

# Statistical Institute of Belize

## Technical Note: Updating the Consumer Price Index Basket

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Economic Statistics Department

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## Introduction

The Consumer Price Index (CPI) for the month of October 2020 will introduce an updated CPI series with a new index reference period of October 2020<sup>1</sup>. The CPI measures changes in the general level of prices of consumer goods and services purchased by households. The CPI tracks the movement of prices over time for a fixed and representative specified basket of consumer goods and services purchased by households for personal consumption. The index does not reflect the changes between two periods in individual consumption preferences or changes in standards of living due to changes in levels of income. Nor does it measure changes in the cost-of-living, i.e. the change between two periods in the minimum expenditures that would be incurred by a utility-maximising consumer whose preferences or tastes remain unchanged, in order to maintain a given level of utility, standard of living or welfare.

The basket contains those goods and services most purchased by Belizean households. Since new goods and services are periodically introduced to the market and general expenditure patterns change over time, it is necessary to regularly update the basket of goods and services used in the compilation of the CPI. This allows for the basket to maintain its relevance, reflecting the current spending habits of the population. The content of the basket of goods and services is based on empirical and detailed data on household spending, collected through a Household Budget Survey (HBS). Internationally accepted best practices for official statistics recommend the basket be updated at least every five years. Prior to the HBS of 2018/19, the CPI basket was based on data from the 2008 Household Expenditure Survey (HES), with an index reference period set to February 2011. Household expenditure patterns have changed notably since that basket was developed, resulting in a change not only in the products comprising the basket, but also in the distribution of expenditure weights across major categories.

One of the main priorities for the updating exercise is to ensure that the methodological basis upon which the CPI is constructed is robust. Therefore, in addition to updating the basket's composition and weights, other methodological improvements were implemented. The Institute was provided with technical assistance from Statistics Canada<sup>2</sup> (StatCan) and the Caribbean Regional Technical Assistance Centre<sup>3</sup> (CARTAC) in the design of the HBS and its questionnaire, data processing, data analysis, development of the new CPI basket, and recommendations for methodological improvements.

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<sup>1</sup> October 2020 = 100

<sup>2</sup> Assistance from StatCan was provided through the Government of Canada's Project for the Regional Advancement of Statistics in the Caribbean (PRASC).

<sup>3</sup> Assistance from CARTAC was provided by means of virtual consultations and a two-week in-country mission.

## The Household Budget Survey (2018/19)

The primary purpose of a Household Budget Survey is to obtain detailed information on the types of goods and services purchased by Belizean households and how spending is distributed across these goods and services. This provides a picture of the general spending pattern of private households in the economy and is the basis for the development of the basket of items used to derive CPI statistics. The 2018/19 HBS covered a nationally representative sample of approximately 3,000 households across both urban and rural areas in all districts of the country. The survey captured data on spending over a 12-month period, with the sample being sub divided into quarterly rounds, to capture seasonal expenditure patterns throughout the year. Data resulting from the 2018/19 HBS was used to determine:

- The CPI basket, that is the representative goods and services for which prices will be collected on a monthly basis;
- The weight of each item, that is, their relative importance to total expenditure;
- The establishments where households most frequently purchase these goods and services.

## Scope and Coverage

The expenditure coverage of the CPI follows the national concept<sup>4</sup>. It covers the non-business expenditure of the resident population, regardless of where the expenditure takes place. Expenditure abroad is included in the HBS and can be indirectly identified from the “place of purchase” questionnaire which was incorporated into the HBS. It excludes income taxes, charitable donations such as offerings, contributions made to pension plans, consumer savings and investments. Under-reporting of expenditure on alcohol, cigarettes and tobacco was corrected by referring to national accounts and GDP estimates using the commodity flow approach<sup>5</sup>. Data from the 2014 Supply and Use Tables (SUTs) was also used for a small number of other expenditure categories to adjust for misreporting in the HBS due to a few instances of bad signposting in the household and individual questionnaires.

The geographic coverage of the CPI weights is national, as they were derived using data from both urban and rural areas of all six districts. Coverage for price collection, on the other hand, is limited to urban areas and selected rural areas due to budgetary constraints. Nonetheless, this represents an expansion in coverage in price collection, since prices were previously collected in only seven of the country’s nine urban areas and no rural communities. On a monthly basis, prices are collected from outlets across all six

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<sup>4</sup> This is consistent with the concepts and definitions of the 2008 System of National Accounts.

<sup>5</sup> A technique based on analysis of various national accounts aggregates (production, exports, re-exports and imports) designed to produce reliable estimates of household expenditure where direct estimates are lacking or unreliable, e.g. due to the under-reporting of expenditure on alcohol.

districts of Belize, in all urban and in the selected rural areas. The CPI is designed to produce reliable estimates at both the national and district levels. The reporting regions for the CPI are:

- |                               |                                 |                                   |
|-------------------------------|---------------------------------|-----------------------------------|
| 1. Corozal Town               | 4. San Pedro Town               | 7. Benque Viejo Town              |
| 2. Orange Walk Town           | 5. Belmopan City                | 8. Dangriga Town and Independence |
| 3. Belize City and Laydiville | 6. San Ignacio/Santa Elena Town | 9. Punta Gorda Town               |

The indices from all regions are aggregated to produce the National “All-Items” CPI for Belize.

