

## **OFFICIAL CONSUMER PRICE INDICES – HISTORICAL PERSPECTIVE**

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### **Abstract**

CPIs have been published by national statistical authorities for more than one hundred years. A number of changes has taken place in all stages on CPI compilation, including concepts definitions and methodology used in collection, compilation and publication of CPI, etc. This paper describes the changes that have taken place to date. It provides basic information about the main characteristics of national CPI over time and gradual improvements in the coverage, definitions, methods of measurement, methods of data collection, sources of data, periodicity of dissemination, etc.

### **Introduction**

The consumer price index (CPI) is one of the most important statistical indicators produced on a regular basis by national statistical agencies. It has played and will continue to play an important role in determining national economic and monetary policies and is followed closely by businesses and households, as contractual obligations, interest rates and pay are often adjusted according to CPI movements or influenced by them. Given its importance, it is not surprising that measurement issues have attracted considerable attention over the years and have been the subject of numerous discussions and conferences organised by national and international agencies.

Official CPIs have been published by national statistical authorities for more than one hundred years. In many countries the first official CPI estimates were initiated during World War I, mainly for use in wage negotiations.

The main purpose of this paper is to provide basic information on CPI estimates produced more than 100 years ago and to indicate changes that have taken place over time with regard to scope, concepts, definitions, classification and weights, sample design, data collection, computation, editing and validation procedures, and dissemination.

The information presented here was prepared on the basis of information provided by national statistical agencies or governments to the ILO over the years, and ILO records. Nevertheless, it has not been possible to cover all methodological aspects relating to the CPI for every country and for each period. It does however, describe main changes that have taken place and provide a brief overview of international standards developed over the years.

### **1910'- Origins of the official indices**

The first official CPIs were published about 100 years ago and introduced in many countries very fast.

The main purpose of the indices at that time was its use for adjusting wages to compensate for changes in the cost of living. The first indices therefore were referred to "cost-of-living" indices rather than CPIs.

In attempting to evaluate the extent to which workers were affected by price changes, it soon became apparent that many aspects of statistical methodologies used for compiling CPI suffered from a number of shortcomings.

Figures below provide basic characteristics of indices compiled around 1915. The figures show, as indicated above, a wide diversity between countries.

NUMBER OF ITEMS IN THE FOOD, FUEL AND LIGHTING, AND  
CLOTHING GROUPS FOR WHICH PRICES ARE OBTAINED FOR  
THE CALCULATION OF COST OF LIVING INDEX NUMBERS IN  
VARIOUS COUNTRIES

Country <sup>1</sup>	Food	Fuel and lighting	Clothing
South Africa	20	3	—
Germany	17	4	13
Australia	41	2 <sup>2</sup>	—
Austria	16	4	3
Belgium	33	7	25
Bulgaria	36	6	5
Canada	29	5	—
Egypt (Cairo)	20	2	*
Spain (Madrid)	19	8 <sup>3</sup>	*
Irish Free State	36	6	23
United States	43	6	54-57
Finland	14	1	2
Great Britain	20	5	8
Hungary	10	2	5
India (Bombay) : working-class index	17	3	3
European »	30	4	22
Italy (Milan)	18	—	16
Luxemburg	13	4	2
Massachusetts	37	4	17
Norway	55	—	—
New Zealand	55	7	*
Netherlands (Amsterdam)	13	—	—
Poland (Warsaw)	16	2-3	7
Switzerland	50	9	25
Tchecoslovakia	42	10	* <sup>4</sup>

— Figure not available.

\* Not included.

<sup>1</sup> In the tables given in this report the countries are arranged in alphabetical order as determined by the French names.

<sup>2</sup> Lighting. In one series of statistics items of fuel are also included.

<sup>3</sup> Including sundries.

<sup>4</sup> A separate series of index numbers is compiled, based on 14 items including textiles, boots, and men's hats.

N.B. — In addition to countries covered by the table, the index numbers in Denmark, France (Paris), Sweden, etc. include items in each of the three groups, but the numbers are not available.

