the Consumer Price Index (CPI).

This unit has been calculated since 01 January 2000. From then until 10 August 2000, it was calculated by the Technical Secretariat of the Supreme Housing Council (Secretaría Técnica del Consejo Superior de Vivienda in Spanish), when in ruling C-955/2000, it was regulated that the Board of Directors of *Banco de la República* should establish the value of the UVR. Thus, since 11 August 2000, *Banco de la República* has been calculating these values using the same methodology and calculation formula.

This methodology is described in the Issuer Report number 41 (only in Spanish)2 which, generally, establishes that

> The UVR values should be daily since mortgage loan disbursements and housing installment payments may occur daily. This fact makes it necessary to establish a methodology for calculating the UVR that allows distributing the monthly variation of the CPI in daily changes, so that, when these daily changes are accumulated, they coincide with the monthly variation of the CPI that is being applied. In other words, the change in the UVR between the 15th of a month and the same day of the previous month must coincide with the monthly change in the CPI used for its calculation.

The formula for calculating daily changes in the UVR and an example of its application can be found in this methodological note.

Before the UVR was created, there was another unit of account called UCPP (Unit of Constant Purchasing Power, UPAC in Spanish), which was initially updated only with variations of the CPI. Between 1994 and 1999, its calculation included the DTF (fixed-term deposit) interest rate in addition to the CPI.

Subsequently, Law 546 of 1999 replaced the UCPP with the UVR, which "reflects the purchasing power of the currency, based exclusively on the variation of the consumer price index certified by DANE, whose value will be calculated in accordance with the methodology established by the Economic and Social Policy Council, (*Consejo Nacional de Política Económica y Social, CONPES* in Spanish."

In addition, according to this Law, the Government would determine the equivalence between the UCPP and the UVR, as well as the transition regime between them. For this transition, the Ministry of Finance and Public Credit published the values of the UVR from 01 January 1993 to 31 December 1999 by Resolution 2896 of 1999.

The series presented in this repository has not been spliced; rather, the UVR values established by the different responsible institutions have been taken as follows:

- From 01 January 1993 to 31 December 1999: Source: Ministry of Finance and Public Credit (Resolution 2896 of 1999).
- Between 01 January and 10 August 2000, they are faithful copies of those disclosed by the Supreme Housing Council.
- As of 11 August 2000, the data refer to the values of the UVR calculated by *Banco de la República*, in accordance with the provisions of External Resolution 13 of 2000, issued by the Board of Directors of *Banco de la República*.

For further details, please refer to the UVR methodology sheet (only in Spanish).

Housing pricesUsed housing price index (UHPI)
The used housing price index (*Índice de precios de vivienda usada, IPVU* in Spanish) measures the quarterly and annual evolution of used housing prices based on the appraisal data from mortgaged properties that back the loans made by the main housing credit institutions in the country. This indicator provides insights into the performance of the housing market, considering both population and housing characteristics. It also allows to analyze supply shocks or the presence of speculative bubbles, factors that affect the equilibrium price of assets. Its monitoring assesses the valuation and trend of the real estate market and related sectors.

History of statistics
Since 2005, *Banco de la República* has been calculating the Used Housing Price Index (UHPI) with a historical base of information since 1986, initially available for the three main cities of Colombia: Bogotá, Medellín, and Cali, as well as considering some areas near these capital cities: for Bogotá, the municipality of Soacha (in Cundinamarca), and in Medellín, the municipalities of Bello, Envigado, and Itagüí.

In the case of Colombia, some guilds, public entities, or academic institutions had calculated price indicators for new housing; however, these indexes had drawbacks such as an inadequate source of information or limited coverage. Likewise, although several of these methodologies followed the evolution of the price of a "standard" house, the indexes may involve high biases due to changes in the property quality since, from one period to another, the price does not correspond to the same house. Finally, in all of them, the price refers to the offer price, and its behavior may be different from that of the final transaction. In this context, it was essential to have a measurement of used housing prices by building an index with a greater coverage and that could closely approximate transaction prices.

The data needed to construct the indicator is obtained from 6 financial institutions that offer housing loans, which since the origin of the UHPI are part of the cooperation agreement for the delivery of housing disbursement information. These are: Davivienda (Bancafé), BBVA (Granahorrar), AV Villas, Bancolombia (Conavi), Banco Caja Social (Colmena), and Colpatria.

Initially, the index considered information from the following cities: Bogotá (including Soacha), Medellín (including Bello, Envigado, and Itagüí), and Cali. In May 2014, the national index was recalculated to include information from Barranquilla, Bucaramanga, Cúcuta, Manizales, Neiva, and Villavicencio, creating a new annual indicator for other cities. This was done with a previous analysis that allowed to conclude the feasibility of adding new cities to the calculation without affecting the quality of the results.

To obtain the indicator, the weighted repeated sales methodology proposed by Case and Shiller (1989) is used. It consists of constructing the index through a three-stage econometric estimation, selecting homes sold at least twice during the study period and which have not undergone significant changes in their physical structure. To identify each property, the address and real estate registration variables are used, and the information is cross-checked to establish the variation in prices between the first and second transaction. In the absence of the exact housing price, the commercial appraisal value of the financed housing during the calculation period is used as collateral at the time of disbursement of the mortgage loan.

On a quarterly basis, only the total index is calculated, which refers to the calculation of the UHPI for the cities of Bogotá (including Soacha), Medellín (including Bello, Envigado, and Itagüí), Cali, Barranquilla, Bucaramanga, Cúcuta, Manizales, Neiva, and Villavicencio. While indexes for Bogotá, Medellín, Cali, and other cities are also presented annually, the quarterly index includes information from Barranquilla, Bucaramanga, Cúcuta, Manizales, Neiva, and Villavicencio, together with indexes for low-income housing (VIS in Spanish) and non-low-income housing (NO VIS in Spanish). More specific methodological details can be found in the UHPI methodological document (only in Spanish).

The first results of the construction of the UHPI were issued at the end of 2005. The first stage disclosed the calculation methodology and its results, in order to obtain comments from guilds, academic community, and the public. The index was calculated for the historical period 1988-2004, and its results were published on *Banco de la República*'s website in 2005. Since then, the national index is calculated and published quarterly, and the indicator by cities is published annually.

For further details, please refer to the UHPI methodology sheet (only in Spanish).

1 Currently, there are loans denominated in UVR and in pesos.

2 Issuer Report number 41: "Real value unit (UVR): background and calculation methodology." *Banco de la República*.

Fuente: https://www.banrep.gov.co/en/historical-statistical-series/prices-inflation