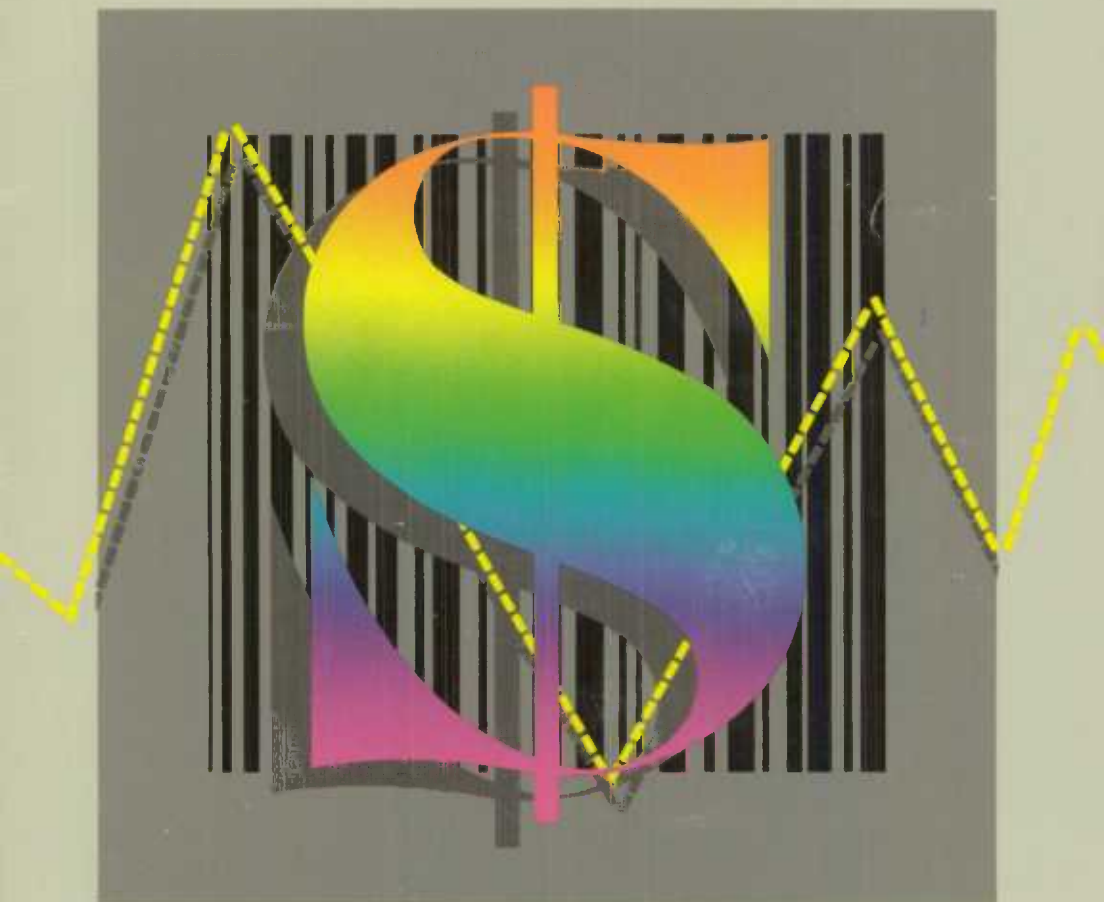


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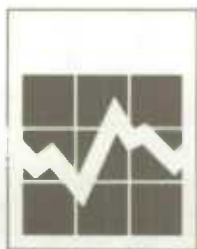
Your Guide to The Consumer Price Index