**RELATIVE WEIGHTS (PERCENTAGES) APPLIED TO VARIOUS GROUPS  
OF EXPENDITURE**

Country	Date of enquiry <sup>1</sup>	Food	Rent	Fuel and lighting	Clothing	Miscellaneous
Austria (Vienna)	1921	65	1.6	14.4	19.0	—
Belgium :	1921					
Workers' families <sup>2</sup>						
Group 1		68.13	7.68 <sup>3</sup>	6.70	11.84	5.65
" 2		66.80	7.76 <sup>3</sup>	6.08	13.41	5.95
" 3		63.94	6.20 <sup>3</sup>	5.03	14.57	10.26
" 4		60.68	4.77 <sup>3</sup>	4.09	18.83	11.63
Lower middle class families :		64	9.65 <sup>3</sup>	4.82	13.81	7.72
Canada	1913	52.6 <sup>4</sup>	33.9	13.6	—	—
Denmark	1922	41.8	12.4	4.0	11.3	30.5
Egypt (Cairo)	1920	51.9 <sup>5</sup>	11.7	—	16.7	19.7
Irish Free State	1922	57.1	5.4	7.0	17.5	13.0
Finland	1908-9	55	11.8	4.1	11.6	17.5
United States	1918	38.2	13.4	5.3	16.6	26.4
France (Paris)	1914	60	12	5	15	8
Great Britain	1904 and 1912	60	16	8	12	4
India (Bombay) :	1909-					
Working class index	1914	81.7	9.1	4.9	4.3	—
European index	1923	11.3	18.5	4.3	6.8	59.1
Italy (Milan)	1913	62.09	11.4	4.51	12	10
Norway	1912-13	47.9	15.65	5.2	12.65	18.55
Netherlands (Amsterdam)	1920	49.4	7.5	4.4	17.9	20.8
Poland (Warsaw)	Post-war	50.5	6.1	8.7	20.2	14.6
Sweden	1913-14	43	15	4	12	26 <sup>6</sup>

<sup>1</sup> In the case of Austria (Vienna), Canada, and Poland (Warsaw) the weights established at the date of the enquiry were quantity weights. For the purpose of inclusion in the table these have been multiplied by the price per unit at a given date, and the total expenditure for each group expressed as a percentage of the total expenditure for all groups. The percentages given in the table for these countries, therefore, do not necessarily refer to the date of the enquiry establishing the weights. The percentages for Austria and Poland refer to the middle of 1924, and for Canada to 1913.

<sup>2</sup> The groups are for families with an income per unit of consumption of less than 20 francs per fortnight, 20 to 30 francs, 30 to 40 francs, and over 40 francs.

<sup>3</sup> Including furniture.

<sup>4</sup> Including laundry starch.

<sup>5</sup> Includes certain miscellaneous items such as mineral oil, methylated spirit, and soap.

<sup>6</sup> Including taxes.

The number of items was very limited, and in some cases restricted to food items only. Wide variations also existed especially with regard to the number of items included in other groups.

In a large number of countries the weights used in the compilation of the cost of living index numbers are based on the consumption of working class families as a whole, or of those living in industrial areas, or families of workers employed in selected important industries. The main reason for this was that such workers represented a large proportion of the consumers but also such indices were particularly appropriate for use in adjusting wage rates of these workers.

The quality and representativeness of weights were insufficient because they were either out of date or covering only part of the household consumption. The geographical coverage of price collection was limited to capital cities only. Also because of the different methodologies used across it was difficult to compare the available data between countries.

To remedy this situation, some general principles with regard to the establishment of cost of living indices were required, especially with respect of periodicity, coverage, etc. Desirability of increasing comparability and of putting into practice more uniform methods was recognised by the International Conference of Labour Statisticians held in Geneva in 1923 during its discussion of the problem of calculating real wage index numbers. The 1923 conference also recommended that the ILO should take over the collection of statistics on occupational wages and food prices in 16 capital cities, initiated by the British Ministry of Labour in order to compare levels of real wages in the different countries.

