

62-557E

1984

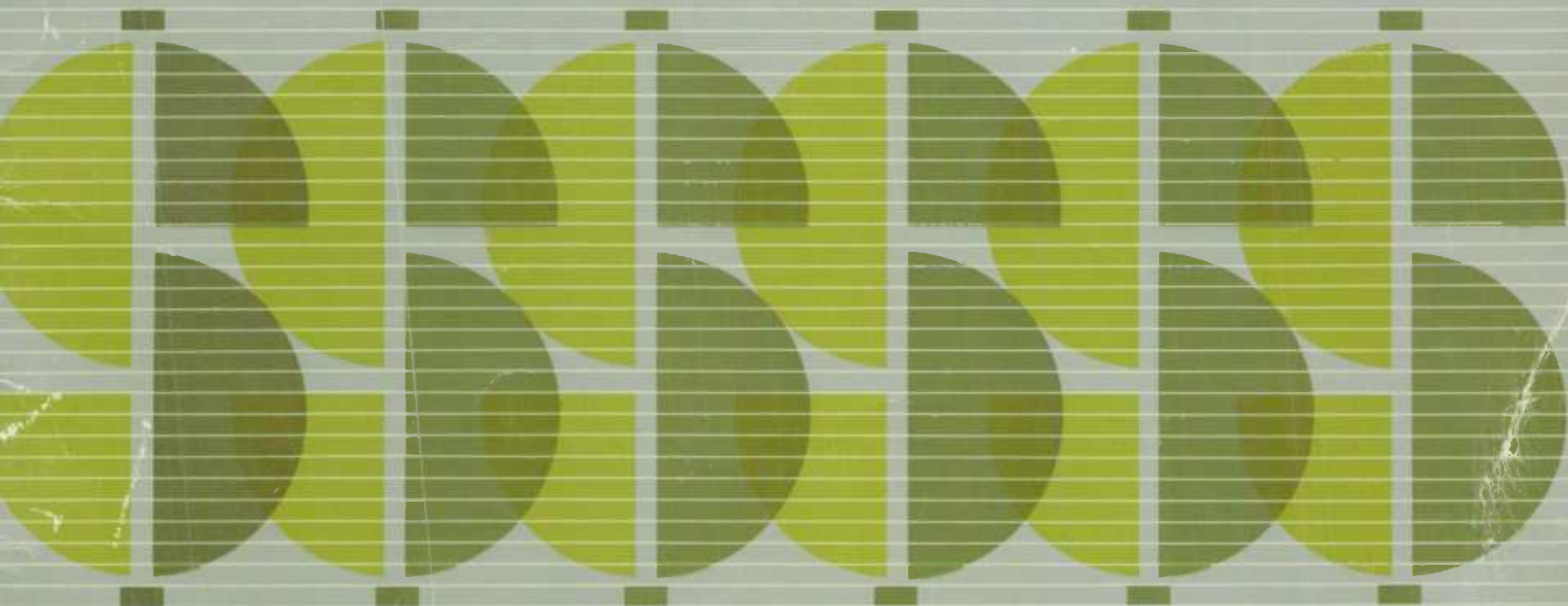
c.2



Statistics Canada Statistique Canada

\$1.00

Your Guide to the Consumer Price Index

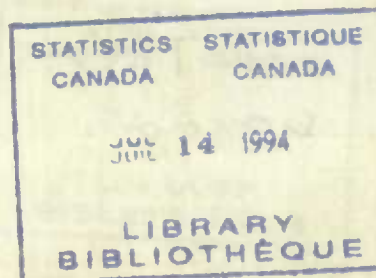


Canada

Table of Contents

- 1 Introduction
- 1 What is the CPI?
- 3 Whom does the CPI relate to?
- 3 Which items are in the basket of goods and services?
- 5 Relative importance of budget items
- 6 Collecting the prices
- 7 Quality change
- 8 Calculating the CPI
- 12 Using the CPI
- 12 Choose the right tool for the job
- 13 Calculating index changes
- 15 Periodic updating of the CPI
- 15 The CPI in perspective
- 16 For more information

INSERT: Current facts about the CPI



Introduction

What is the CPI?