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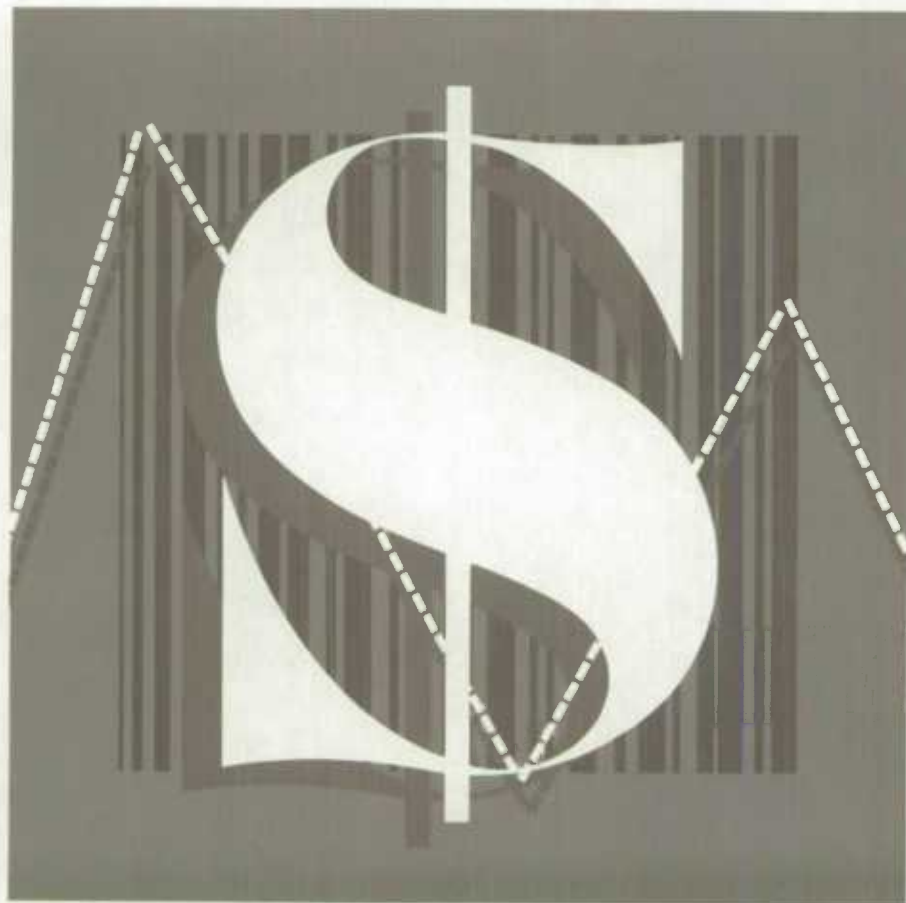
Your Guide to The Consumer Price Index

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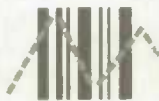
Introduction

The origins of the Consumer Price Index (CPI) for Canada can be traced back to the early 1900's. Since then, as a statistical series, this index has grown in comprehensiveness and detail to keep pace with increases in its use. Today it has a direct or indirect effect on nearly all Canadians. Consider the following:

- Labour contracts governing the wages of hundreds of thousands of Canadian workers include cost of living adjustment (COLA) clauses which result in automatic wage and/or pension benefit increases linked to movements in the CPI.
- Family allowance payments, old age security pensions, the guaranteed income supplement and other forms of social and welfare payments are adjusted periodically to take account of changes in the CPI.
- Rental agreements, insurance premiums, alimony and child support payments and other forms of contractual and price-setting arrangements are frequently tied in some manner to movements in the CPI.

In a very broad sense, the CPI is relevant to all those who earn and spend money. When prices change, the real value of money, i.e. the buying or purchasing power of money, also changes but in the opposite direction. A rise in prices means a decline in purchasing power. The CPI is frequently used to estimate the extent to which the buying power of money changes in Canada.

In view of the extensive use and interest in the CPI this booklet is written to serve as a general guide to people wanting an introduction to the subject. The guide explains the CPI and describes how it is calculated. It also responds to many of the more frequently asked questions about the CPI. Finally, it provides some direction on how to interpret and use the price index numbers.



What is the CPI?

Canada, like other countries, requires a general measure of the rate of price change for consumer goods and services. The Consumer Price Index is one of the most widely used indicators of such change. Think of this measure as the change over time in the cost of a wide-ranging collection or basket of goods and services purchased by Canadian urban families. The quantity and the quality of the goods and services in the basket are kept constant. Hence, changes in the cost of the "basket" over time are not due to changes in the quality or quantity of the goods and services observed. Price changes resulting from such a "constant basket" are defined as "pure" price movements. The CPI is defined, more precisely, as a measure of price change obtained by comparing, through time, the cost of a "constant" basket of commodities determined by the purchases of consumers living in cities of 30,000 and above.

The CPI, like all indexes, is expressed in relative terms. As such, the index series carries a time base reference period for which the level is set at 100. The current time base for the Canadian CPI is 1986. Index levels at other points in time express the percentage change from that

base period. The standard practice when quoting an index level is to ensure that the base period is also quoted. For instance, the CPI for Canada for the month of October 1988 was 110.0 (1986 = 100).

Sometimes the CPI is mistakenly read to mean differences in price levels. Suppose price indexes for September 1988 were given as follows: Oranges 107.7 (1986 = 100) and Apples 142.3 (1986 = 100). We cannot use these numbers to state that the price of apples is higher than that for oranges. What we could legitimately say is that since 1986 the price of apples has risen a great deal faster than that of oranges.