Following these requests, the Second ICLS<sup>1</sup> in 1925 adopted the first resolution concerning cost-of-living index numbers. The purpose of the resolution was to provide guidelines of best practices in developing the national CPI, and to encourage comparability to study the various aspects of labour and living conditions of workers.

As at the time of the 1925 ICLS resolution, the main reason for compiling a CPI was its use for adjusting wages to compensate for changes in the cost of living, the first set of standards therefore referred to “cost-of-living” indices rather than CPIs.

The resolution provided a number of recommendations including a statement on the purposes and nature on the index, expenditure groups for which indices should be published (food, clothing, heating and lighting, rent, and miscellaneous); sources of weights (family budgets or if not available statistics of aggregate consumption), pricing of same qualities over time, periodicity (monthly or less frequently under more stable conditions), base period (1930=100).

### **1950' - Wartime and post-war developments in methods and techniques**

Further development took place in late 1940s. The war brought changes affecting the role and function of the cost-of-living index. In some countries, attempts were made to control price movements, and administrative action was taken with a view to preventing the cost of living from rising. As the items in the index basket were originally selected on the basis of surveys to represent food consumption, it was felt that such indices were not adequate measures of changes in the cost of living.

Therefore large scale household budget surveys were conducted to reflect extensive changes in consumption habits that have taken place during and since the war. The number of items included in the basket was substantially increased as was the number of price quotations collected. Considerable efforts were made to improve the representativity, reliability and validity of price data collected, as well as to increase the frequency of data collection.

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<sup>1</sup> *METHODS OF COMPILING COST OF LIVING INDEX NUMBERS*, Report prepared for the Second International Conference of Labour Statisticians (ILO, Geneva, 1925), [http://www.ilo.org/public/libdoc/ilo/ILO-SR/ILO-SR\\_N6\\_engl.pdf](http://www.ilo.org/public/libdoc/ilo/ILO-SR/ILO-SR_N6_engl.pdf)

In many countries, separate indices were initiated and calculated for different population groups such as wage-earners, salaried employees, farmers, or the whole population. Indices were calculated for particular cities, for groups of cities, and for the country as a whole.

The terms “cost-of-living index” and “consumer price index” were usually used interchangeably as synonyms, which created some misunderstanding of the nature and use of indices.

In order to agree on the most appropriate methods for estimating changes, the 6<sup>th</sup> ICLS<sup>2</sup> in 1947 discussed various issues and adopted a new resolution concerning CPI.

The 1947 ICLS resolution defined the primary purpose of the index as measuring changes in the level of retail prices paid by consumers. It also highlighted that price quotations should reflect actual market prices. The resolution also recommended that wherever suitable, separate index numbers should be compiled for different economic and social groups, geographical areas and different family types. The Resolution also stressed the importance of public acceptance of consumer price indices.

It provided guidance on methods of keeping the index up to date (e.g. updating the weights in regular intervals), techniques for obtaining better price data (e.g. treatment of damaged goods, validation checks, training for price collectors), the treatment of black market prices, the application of sampling techniques. In order to promote understanding of the nature and use of indices of retail prices charged to a particular group, it was recommended that the term "cost-of living index" should be replaced, where appropriate, by the term "price-of-living index ", "cost-of-living price index ", or "consumer price index ".

### **1960' - Practical measurement issues**

Consumer price indices continued to play an important role in wage negotiations but increasingly for many other purposes, e.g. as general indices of the purchasing power of money, in the formulation of wage policies by governments, in the adjustment of figures relating to certain components of national income to allow for price variations, etc. In order to meet specific user needs, variants of CPI and special indices for different population groups and/or regions were compiled.

With the increasing interest in CPI, but also as a result of the evolution of national statistical services, definitions, methods of collection and tabulation of CPI were further improved. A distinction was drawn between the concept of a ‘cost-of-living index’, designed to measure the change in the cost of maintaining a given standard of living, and the concept of a ‘pure price index’ designed to measure the change in the cost of purchasing a specific set, or ‘basket’, of consumer goods and services.