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

- With the exception of 1983 and 1984 when the federal government restraint program was in effect, personal income tax exemption levels and tax brackets have been adjusted with changes in the CPI each year since 1973, thus directly affecting the amount of income tax that the individual pays.
- Many labour contracts, governing the wages of hundreds of thousands of Canadian workers, include cost of living adjustment (COLA) clauses which result in automatic wage increases linked to movements in the CPI.
- Family Allowance payments have been indexed using the CPI but as with the tax system there was partial indexing in 1983 and 1984.
- Old age security pensions are adjusted each quarter to take account of changes in the CPI.
- Rental agreements, insurance coverages, alimony and child support payments, along with many other contractual or regulatory arrangements, are frequently tied in some manner to movements in the CPI.

In view of these extensive applications, it was felt that this basic guide to the CPI would be of assistance to general users. The guide provides an explanation of what the CPI is, and how it is put together; it also deals with special topics and provides some notes on how to interpret and use the Index. A list of publications which may be of interest to users of the CPI is presented in the insert "Current facts about the CPI" in this booklet.

Canada, like other countries the world over, needs a general indicator of the rate of price change for consumer goods and services. The measure most commonly used as indicator is an index relating to prices paid by consumers for the goods and services they

buy. This is what the Consumer Price Index is. The simplest way of thinking about the CPI is to imagine a wide-ranging basket of selected goods and services of the kind bought by a particular population group representative of Canadian urban families. As prices vary, the total cost of this basket will also vary. The CPI is simply a measure, expressed in relative terms, of the changes in the cost of this basket as the prices of items in it change.

More formally defined, the Consumer Price Index measures the percentage change in the cost of purchasing a constant "basket" of goods and services, representative of the purchases made by a particular population group in a specified time period.

The price of the CPI basket in the base period is assigned a value of 100 and the price at other points in time is expressed as a percentage of the price in the base period. For example, if the price of the basket had increased 35% since the base year, then the index would read 135.0; similarly, if the price had fallen by 5%, the index would stand at 95.0.

It is important to note that price indexes measure price movements rather than actual price levels. For instance, if the index for milk is 110 at a given point in time when the corresponding index for butter is 105, this does not mean that milk is necessarily more expensive than butter. What it means is that the price of milk has increased twice as much as that of butter since the base period.

Although the CPI is often loosely called the "cost-of-living" index, strictly speaking this is a misnomer. No country has yet been able to produce a truly valid cost-of-living index, one which would, among other things, include income taxes and immediately reflect the various substitutions that consumers tend to make in order to maintain their standard of living in the face of changing market conditions. As mentioned above, the CPI assumes the purchase, month after month, of a fixed basket of goods and services and measures price changes in that basket alone. Periodically, however, the basket is revised to ensure its continued relevancy to the actual spending habits of the population to which the CPI relates. The current practice in Canada is to update the CPI basket on a four-year cycle.

What does the CPI relate to?

Which items are in the basket of goods and services?

The CPI is designed to measure the percentage change over time in the cost to a representative Canadian urban household (families and unattached individuals) of purchasing a specified basket of goods and services. This makes it necessary to define such a family and to examine just what goods and services it buys and how much it spends on them.

Information on the spending habits of a representative cross-section of Canadian households is obtained from periodic Family Expenditure Surveys. Through these surveys, a large, scientifically-selected sample of households is interviewed to provide detailed reports on the things they bought during a given period and the amounts of money spent on them.

Although no two households are exactly alike in their spending habits, it is possible by combining the information from many households to develop a broad, representative picture of the spending patterns of the group as a whole, or of sub-groups within it. (The insert "Current facts about the CPI" in this booklet describes the population covered by the present CPI.)

Although in Canada the CPI has historically related to the urban population, it does not necessarily follow that it is unrepresentative of other Canadian households. On the contrary, there is ample evidence to suggest that even quite marked differences in spending patterns do not result in significantly different CPI movements because either rates of price change of various items are broadly similar or different price trends for the various items in the basket offset one another.

The Family Expenditure Survey previously referred to not only serves to determine the spending patterns of the population covered by the CPI, but it also provides information for selecting the particular basket of goods and services for which prices should be regularly monitored.

Obviously, the basket cannot include each and every item bought by the representative Canadian urban household, but it does include those which are most important.

It is neither practical nor necessary to include all the items people buy since many items are subject to similar price changes. Thus, through a judicious selection of key representative items, it is possible to ensure that the index reflects price changes for a much wider range of commodities than is actually sampled.