In like manner, if in June 1988 the All-items CPI for St. John's was 105.2 (1986 = 100) and for Saskatoon was 109.6 (1986 = 100), we could not infer that prices as a whole were lower in St. John's than in Saskatoon. We could say that, on average, prices rose slightly faster in Saskatoon compared to St. John's between 1986 and June 1988.



The CPI and a Cost of Living Index

Some people continue to refer to the CPI as a cost-of-living index. In strict technical terms the CPI is different from a cost-of-living index. In the latter case, the objective of the index maker, in theory, is to measure price changes experienced by consumers in maintaining a constant standard of living. In such an index one can replace a cheaper product for a more expensive one, provided the two products yield the same level of satisfaction to consumers. The practice assumes that consumers would normally switch between substitutes as the price relationship of goods change. If, for instance, consumers get the same satisfaction from drinking tea as they do from coffee, then it is possible to substitute tea for coffee if the price of tea fell relative to the price of coffee.

It may be practicable to compute a cost-of-living index for a single person, provided we have a lot of information about his taste and consuming habits. However, to do this for a large number of persons, let alone the urban population of Canada, is an impossible exercise. For this reason regularly published indexes are not based on the cost-of-living concept.

Since the CPI does not allow for these substitutions from month to month, it is not a cost-of-living index. However, in recent years the content of the CPI basket has been revised every four years. Because of this, some part of the substitution effect is captured over a longer time period. There is, however, some evidence to suggest that the CPI would not differ greatly from an index which took account of substitutions.



To Whom does the CPI Relate?

Information on the spending habits of representative Canadian households is obtained periodically from family expenditure surveys. In these surveys a randomly selected sample of households is interviewed to obtain detailed information on the goods and services purchased during a given year together with the amount of money spent on such items.

While no two households are exactly alike in their spending habits, by combining the information from many households, it is possible to develop a broad representative picture of the spending patterns of the group as a whole, or of some sub-groups within it. As noted before, the expenditure data used in the CPI refers to the spending habits of families living in urban centres of 30,000 and above in population. Although the cities of Whitehorse and Yellowknife do not meet the population-size criterion they are included in the CPI as well in order to have some representation of the Territories. Households in the urban centres covered by the CPI account for an estimated 75% of total consumer spending in Canada.

The Canadian CPI has, for many years, related to the population of urban centres of 30,000 and above. Does it follow that this index is unrepresentative of Canadian households outside the covered urban centres? Not really. Studies undertaken by Statistics Canada and others show that quite marked differences in spending patterns do not result in significantly different CPI movements. This is either because rates of price change of various items are broadly similar, or because different price trends in the basket offset one another. Based on such evidence, one can be reasonably confident that the CPI provides a good, approximate measure of price changes in areas outside the observed urban centres.

The CPI is designed to provide a broad measure of changes in retail prices encountered by urban consumers. It cannot, and should not, be expected to reflect the price change experience of any particular household. The CPI basket contains a long list of goods and services. Each consumer buys a different combination of goods from this long list and it is rare that any consumer will buy everything on the list at one point in time. For example, it would be highly unusual to find a consumer using both fuel oil and natural gas for home heating. However, both fuels are included in the CPI since both are important in the spending pattern of Canadian urban consumers as a whole.



What Goods and Services are Contained in the CPI Basket?

The CPI basket includes those goods and services which are important in terms of the size of the expenditures made on them by Canadian urban households. It is neither practical, nor necessary, to include all the items that consumers buy since many items show similar price changes. Hence, by selecting representative items (or samples) carefully, it is possible for the index to reflect price changes for a much wider range of goods than just those observed directly.

Over 300 separate goods and services, ranging from ground beef to haircuts and from dental fillings to restaurant dinners are included in the CPI basket. These items are chosen, not only because they represent the spending habits of urban families, but also because their prices are associated with specific quantities of the goods offered for sale. Without this quantity/price relation it is extremely difficult to measure price changes. A price change for a given quantity of bread or beer can easily be identified and measured. However, a price change associated with a given quantity of national defence services or the services provided by public roads or public health care is far more difficult to measure.

The difficulty of associating quantities to prices is one of the main factors which lead to the exclusion of some items. Thus, the CPI basket excludes direct compulsory levies on consumers' incomes such as income taxes and contributions made to pension plans. It also excludes consumer savings and disbursements on financial assets. For the same reason, premiums paid on life insurance plans and the contributions towards public health insurance are not included.