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<sup>2</sup> *COST-OF-LIVING STATISTICS Methods and Techniques for the Post-War Period*, Report prepared for the Sixth International Conference of Labour Statisticians (ILO, Montreal, 1947)  
[http://www.ilo.org/public/libdoc/ilo/ILO-SR/ILO-SR\\_NS7\\_engl\\_part.2.pdf](http://www.ilo.org/public/libdoc/ilo/ILO-SR/ILO-SR_NS7_engl_part.2.pdf)

However, an examination of these methods shows that very different practices were adopted in different countries for measuring changes in the cost of living, and there is a considerable degree of incomparability between the results

Recognising the need for more accurate measurement of consumer price changes and the advantages attaching to such further standardisation of methods and procedures, a new resolution was adopted by the 10<sup>th</sup> ICLS<sup>3</sup> in 1962.

The resolution adopted by the 10<sup>th</sup> ICLS provided guidelines on the practical measurement issues that should increase the quality and accuracy of the price information. More specifically, the 10<sup>th</sup> ICLS resolution stressed:

- the importance of public acceptance of consumer price indices,
- the need to compile separate index numbers for different economic and social groups, geographical areas and different family size,
- the need to revise weights as frequently as consumption patterns show significant changes,
- the need to complement and assess validity of weights data derived from household with data from retail sales statistics, national accounts and frequent small sample surveys of family expenditures,
- the need for frequent revision of the outlet and item samples,
- the need to use more precise specifications for commodities to be priced and observing actual transaction prices paid by the consumers,
- the need to properly treat seasonal items (use of seasonally varying weights or seasonally adjusted price relatives, or both, or possible application of seasonal adjustment to the series),
- the need to include in the index cost on owner-occupied dwellings (weights derived on the basis of either reported tenant shelter expenditure, or the expenditure on operating costs).

Given the misinterpretation and confusion the term cost-of-living-indices created among users it was decided to adopt the more general term 'Consumer Price Index' which may be understood to refer to both concepts (i.e. cost-of-living index and pure price index).

### **1980' - Different CPIs for different purposes**

The CPI continued to be developed in the 1980s. During the periods 1970 and 1980 CPI were used for a wide variety of purposes and objectives and uses of CPI differed among countries. Therefore, it became clear that a single standard could not be applied universally.

It was also acknowledged that the owner—occupied housing component of CPI was one of the most complex issues in CPI measurement and that different methods yielded very different results. Therefore there was a need to clearly define the conceptual framework of

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<sup>3</sup> *COMPUTATION OF CONSUMER PRICE INDICES (SPECIAL PROBLEMS)*, Report prepared for the Tenth International Conference of Labour Statisticians (ILO, Geneva, 1962)  
[http://www.ilo.org/public/libdoc/ilo/1970/70B09\\_141.pdf](http://www.ilo.org/public/libdoc/ilo/1970/70B09_141.pdf)

the index and to make choices, taking into account the main purposes which the index was to serve.

The main issues that were affected were:

- the concepts and techniques to be used for both weighting and pricing durable consumer goods, including housing;
- owner—occupied housing (weighting and pricing);
- consumer credit, insurance, taxation;
- combining price quotations (substitutions and treatment of quality changes);
- seasonal items (seasonal changes in price and consumption).

In order to exchange views and experiences in the field of price statistics and to identify the best practices, at an initiative led by the International Labour Office (ILO), the first meeting on CPI was jointly organised by UNECE and ILO in 1978.<sup>4</sup>

Guidelines on most of these issues were provided in the resolution adopted by the 14th ICLS<sup>5</sup> in 1987. It provided guidelines on such important aspects of CPI as its scope, the derivation of weights, sampling, procedures for collecting price data, substitution problems, etc. It also provided definition of main concepts in CPI such as definition of elementary aggregates, and introduced the concepts of acquisition, use and payment, which greatly contributed to better understanding and interpretation of the index.

In 1989, the ILO published a manual on methods, which provided guidance to countries on the practical application of the standards (An ILO Manual on CPI, Turvey et al., Geneva, 1989).