## Methodology

The concepts and definitions of the CPI are based on The Consumer Price Index Manual: Theory and Practice<sup>6</sup>. The price reference period for the new series, i.e. the period for which the prices appear in the denominator of the price relatives to produce the ratio of the price of an item in one period to the price of that item in another period, is the month of October 2020 and the weights are based on the 2018/19 HBS. The acquisition approach is used as the basis for developing the CPI weights and methods used for the collection of prices. This approach measures the cost of acquiring a good or service during a given period, whether or not it was used or consumed during that period. The prices collected for the CPI are final prices paid by the purchaser, meaning that they are inclusive of all taxes that factor into the final price paid by the consumer for the product. Where the price for any given item in any given time period is a temporary promotional price, this should be fully reflected as a price change. When the price determining characteristics of a sampled variety change, some form of quality adjustment may be needed to ensure the index measures pure price change. This would require some technical assistance to determine a suitable methodology for quality adjustments.

## Classification

All commodities included in the CPI are divided into major expenditure divisions based on the Classification of Individual Consumption According to Purpose 2018 (COICOP 2018). The United Nations endorses this consumption classification system for use in CPI compilation. The most recent version was

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<sup>6</sup> ILO/IMF/OECD/UNECE/Eurostat/The World Bank. (2004). Consumer Price Index Manual: Theory and Practice. Geneva: International Labour Office. Since the updating of the CPI, the 2020 CPI Manual: Concepts and Methods - an update of the 2004 edition - has been posted at [www.imf.org/cpi](http://www.imf.org/cpi). A printed version is expected to be available early in 2021. The editorial changes reflected in the new edition have no implications for the updating of the Belizean CPI.

published in 2018, and this was used in the compilation of the new CPI series. The classification now has 13 broad expenditure divisions, compared to 12 in the 1999 version which was previously used. Additionally, it should be noted that the updated classification has up to 5 levels of disaggregation in comparison to the previous version, which only had up to 4 levels of disaggregation. Table 1 below provides a mapping of the 2018 and 1999 COICOP expenditure divisions.

**Table 1: Mapping of 2018 and 1999 COICOP Broad Expenditure Divisions**

COICOP Code	2018	1999
01	Food and non-alcoholic beverages	Food and non-alcoholic beverages
02	Alcoholic beverages, tobacco and narcotics	Alcohol beverages, tobacco and narcotics
03	Clothing and footwear	Clothing and footwear
04	Housing, water, electricity, gas and other fuels	Housing, water, electricity, gas, and other fuels
05	Furnishings, household equipment and routine household maintenance	Furnishing, household equipment and routine household maintenance
06	Health	Health
07	Transport	Transport
08	Information and communication	Communication
09	Recreation, sport and culture	Recreation and culture
10	Education services	Education
11	Restaurants and accommodation services	Restaurants and hotels
12	Insurance and financial services	Miscellaneous goods and services
13	Personal care, social protection and miscellaneous goods and services	

## CPI Basket

Consumer preferences change continuously. Therefore, in order for the CPI to accurately measure inflation, the goods and services that are included in the CPI basket should reflect, as much as possible, these updated preferences. The items in the basket are not meant to cover every item that consumers in Belize purchase; however, they should be as representative as possible of what households spend their money on. As a result of the 2018/19 HBS survey and an October 2019 technical mission by the IMF, the number of items in the CPI basket has been increased from 260 items to 409 items.

To determine which items are ultimately included in the basket, the level of expenditure on each item and the feasibility of obtaining accurate and reliable prices on these items were the main criteria used. Items

with a relative importance of 0.1 percent or higher were selected for inclusion in the basket. Where the relative importance of an item was less than 0.1 per cent, its expenditure weight was re-distributed proportionately among the other items in the related category. However, where there was only one item in a group, it was selected regardless of its weight.

Each item, class, group and division in the CPI basket is assigned a weight which reflects its relative importance to the average household's total expenditures. The weight is given by the total expenditure on a given good or service as a percent of total expenditure on all items. Table 2 provides the weights by COICOP 2018 division of the current and previous CPI baskets.