The goods and services included in the CPI basket are determined, as noted above, by the spending behaviour of urban consumers. No attempt is made to differentiate between "luxuries" and "necessities" and nothing is deleted on the basis of moral or social judgement. Some people may regard the use of tobacco and alcohol as socially undesirable, however, these products are included in the CPI basket because they make up a notable proportion of the expenditures of urban families.



How is the CPI Basket Organized?

The goods and services in the basket are grouped and organized into a commodity classification system. Every product has a unique place in this system. It is grouped with other items either because it has a common end-use or because it is seen as a substitute. These families of products are grouped at different levels to form a hierarchy. For instance, a product like toothpaste occupies a particular spot in this hierarchy. It belongs to the group identified as "Oral Hygiene Products". In like manner, the latter group belongs to a larger category called "Personal Care" which, in turn, is part of the major component index entitled "Health and Personal Care".

Indexes are computed for each commodity group identified in the classification system. The index representing the average price movement for all the goods and services in the basket is identified as the "All-items CPI". The major sub-divisions of the All-items index are referred to as the seven major component indexes and are: Food; Housing; Clothing; Transportation; Health and Personal Care; Recreation, Reading and Education; and Tobacco Products and Alcoholic Beverages.

In addition to this primary classification system, the contents of the CPI basket are also arranged into a supplementary classification system in which commodities are sorted by goods components as distinct from service components. Furthermore, the classification system enables index makers to combine components in a variety of ways to meet specific needs. One long-standing special category is obtained by excluding the Food index from the All-items index to provide an index for all non-food items in the basket.



Relative Importance of Items in the Basket

The spending associated with each item in the basket is compared to total spending. These proportions indicate the relative importance or "weight" of a commodity in the CPI basket. Weights establish the

impact that a particular price change will have on the overall consumer budget. For example, a 5% rise in the price of bread would normally have a much greater impact on the budget of an average consumer than a 5% increase in the price of pepper. That follows because consumers spend more on bread than they do on pepper.

The computation of the weight for a given commodity is a relatively simple matter. As an illustration, take consumers' spending on gasoline. The average spending per family in a given city is multiplied by the estimated number of families in that city. Total expenditures on gasoline are added up across cities to arrive at the estimated total expenditures on gasoline for Canada. The proportion of this estimate to the grand total of spending on all goods and services in the CPI basket for Canada becomes the weight for gasoline in the Canada CPI.

To illustrate the meaning of weights in a more direct fashion, take the data on average spending by urban families in 1986 as shown in column (1) below. The expenditure information is classified according to the seven major CPI components.

	(1) Expenditure in 1986	(2) Weights as Percentages
Food	\$ 4,870	18.1
Housing	9,760	36.3
Clothing	2,340	8.7
Transportation	4,920	18.3
Health and Personal Care	1,130	4.2
Recreation, Reading & Education	2,370	8.8
Tobacco Products & Alcoholic Beverages	1,500	5.6
Total Expenditure	26,890	100.0

To calculate the weights associated with each of these components, as shown in col. (2), the percentage of each component to the total is found. The weight for Food, for instance, is obtained thus:

$$\frac{4,870}{26,890} \times 100 = 18.1\%$$



Collecting Prices

The CPI is designed to measure price changes experienced by urban consumers. As a result, price movements are monitored in retail outlets and other types of distributors from which urban consumers would normally buy. The sample of outlets therefore includes supermarkets, specialty shops, department stores, garages, dentists' offices, hair-dressing salons, etc. Items such as bus, rail and air fares, hydro and gas rates, telephone charges and property taxes are collected from the appropriate local or regional authorities. Information on rental charges for living accommodation is obtained from a monthly survey of thousands of tenants in urban areas. All this price collection activity results in over 110,000 price quotations being used in the calculation of the Canada CPI each month.

The price collection activity takes place to varying extents in about 80 cities across Canada. Prices are observed and collected by trained and experienced personnel operating out of the Regional Offices of Statistics Canada. The pricing cycle starts in the latter part of the previous month and extends into the third week of the reference month. As a general rule, prices of each group of commodities are collected, more or less, around the same time in each month. Food prices from supermarkets, for example, are collected during the first and third weeks of each month.

Most commodities are priced once a month. In some cases, such as food sold in grocery stores and gasoline, prices are observed twice a month. This is because such prices tend to fluctuate much more frequently within a month. Some items are priced on a quarterly basis, for example haircuts and dry-cleaning services. Some are priced semi-annually, such as automobile insurance, while others, such as property taxes, are priced once a year. As a general rule, the more frequently prices change, the more frequently they are observed. Also, in cases where prices change outside the scheduled time of collection, a special survey is carried out to ensure that such changes are reported in the CPI in a timely fashion.