In all, over 300 individual goods and services ranging from ground beef to haircuts and from dental fillings to restaurant dinners, are included in the CPI basket. (For a listing of the various categories of these items, along with their relative importance in the CPI, see "Current facts about the CPI" inserted in this booklet.) These items were chosen, not only because they were representative of Canadian urban family spending habits, but also because the items were those whose prices could be associated with an identifiable and specific quantity of a commodity or service. Thus a price change for a given quantity of bread or beer can be measured in the CPI. Any sales or excise taxes which the consumer must pay when purchasing specific items are also reflected in the CPI price of those items. Income taxes and personal savings, on the other hand, do not form part of the CPI because they cannot be clearly associated with the purchase of a specific quantity of a good or service.

Decisions on the inclusion or exclusion of an item in the CPI basket are based only on the factual considerations described above. No attempt is made to differentiate between "luxuries" or "necessities" and nothing is deleted on the basis of moral or social judgments. Some people may, for example, regard the use of tobacco and alcohol as socially undesirable; these commodities are nonetheless included in the CPI basket because they represent significant priceable elements in reported family expenditures.

The total basket is divided into the following major expenditure categories: food; housing; clothing; transportation; health and personal care; recreation, reading and education, and; tobacco and alcohol. These categories are further sub-divided into groups, sub-groups and finally to the item level. For example, "transportation" includes both a "private transportation" and a "public transportation" group, and the former is further sub-divided into the "automobile purchase" and "automobile operation and maintenance" sub-groups. Within the latter sub-group are included such items as gasoline, automobile repairs, car insurance, parking charges, etc.

Relative importance of budget items

In addition to this system of classification, there is also a supplementary classification of the CPI in terms of goods and services. Furthermore, to meet special needs, it is also possible to combine CPI component indexes in a variety of ways; for example, the price index for food may be excluded so as to provide a picture of consumer price change for all non-food items.

In addition to identifying the items for inclusion in the CPI, the Family Expenditure Survey results also define that proportion which average spending on each item bears to average total spending for all items. These relationships can be very important in determining the overall effect of different price changes. For example, a 5% rise in the price of milk would normally have a much greater impact on the budget of the average consumer than even a 50% increase in the price of pepper. Such measures of the relative importance of each item (or "weights" as they are called) must be incorporated in the CPI in order that differing item price movements can be combined in a manner which properly reflects their overall impact on the typical family.

Thus, associated with every item in the CPI is its corresponding "weight" or importance factor. These item weights, expressed in terms of percentages of expenditure in relation to the entire basket of goods and services, may be usefully grouped together. For example, the weights for milk, butter, cheese, ice cream, etc., can be combined into a total weight for dairy products which in turn would form part of the total weight for food. Similarly, combined item weights can be aggregated for clothing, housing, transportation, etc., which reflect nothing more than the relative amount of money spent on them. As a simple illustration, suppose a household had a \$10,000 annual budget for current consumption purposes and spent it in the manner shown on the left of Table A; then, that household's weighting pattern, in percentage terms, would be as indicated on the right.

Collecting the prices

Table A
Illustration of Concept of Relative Importance in the CPI

	Amount Spent \$	Relative Importance or "Weight" %
Food	2,000	20.0
Housing	3,810	38.1
Clothing	840	8.4
Transportation	1,580	15.8
Health and Personal Care	400	4.0
Recreation, Reading and Education	830	8.3
Tobacco and Alcohol	540	5.4
	<u>\$10,000</u>	<u>100.0%</u>

Since the CPI is designed to measure the impact of changing prices on a large group of Canadian urban households, price movements are naturally monitored in the kinds of retail outlets or other establishments where such households would normally be expected to do their shopping. This involves sampling amongst supermarkets, specialty shops, department stores, garages, dentists' offices, hairdressers, etc. Items like bus, rail and air fares, hydro and gas rates, telephone charges and property taxes are collected from the appropriate local or regional authorities and establishments. Information on rent movements is obtained through a monthly survey of thousands of rental households in urban areas. A perspective of the volume of pricing underpinning the CPI is provided when one considers that, in total, over 100,000 individual price quotations are collected each month.