In order to allow for progressive expansion of the scope of the collection, compilation and publication of labour statistics, including the CPI, a Labour Statistics Convention, 1985 (No. 160) and its Recommendation No. 170 were adopted by International Labour Conference in 1985. The Convention is legally binding treaty that provides the basic principles for the collection, compilation and publication of CPI, as well 8 other labour statistics subjects, as well as basic principles covering confidentiality, consultation, dissemination and metadata.

### **1990-2000 – Major concerns with the quality of CPI estimates**

Following the publication of the Boskin Commission Report at the end of 1996, many comments have been made about the possible sources of bias in CPI estimates. Questions have been raised concerning the treatment of quality changes and new goods, about the choice of index formula, relevance and age of the weights used, etc. The possibility that CPI may not adequately represent true price movements has led many statistical agencies to reconsider and make significant changes to the methodology used to prepare CPI estimates.

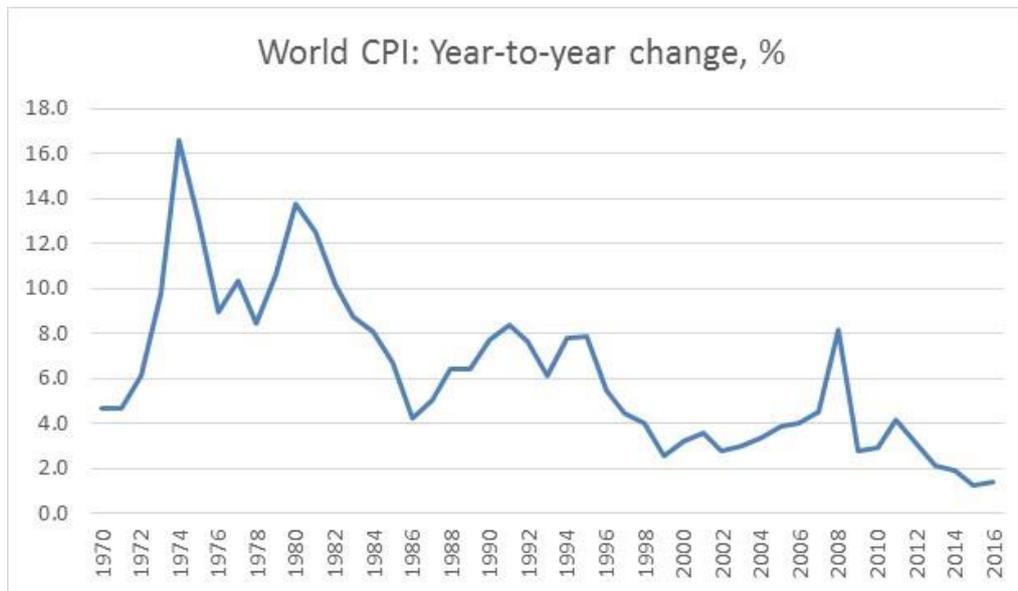
A further reason for concern with these issues was the high priority given to the control of inflation as a policy objective in most countries, after the experience of high inflation, or even hyperinflation, during the last three decades of the twentieth century. The slowing down of rates of inflation in many parts of the world in the 1990s, compared with those of the 1970s

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<sup>4</sup> This meeting became one of the regular meetings on CPI, usually held every second year.

<sup>5</sup> *CONSUMER PRICE INDICES*, Report prepared for the Fourteenth International Conference of Labour Statisticians (ILO, Geneva, 1987) [http://www.ilo.org/public/libdoc/ilo/1987/87B09\\_667\\_engl.pdf](http://www.ilo.org/public/libdoc/ilo/1987/87B09_667_engl.pdf)

and 1980s, did not lead to a loss of interest in measurement issues; on the contrary, it stimulated a demand for more accurate and reliable measures of inflation. Whereas an error or bias of one, or even two, percentage points in the annual rate of inflation may not be considered important when inflation is running at 10 or 20 per cent or more per year, it becomes very significant when the rate of inflation itself is estimated to be only 1 or 2 per cent.