The prices used in the CPI are those that any member of the public would have to pay on the day of the survey. This means that discounted prices or "specials" are collected for CPI purposes. Since sales taxes are part of the total price paid by the consumer, they are also taken into account. Prices that are known to contain large elements of subsidies, e.g. rents paid by some low-income tenants, are generally not included in the CPI.

To be acceptable for purposes of pricing, a good or service must satisfy certain quality standards and it must be offered for sale in a reasonable quantity. To ensure that price movements reflect the experience of the bulk of the urban population, the brands and varieties of the items which are observed are generally those which are most popular and so sell in the greatest volume.



Dealing with Quality Change

As previously stated, the goods and services included in the CPI basket are held constant in terms of their quantity and quality. This condition is necessary so as to observe and measure a "pure" price change. In the real world, however, the quality of goods is continually changing as new models and varieties replace earlier ones.

If prices rise because of an improvement in the quality of a product such a price increase will not be treated as a pure price change. Suppose, for example, that we had been pricing a three-speed bicycle, but we wanted to start pricing a ten-speed bicycle. Suppose also that the latter's price was 10% higher than the former. Could the index maker conclude that the price of bicycles had risen by 10%? Probably not. If the ten-speed model was seen as a superior bicycle to the three-speed model, then the prices of the two bicycles are not comparable unless an adjustment is made to take account of this difference in quality.

There are several techniques employed in practice in adjusting prices to take account of quality changes. Some of the techniques are too complex to describe here. One of the most common methods is to try to find a period of time when both models are available for sale and to

use the difference in their prices then as a measure of the quality difference. Another common technique is to determine the cost of that aspect of the product that is deemed to be a significant quality change. An example, is the cost of air conditioning if this has been added as a standard feature in the new model of a car. These costs are then used as an adjustment factor to make the price of the new model comparable with that of the older one.

The problems encountered in adjusting prices to take account of quality changes are extremely complex and sometimes impossible to solve in a fully satisfactory manner. This is especially true in evaluating the price of services. For example, it is fairly easy to monitor changes in bus ticket prices, but how does one attach a dollar value to changes in the frequency and punctuality of the service?



Calculating the CPI

Once the price quotations are gathered they undergo a careful screening. This function is to ensure the validity of the data used in the CPI calculations. The checking procedure involves close scrutiny of price levels in the current month to ensure that such prices are consistent with the prices collected the previous month. On-the-spot verification of doubtful information is also carried out by the field staff in the process of collecting prices.

The calculation of the monthly All-items index for Canada starts off with measuring the price change of a particular good in a given city. All city indexes for this particular product are combined to arrive at the Canada index. The product indexes obtained in this fashion for Canada are then aggregated using their weights and following the hierarchy of the classification system. For instance, the price indexes for milk, butter, cheese, etc. are combined to form a sub-group index for dairy products. The various price indexes for ladies' apparel are combined to obtain a women's wear index. These group indexes are then further drawn together to come up with the major component indexes. Finally, the major component indexes are grouped together to arrive at the All-items index for Canada.

The first step in calculating the price change for a particular good is to obtain an average price for that product in a given city. As an illustration, take the price of butter in Halifax for February. The prices collected are reviewed to ensure that they refer to the same quantity and quality of butter as observed in the previous month. A simple average of butter prices collected in Halifax is calculated.

The next step is to compute a price relative. This is the ratio of February's average price to the January average price. If the average price for January and February were \$2.46 and \$2.58 respectively, then the price relative for February becomes:

$$R \text{ Feb} = \frac{2.58}{2.46} = 1.049$$

This relative indicates a 4.9% increase in the average price for butter in Halifax.

The third step is to calculate the price index for butter for the city of Halifax for the month of February. The price index for February is simply the January index level multiplied by the price relative for

February (compared to January). If the index for January were 107.0 (1986-100) this becomes:

$$1 \text{ Feb.} = 107.0 \times 1.049 \text{ (R.Feb.)} = 112.2 \text{ (1986} = 100\text{)}$$

Price indexes for butter for February are calculated similarly for all cities across Canada. These indexes are then "weighted" appropriately to arrive at an index for Canada.