Quality change

This pricing activity, which takes place to a greater or lesser extent in some 80 cities across Canada, is carried out by trained and experienced personnel operating out of Statistics Canada Regional Offices. The pricing cycle starts in the latter part of each month and extends to the third week of the following month; for example, supermarket pricing takes place on the first and third Wednesdays, Thursdays and Fridays of each month. Although prices of most CPI items including food, clothing, pharmaceuticals and gasoline are collected every month, some are priced less frequently. For example, haircuts and dry cleaning are normally priced quarterly; automobile insurance is priced semi-annually and property taxes are priced on an annual basis. However, such goods and services scheduled for pricing at less than monthly intervals will be priced in any month when there is evidence to suggest that significant price changes may occur prior to the next regularly scheduled pricing. Should it become evident that more frequent price changes are occurring for a particular good or service, it would be necessary to increase the frequency of scheduled pricings.

The prices used in the CPI are those that any member of the public would have to pay on the pricing day to purchase the specified good or service. To be acceptable for pricing, items must meet certain quality standards and they must be offered for sale in reasonable quantity. To ensure that the price movements reflect the experience of the bulk of the urban population, the brands and the varieties of the items which are priced are generally those which sell in greatest volume.

As previously stated, the CPI aims to measure the price change of a constant basket of goods and services over time. For this reason, efforts must be made to ensure that identical or equivalent items are priced in successive time periods. However, products do change: they may be improved, downgraded, packaged differently, etc. As the characteristics of products are altered, the price index maker attempts, through the use of good judgment backed by sound technical knowledge, to evaluate the effects of quality change separately from price change. For example, a 10% decrease in an item's selling

Calculating the CPI

price is not a “true” price decrease if the quality of the item has likewise been reduced by 10%.

Some of the problems posed by this need to take account of shifts in quality, so as to ensure that the index reflects “pure” price change only, are extremely complex and virtually impossible to solve. For example, while it is fairly easy to monitor changes in rail or bus ticket prices, how does one attach a dollar value to changes in the frequency and punctuality of the service?

Once the price quotations are gathered, they undergo a careful screening so as to ensure the validity of the data entering into the CPI calculations. The checking procedure not only involves close scrutiny of price levels in the current month but also of price changes since the preceding pricing period; on-the-spot verification of questionable information may also be undertaken by field staffs in cases of doubt.

Although calculation of a monthly CPI from over 100,000 individual price quotations is obviously a massive undertaking, the procedure can be easily described. Essentially, it consists of developing for each specific CPI item such as bread or refrigerators, a separate measurement of price change since the base reference period: these may be termed item price indexes. The item price indexes must then be combined in a manner that suitably reflects their relative importance in the spending habits of consumers.

For technical reasons, item price indexes are calculated in two steps. First, the percentage change is calculated between the average price of the item in the current month and its price in the preceding month. This one-month’s price movement must then be linked with the total price movement which has taken place between the CPI’s base reference period and the preceding month. The result is the current month’s index for the item concerned.

To illustrate the calculation of an item price index, let us assume, for example that the average price of a kilogram of ground beef last month was \$3.60 and this month \$3.78, or 105% of the price in the preceding month. Assuming further that ground beef averaged \$3.00 per kilogram in the base reference period, it can be seen that its index

last month would have to have been 120.0 because \$3.60 is 120% of the base price of \$3.00. This month's index for ground beef, being 5% higher than it was last month, would therefore be 126.0 i.e. $(120 \times \frac{105}{100} = 126.0)$. This two-stage calculation of the ground beef index can be verified quite simply by directly relating the price in the current month (\$3.78 per kilogram) to its price in the base period (\$3.00 per kilogram) and finding that it takes 126.0% of the amount of money necessary in the base period to buy a kilogram of ground beef currently $(\frac{3.78}{3.00} \times 100 = 126.0)$.

The foregoing example might relate to the calculation of a price index for ground beef in a specific city, say Montreal or Vancouver. It could likewise relate to ground beef price index for Canada; the latter is built up through a process of combining price movements across all cities represented in the CPI, having due regard, of course, for their relative importance in terms of each city's consumer expenditures for this item.

Price indexes for various groupings of items, as well as for the All-items CPI, are calculated by a process of aggregation which ensures that each individual item index is assigned a weight, or degree of relative importance, which reflects the actual spending pattern of the consumer population to which the CPI refers. This is true whether one is combining the price indexes for milk, butter, cheese, etc., to form a sub-group index for dairy products, or putting together the various item price indexes for ladies' apparel to obtain a women's wear index, or when combining the major component indexes of the CPI — those for food, housing, clothing, transportation, etc. — to yield the All-items CPI.