Source: ILO Statistical database <http://www.ilo.org/ilostat>

A considerable amount of work on the methodology of price indices has been undertaken at the international level as a result of the formation of the *International Working Group on Price Indices*, established in 1994 under the auspices of the United Nations Statistical Commission. The joint UNECE/ILO on CPI meetings organised since 1978, on the other hand, focused on the practical application of methods. Within the European Union, EUROSTAT together with the statistical authorities in Member States has developed procedures and standards for a Harmonized Index of Consumer Prices (HICP). HICP is one of the main indicators used in setting interest rates in the European Monetary Union (EMU). Similar efforts were made in other regions.

In response to these developments, the need to revise, update and greatly expand the ILO Manual was gradually recognised and accepted during the late 1990s. It was at the joint ECE/ILO Meeting on Consumer Price Indices in 1997 that this request was officially formulated. In order to coordinate the efforts and expertise of the major organisations concerned with prices so as to successfully revise the international standard on prices, in particular the CPI manual<sup>6</sup>, an Inter-Secretariat Working Group on Price Statistics (IWGPS)

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<sup>6</sup> The IWGPS is composed of representatives from the International Labour Office, the International Monetary Fund, the Organisation for Economic Cooperation and Development, the UN Economic Commission of Europe, the World Bank and the Statistical Office of the European Communities (Eurostat). For more information on the IWGPS see:

[www.ilo.org/public/english/bureau/stat/guides/cpi/index.htm](http://www.ilo.org/public/english/bureau/stat/guides/cpi/index.htm)

was established in 1998. The CPI manual: Theory and Practice<sup>7</sup>, developed by the Technical Expert Group on the Consumer Price Index (TEG-CPI) under the aegis of the IWGPS, was published in 2004. The joint ECE/ILO Meeting on Consumer Price Indices, and papers presented to these meeting greatly contributed to the work on the manual. The manual was supplemented with a Practical Guide for producing CPI<sup>8</sup>, published in 2009.

In parallel with the development of the manual on CPI a new resolution concerning CPI was developed and adopted by the 17<sup>th</sup> ICLS<sup>9</sup> meeting in 2003. The 17th ICLS resolution provided guidelines on the following elements of importance for the quality and accuracy of the CPI: the most appropriate formula to use to estimate an elementary price index; the frequency of weight updates, the procedures for quality adjustment, introduction of new goods and new outlets, the sampling methods used, the need for constructing and publishing more than one index to meet specific requirements, etc.

## **2010 – New sources of data**

Since the publication of the Consumer Price Index Manual: Theory and Practice in 2004, methods and best practices have continued to evolve, and there was a need to include to better reflect current best practices and to include more practical compilation advice wherever possible.

In the preceding 10 years, national statistical institutes and international organisations have devoted much attention to the new sources of data such as electronic scanner data, web scraping, that require different approaches in aggregating the data but also open new opportunities for improving the treatment of quality changes, inclusion of new goods and services, weighting, validating and updating the sample, etc. Therefore, a new TEG was established under the auspice of IWGPS to update the 2004 Manual and reflect the theoretical and empirical developments over the last 10 years.

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<sup>7</sup> ILO/IMF/OECD/UNECE/Eurostat/The World Bank *Consumer price index manual: Theory and practice*, Geneva, International Labour Office, 2004

[http://www.ilo.org/public/english/bureau/stat/guides/cpi/CPI\\_Manual.html](http://www.ilo.org/public/english/bureau/stat/guides/cpi/CPI_Manual.html)

<sup>8</sup> ILO/IMF/OECD/UNECE/Eurostat/The World Bank *Practical Guide to producing CP*, UN Geneva and New York, 2009 [www.ilo.org/public/english/bureau/stat/download/cpi/guide1.pdf](http://www.ilo.org/public/english/bureau/stat/download/cpi/guide1.pdf)

<sup>9</sup> *CONSUMER PRICE INDICES*, Report prepared for the Seventeenth International Conference of Labour Statisticians (ILO, Geneva, 2003) [www.ilo.org/global/statistics-and-databases/meetings-and-events/international-conference-of-labour-statisticians/WCMS\\_087591/lang--en/index.htm](http://www.ilo.org/global/statistics-and-databases/meetings-and-events/international-conference-of-labour-statisticians/WCMS_087591/lang--en/index.htm)