The following step illustrates how city indexes are combined to produce Canada indexes. Suppose, for the sake of simplicity, that Canada were made up of only two cities, X and Y. The price index for Canada will be calculated as follows:

	(1) Weights in %	(2) Price Index for Feb. (1986 = 100)	(3) = (2) X (1)
City X	80.0	120.3 →	9,624
City Y	20.0	113.5 →	2,270
Canada	100.0	118.9 ←	11,894

The price index for Canada shown in Col. (2) was obtained as follows:

$$\frac{(80 \times 120.3) + (20 \times 113.5)}{100.0} = \frac{9,624 + 2,270}{100.0} = \frac{11,894}{100.0} = 118.9 \text{ (1986} = 100\text{)}$$

Price indexes are multiplied by their appropriate weights to arrive at composite indexes of increasingly larger and larger groups. Suppose, after going through this process we have computed indexes at the level of the seven major components for Canada. The following example illustrates how the All-items index for Canada is computed.

	(1) Weights in %	(2) Price Index for Jan. 1990 (Dec. '88 = 100)	(3) = (1) X (2)
Food	17.59	106.0 →	1,864.540
Housing	36.67	105.8 →	3,879.686
Clothing	8.72	103.6 →	903.392
Transportation	17.87	107.6 →	1,922.812
Health & Personal Care	4.21	104.9 →	441.629
Recreation, Reading & Education	9.04	103.1 →	932.024
Tobacco products and Alcoholic beverages	5.91	111.5 →	658.965
All-Items Index for Canada	100.00	106.0 ←	10,603.048

The All-items index for Canada is obtained thus:

$$\frac{10,603.048}{100.0} = 106.0 \text{ (Dec. 1988 = 100)}$$

Again, the All-items index is a weighted average of all the major component indexes.

In some cases, readers may be interested in constructing indexes to serve special purposes. To illustrate this, the index for All-items excluding Food (or the non-food index) is calculated as follows:

	(1) Weights	(2) Index 1986 = 100	(3) = (1) X (2)
All-items	100.00	106.0 →	10,600.000
Food	-17.59	106.0 →	1,864.540
All-items excluding Food	82.41	106.0 ←	8,735.460

The All-items excluding Food index is obtained thus:

$$\frac{(100 \times 106.0) - (17.59 \times 106.0)}{82.41} = \frac{10,600.000 - 1,864.540}{82.41} = \frac{8,735.460}{82.41} = 106.0$$

Readers must bear in mind that weights in the CPI (or the "basket") are changed every four years. Hence, some modifications to all the calculations above must be made when a series to be produced involves more than one "basket" or weighting pattern. The Information and Current Analysis Unit of Prices Division should be consulted for the appropriate methods in such cases.



Using the CPI

Before attempting to use the CPI, users should first determine whether this index, or one of its components, is best suited to their needs. The CPI is one of several price change measures available to the public. Some of these, like the CPI, contain a fixed group of commodities. Others are constructed with weights derived from the current mix of goods and services. This mix is changing continuously.

Among the fixed weighted indexes are: the industry producer price indexes and their components, raw material price indexes, indexes on machinery and equipment, indexes on commercial and residential building construction and farm input price indexes. Indexes derived as by-products from producing estimates of the Gross Domestic Product and its components are among those in which weights change regularly. These are called implicit price indexes and are calculated and published on a quarterly frequency. The compilers of the data on the Gross Domestic Product also produce a set of fixed weighted and "chained" price indexes.

Where the CPI is considered the appropriate index for use, the user may want to consider further options in this framework. The CPI for

Canada is published simultaneously with CPI's for eighteen cities and, more recently, ten provinces (urban areas only included in the sample). Users may wish to consider whether the city or provincial indexes are more suited to their special situation. City and provincial indexes are constructed using the same concepts and methods as those employed for the Canada index.

In addition to the All-items CPI, Statistics Canada publishes, or can make available, a large number of CPI sub-indexes relating to individual items or groupings of items which may well serve particular needs. These include price indexes of food consumed at home, restaurant meals, rents, domestic fuel and utilities, automobile operation and maintenance, etc.

Seasonally adjusted data for selected series provide an additional source of useful information for certain analytical purposes. To meet this specialized need, Statistics Canada publishes a limited amount of monthly consumer price index data which remove seasonal influences in order that underlying price trends can be more precisely observed.

The Prices Division of Statistics Canada in Ottawa and the agency's Regional Advisory offices in major cities across the country, would be pleased to provide users with advice on the selection of appropriate indexes and with assistance in their use.