The procedure is similar in all these instances, and we can again use the spending pattern of the hypothetical household with \$10,000 for current annual consumption referred to in Table A to illustrate how a set of price indexes for the main components of the CPI are combined to form the All-items CPI (see Table B).

Table B

Illustration of Aggregating Price Indexes to the All-items CPI

	Col. A	Col. B	Col. C	Col. D
	Amount spent (In Reference Period)	Relative Importance or "Weight"	Current Price Index	Weight × Index (Col. B. × Col. C)
	\$	%	(Reference Period = 100)	
Food	2,000	20.0	169.0	3,380.00
Housing	3,810	38.1	148.5	5,657.85
Clothing	840	8.4	130.8	1,098.72
Transportation	1,580	15.8	143.2	2,262.56
Health and Personal Care	400	4.0	145.0	580.00
Recreation, Reading and Education	830	8.3	137.9	1,144.57
Tobacco and Alcohol	540	5.4	135.0	729.00
	<u>\$10,000</u>	<u>100.0</u>		<u>14,852.70</u>

$$ALL-ITEMS INDEX (Ref. Period = 100) = 14,852.70 \div 100.0 = 148.5$$

Thus in the foregoing hypothetical example, the assumption is made that since the reference period, food prices rose by 69.0%, housing prices moved up by 48.5%, clothing prices increased by 30.8%, etc. To combine these component indexes into an All-items Index, one simply multiplies each of the seven indexes in Col. C by its respective weight in Col. B, adds up the seven resulting products in Col. D and divides this total by the sum of the weights (100.0) to derive an All-items Index of 148.5.

Using the CPI

Choose the right tool for the job

In other words, since the reference period, the various price increases in the seven major components resulted in an overall index rise of 48.5%.

The CPI is but one of a number of measures of price change available to users and users should carefully consider which is the best statistical tool for their needs. There are, for example, a range of manufacturers' selling price indexes available in considerable detail, there are contractors' selling price indexes, machinery and equipment indexes and farm input price indexes to name a few. The above mentioned indexes, like the CPI, measure price change for a fixed group of commodities. There is yet another class of price indexes in the implicit price deflators of Gross National Expenditure and its components which reflect both price change and changes in the mix of goods and services purchased. Whereas the CPI has fixed weights to correspond to the fixed basket of goods and services, the implicit weights for the implicit deflators are based on the ever-changing mix of current expenditures. While this conceptual difference may be important in choosing the appropriate index, it should be noted that over extended periods of time the implicit deflator for Personal Expenditure and the CPI have exhibited quite similar movements. For example, between 1971 and 1981, the implicit deflator for Personal Expenditure exhibited a price increase of 133.4 percent while the CPI showed an increase of 137.0 percent, a difference of only 3.6 percentage points over 10 years.

Assuming, as is frequently the case, that a consumer price index is considered to be the most appropriate measure to use in a specific context, there is still room for some choice. Statistics Canada, aside from producing the well-known monthly All-items CPI for Canada, also publishes more than 15 separate CPI's for cities across the country from St. John's to Vancouver (see "Current facts about the CPI" insert). City CPI's employ the same concepts and methodology as the Canada series. Each city CPI measures consumer price change over time *within* the city to which it relates. Thus, while such indexes can be used as indicators of relative price *movement* within cities, they do not show whether the basket is more or less expensive in one city than another because they would not,

Calculating index changes

of course, have started from identical price levels. (Note, however, that some information which does allow one to compare price levels between cities is produced by Statistics Canada, though this does not form part of the CPI program.)

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 might well serve particular needs. These include price indexes of various home-consumed foods, restaurant meals, rents, domestic fuel and utilities, automobile operation and maintenance, etc.

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

The Prices Division of Statistics Canada in Ottawa and the agency's Regional Advisors 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.

When using the CPI (or any other index for that matter), it is important not to confuse a change in the number of index points from one time period to another with the index movement expressed in percentage terms over the same interval.

Of course, if the comparison one is making happens to start from the base period of the index, then point change and percentage change will be identical (see example 1, Table C). But often, one wishes to measure price change without reference to the base period of the index, as from one month to another or between corresponding months in successive years. Such movements are usually expressed in terms of percentage change rather than in terms of changes in index points, because the latter are affected by the level of the index in relation to its base period while the former is not. Table C illustrates both methods of measuring change.