Calculating and Interpreting Price Change

To illustrate some of the every-day calculations done with price indexes we shall use the following data:

All-items CPI for Canada (1986 = 100)

	1987	1988	1989
January	102.1	106.3	110.9
February	102.6	106.7	111.6
March	103.0	107.3	112.2
April	103.5	107.6	112.5
May	104.1	108.3	113.7
June	104.4	108.5	114.3
July	105.1	109.1	115.0
August	105.2	109.4	115.1
September	105.2	109.5	115.3
October	105.6	110.0	115.7
November	106.0	110.3	116.1
December	106.1	110.3	116.0
Annual Average	104.4	108.6	114.0

The CPI is the result of a monthly survey, hence, the index represents the month as a whole. Some users ask for the index for a particular day of the month, e.g., March 31st, June 1st, December 31st, etc. In such cases the user will have to decide which monthly index best meets his particular requirements.

In the table on page 10, the monthly indexes are also averaged over the 12 calendar months of the year to arrive at an annual average. Changes calculated from these averages represent average annual changes for the calendar year. It is possible to construct an average for any twelve-month period ending in any month. For instance, the annual average for the year ending in September 1989 would take into account the indexes from October 1988 to September 1989.

Two of the changes most frequently calculated and published apply to changes: (a) between the most recent month and the previous month, and (b) between the most recent month and the same month of the previous year. However, the method of calculation used applies to changes calculated over any period.

To illustrate (a), the percentage increase in the index between May and June 1989 is calculated as follows:

$$\frac{114.3 - 113.7}{113.7} \times 100 = 0.5\%$$

To illustrate (b), the percentage increase in the index between June 1987 and June 1988 is calculated as follows:

$$\frac{108.5 - 104.4}{104.4} \times 100 = 3.9\%$$

Since most users will employ calculators to do these operations, the following mathematically equivalent approach may be more convenient:

$$\left(\frac{108.5}{104.4} \times 100 \right) - 100 = 3.9\%$$

All the cases which follow will employ this formula.

Care must be taken to distinguish between changes expressed in index points and changes expressed as percentages. Changes expressed in index points will vary depending on the base year of the indexes used. Changes expressed in percentages are independent of the base year, i.e. they remain the same regardless of the base year. To show this we provide the following example:

All-items for Canada

	(1981 = 100)	(1986 = 100)
July 1988	144.5	109.1
July 1989	152.3	115.0

The changes in index points between July 1988 and July 1989 are as follows:

Using 1981 = 100 indexes: $152.3 - 144.5 = 7.8$ index points

Using 1986 = 100 indexes: $115.0 - 109.1 = 5.9$ index points

We now show that the percentage increases are the same in spite of the differences in index points.

Using the 1981 = 100 series the percentage change is:

$$\left(\frac{152.3}{144.5} \times 100 \right) - 100 = 5.4\%$$

Using the 1986 = 100 series the percentage change is:

$$\left(\frac{115.0}{109.1} \times 100 \right) - 100 = 5.4\%$$

Employing the CPI in several types of practical situations calls for an implicit or explicit change in the base year of the index. This re-basing is achieved by a simple arithmetical process.

To convert the series at the beginning of this section into one in which April 1988 = 100 divide the value for April 1988 into indexes for all other periods and multiply by 100. The level for May 1988 then becomes:

$$\frac{108.3}{107.6} \times 100 = \frac{108.3}{1.076} = 100.7$$

Similarly, the level for say December 1989 becomes:

$$\frac{116.0}{1.076} = 107.8$$

and the level for January 1987 becomes:

$$\frac{102.1}{1.076} = 94.9$$

The conversion of the series from one base year to another merely changes the level of the indexes. The percentage changes from one time to another do not change (other than because of rounding).



Examples of the Specific Use of the CPI

In most practical situations the CPI is used either as an escalation (or indexation) tool or a tool of deflation. When used as an escalation tool, a rule is written into a contract by which a sum of money to be paid in the future is automatically adjusted by changes in the CPI. Such a rule is called an "escalation clause".

When the CPI is used as a tool of deflation, the aim is to convert money values over time in which prices are changing to values in which prices are constant. Deflated values are referred to as "constant dollar" values.

One common use of the CPI as a deflator is in determining changes in the purchasing power of money. For instance, the buying power of the dollar in December 1989 (see table on page 10) compared to the 1986 dollar is given as:

$$\frac{\$1.00 \times 100}{116.0} = \frac{1.00}{1.160} = \$0.86 \text{ or } 86 \text{ cents}$$

The "real" value (or purchasing power) of the December 1989 dollar has declined in comparison to the 1986 dollar because, according to the CPI, prices have gone up by 16 per cent during that period.