Table C

Point Change vs. Percentage Change

Consumer Price Index for Canada (1981 = 100)

April	1982	108.6	November	1982	114.4
May	1982	110.1	December	1982	114.4
June	1982	111.2	January	1983	114.1
July	1982	111.8	February	1983	114.6
August	1982	112.3	March	1983	115.8
September	1982	112.9	April	1983	115.8
October	1982	113.6			

Example 1 Price movement from 1981 to April 1983

Point Change = 15.8 points Percentage Change = 15.8%

$$(115.8 - 100.0 = 15.8 \text{ points}) \qquad \left(\frac{115.8 - 100.0}{100.0} \right) \times 100 = \frac{15.8}{100.0} \times 100 = 15.8\%$$

Example 2 Price movement from April 1982 to April 1983

Point Change = 7.2 points Percentage Change = 6.6%

$$(115.8 - 108.6 = 7.2 \text{ points}) \qquad \left(\frac{115.8 - 108.6}{108.6} \right) \times 100 = \frac{7.2}{108.6} \times 100 = 6.6\%$$

Example 3 Price movement from Feb. 1983 to March 1983

Point Change = 1.2 points Percentage Change = 1.0%

$$(115.8 - 114.6 = 1.2 \text{ points}) \qquad \left(\frac{115.8 - 114.6}{114.6} \right) \times 100 = \frac{1.2}{114.6} \times 100 = 1.0\%$$

Periodic updating of the CPI

The CPI in perspective

Like any other longstanding and important statistical series, the CPI must be reviewed and updated periodically in order to ensure its continued relevance to current conditions. Over time, demographic characteristics change, average household spending habits change and the range of available goods and services also evolves. Furthermore, as improved statistical techniques for measuring price change are developed, they are also introduced. In Canada, CPI updatings are now regularly carried out at four year intervals.

From time to time, the base reference period of the CPI (the period which is given a value of 100) is also updated so as to focus on a closer and more meaningful time reference point; this also serves to have the CPI coincide with the time reference base of other major statistical series. Such changes in time reference periods have no impact on the movement of the index series (see example below):

	(1971 = 100)	(1981 = 100)
Index for Aug. 1983	280.7	118.5
Index for Aug. 1984	291.2	122.9
Percentage Change	$\left(\frac{291.2 - 280.7}{280.7} \right) \times 100 =$ $\frac{10.5}{280.7} \times 100 = 3.7\%$	$\left(\frac{122.9 - 118.5}{118.5} \right) \times 100 =$ $\frac{4.4}{118.5} \times 100 = 3.7\%$

It will be apparent from the foregoing description that the CPI is designed to provide a broad measure of the changes in retail price conditions that urban consumers encounter. As such, it cannot and should not be expected to exactly reflect the experience of any one particular household with respect to changing prices — not even if that household forms part of the population group covered by the CPI. This becomes obvious if one reflects for a moment on the fact that the CPI measures price movements encountered by the group as a whole, while specific households within the group may well have different spending patterns from the group average. Every single item in the lengthy list

For more information

of consumer goods and services priced for the CPI may not, of course, actually be purchased by each and every household in the population covered. For example, it is the rare household indeed which uses fuel oil as well as natural gas for home heating, though both fuels, of course, must be included in the CPI since both are important in the spending patterns of Canadian urban consumers as consumers as a whole.

Regarded as an attempt each month to reflect the combined price movement of the hundreds of millions of retail transactions which have taken place during the period, it will be apparent that any such statistical indicator is bound to have limitations and shortcomings in some of its multiplicity of uses. But as a general measure of the effect of price change on the purchasing power of urban consumers — and that is what it is meant to be — the CPI stands comparison with the best of its counterparts anywhere in the world.

Users who want more information on the CPI should contact:—

Consumer Prices Section

Prices Division

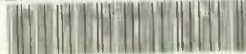
Statistics Canada

Ottawa, Ontario

K1A 0T6

or any of the Regional Offices of Statistics Canada's User Advisory Services listed in the enclosed insert.

STATISTICS CANADA LIBRARY
BIBLIOTHEQUE STATISTIQUE CANADA



1010169055

Ca005

DATE DUE