The principle employed here could be extended to another type of common question. People are interested in knowing, for instance, what sum of money in December 1989 will have the equivalent buying power of \$1,000 in January 1987. This is found as follows:

$$\text{\$1,000} \times \frac{116.0}{102.1} = \text{\$1,000} \times 1.1361 = \text{\$1,136}$$

Note that the \$1000 is multiplied by a factor. This factor equals 1 plus the percentage increase in the CPI over the specified period.

This question is sometimes asked in the reverse form. For instance, we are asked to take \$1000 in December 1989 and find a sum of money in January 1987 that will have the same buying power. The calculation for this is:

$$\text{\$1,000} \times \frac{102.1}{116.0} = \text{\$1,000} \times 0.8802 = \text{\$880}$$

In this case, the adjustment factor is less than 1 because prices in January 1987 were lower than those of December 1989.

One of the commonest uses of the CPI is in escalation clauses found in some wage contracts. These contracts are generally known as collective bargaining contracts and are negotiated and agreed to between business organizations and labour unions. The escalation rule is called a COLA (cost of living adjustment) clause. Two examples of these are as follows:

Example 1:

"Effective May 1, 1990 the contract will provide an increase in basic wages equal to the percentage increase in the Canada CPI from March 1989 to March 1990."

In this case the emphasis is on the "percentage increase" and the base year need not be specified. In the case that follows "index points" are used, making it necessary to specify the base year. (See page 11). Generally, Statistics Canada recommends using this percentage change approach because it is not sensitive to the specification of a base year.

Example 2:

"Effective January 1, 1990, 1 cent for each 0.3 point increase in the Canada CPI (1981 = 100) triggered at 6 percent and not folded in."

This rule specifies that the CPI must exceed an increase of 6.0% before the clause becomes operative. It also says that wage increases gained from this clause are not to be included as part of the basic wage for future price adjustment.

For an example of the use of the CPI as a tool of deflation, take the following data:

Gross Annual Sales of Department Store

	(1) Sales in Current Dollars	(2) 1986 = 100 Price Index	(3) Sales in Constant 1986 Dollars
	\$000		\$000
1987	500	104.4	479
1988	700	108.6	645
1989	1,000	114.0	877

The sales numbers in Column (1) are misleading indicators of sales volume because of price increases. We know what these price increases are because we have a price index in Column (2) to tell us just that. The objective is to use the price index to provide us with sales volumes holding prices for all three years constant. Because the index is based on 1986 = 100 it is a simple matter to convert the sales numbers for the three years in terms of 1986 prices. This is what is shown in Column (3).

The numbers in Column (3) were obtained as follows:

$$\text{For 1987: } \frac{500}{104.4} \times 100 = \frac{500}{1.044} = 479$$

$$\text{For 1988: } \frac{700}{108.6} \times 100 = \frac{700}{1.086} = 645$$

The constant dollar values shown in Column (3) are a better reflection of the quantities sold since the effect of price changes are taken out. Thus, if we were interested in an estimate of the real change in the level of economic activity in the department store, we should look at column (3).

Many people mistakenly believe that a real increase (or an increase after removing the effects of inflation) is the difference between the change in terms of current dollars and the rate of price change (or the rate of inflation). For example, if someone's income rose by 10% but prices increased by 8% during the same time period then, according to this "rule of thumb", the real increase in income is 2%. The technique used for deflation could be used to prove that this is not quite correct.



Periodic Updating of the CPI

Like other long-standing and important statistical series, the CPI is reviewed and updated periodically in order to ensure its continued relevance to current conditions. A major part of this review is the replacement of existing weights with weights obtained from a more recent period. Changes in spending patterns reflect changes in such factors as demographic characteristics, personal incomes, and the quality and availability of goods and services. In addition, as improved statistical techniques for measuring price changes are developed they are also introduced when weights are updated. In recent years the CPI weights have been based on expenditures for 1974, 1978, 1982 and currently 1986.

The time reference of the CPI (the period in which the official CPI is given a value of 100.0) is also changed, but at a less frequent interval. The time base is shifted to a more recent year so as to make the series easier to work with. The shift also serves to make the CPI coincide with the time reference base of other major statistical series. Starting with the indexes of January 1983, the CPI time base was changed from 1971 to 1981. The 1986 timebase came into effect with the release of the CPI for June 1990.



How to Obtain More Information

Inquiries about this publication and related statistics or services should be directed to:

Information and Current Analysis Unit, Prices Division, Statistics Canada,
Ottawa, Ontario, K1A 0T6 (Telephone: 613-951-9606, 613-951-3353
or 613-951-3349) or to the Statistics Canada reference centre in:

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