**Table 2: CPI Weights by COICOP Broad Expenditure Divisions, 2011 and 2020**

COICOP 2018	Description	2020	2011	Change in weight
01	Food and non-alcoholic beverages	25.8%	19.4%	6.4%
02	Alcoholic beverages, tobacco and narcotics	3.6%	1.7%	1.9%
03	Clothing and footwear	4.4%	8.3%	-3.9%
04	Housing, water, electricity, gas and other fuels	19.5%	26.5%	-7.1%
05	Furnishings, household equipment and routine household maintenance	5.1%	6.9%	-1.8%
06	Health	2.6%	4.1%	-1.5%
07	Transport	15.3%	13.6%	1.7%
08	Information and communication	4.6%	3.4%	1.3%
09	Recreation, sport and culture	4.3%	6.9%	-2.6%
10	Education services	2.5%	3.3%	-0.8%
11	Restaurants and accommodation services	6.5%	0.7%	5.8%
12	Insurance and financial services	0.8%	2.1%	-1.3%
13	Personal care, social protection and miscellaneous goods and services	5.1%	3.1%	1.9%

It can be observed that the spending patterns based on the old CPI basket (derived from HES 2008) and new CPI basket (derived from HBS 2018/19) are generally consistent across the expenditure categories. There is, however, a switch in the relative importance or expenditure weights between Category 01 and Category 04. Previously, Category 04, 'Housing, water, electricity, gas and other fuels', had the largest share, accounting for 26.5 percent of household expenditure. Category 01, 'Food and non-alcoholic beverages', had the second highest share at 19.4 percent. Within the new CPI basket, however, there is a reversal of the importance of these two categories. 'Food and non-alcoholic beverages' is now the largest component of household spending, holding an expenditure weight of 25.8 percent, while 'Housing, water,

electricity, gas and other fuels' is now the second largest component, with a weight of 19.5 percent. This was the most notable shift in relative weights to occur as a result of the updating of the CPI basket.

## Price Collection

The outlets to be included in the monthly CPI price collection activity were selected using data from the 2018/19 HBS, as well as information from administrative sources, and interviews with experienced price collectors and staff previously assigned to oversee surveys in the various districts. This provided an informed basis for the selection of outlets throughout the country where households most frequently purchase goods and services.

The CPI is designed to measure price changes for the fixed basket of goods and services, as determined by the established expenditure weights. Trained data collectors are provided with detailed descriptions of the varieties for which prices are to be collected, including brand, size, and other relevant price determining characteristics of each sampled variety. For the month of October 2020, a dual collection was conducted by the SIB, wherein items contained in both the new and the old baskets were collected throughout the country. Inflation rates for that month were based on price changes for the old basket. Subsequently, all CPI calculations will be based on the new basket of goods and services. The following section, Updating of the Weights and Linking of the New Series, provides more a detailed description of how the link between the two baskets was made.

Going forward, the SIB intends to conduct price collection for the entire 409 items in the new basket of goods and services throughout the country every quarter month of the year, that is, in February, May, August and November. During the intervening months, a smaller CPI survey which includes approximately 200 selected commodities, of which about 150 are food items, from the new basket will be conducted<sup>7</sup>.

The SIB's field staff collect prices from a variety of outlets including supermarkets, grocery stores, vegetable markets, clothing and footwear stores, furniture and appliance shops, auto repair garages, doctors, dentists, schools, insurance companies, cable providers, internet providers, electronics stores, hardware stores, bus and taxi service providers, and beauty and barber salons. In total, approximately 20,000 individual price quotations will be collected each quarter to compile the CPI and about 10,000 prices will be collected and processed in each of the intervening months.

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<sup>7</sup> Following the October 2019 IMF mission, it was recommended that prices be collected monthly for all 409 items in the new basket. The decision to do so only during the quarter months is based on cost implications and funding constraints.

## Updating of the Weights and Linking of the New Series

The following terminology is discussed below:

- **Weight reference period** is the period covered by the expenditure statistics used to calculate the weights. The weight reference period for the revised series of the Consumer Price Index (CPI) is 2018/19.
- **Price reference period** is the period for which prices are used as denominators in the index calculation.
- **Index reference period** is the period for which the index is set to 100. The index reference period for the revised CPI series is October 2020.

The new weights and sample are used to start a new CPI series with more up-to-date **weight and price reference periods**. Typically, statistical offices have a **price reference period** which is later than the period to which the expenditure/quantity data (i.e. the weights) relate and the latter will span, say, a year rather than a point in time. This is because the main source of weights data is a Household Budget Survey (HBS) which typically produces usable results a year or more after the end of a survey period which is not a point in time. In these circumstances, either the HBS period weights are used without adjustment, or they are price-updated to the **price reference period** keeping the implied quantities fixed at the **weight reference period** levels. Either of these methods results in a Lowe index, which is often referred to as a “Laspeyres-type” index. A true Laspeyres index uses expenditure/quantity data which relates to exactly the same period as the **price reference period**. The SIB computes a “Laspeyres-type” index without price updating.

As discussed previously, the **weight reference period** for the new CPI covers the period from May 2018 to February 2019, as this is when the HBS was conducted. The CPI **index reference period** is October 2020, when prices were first collected for items in the new basket and, thus, when the CPI is set to 100. It is generally recommended that, when new weights are introduced, there should be an overlap period for the two sets of indices so that they can be linked. The overlap period is used to develop adjustment factors that may be applied to the old series to bring it to the same level as the new series. The linking of the old and new index series creates a continuous and unbroken time series of data. This linking preserves the rates of change between time periods. However, it is not possible to aggregate a linked index. That is, the linked index levels and their associate weights cannot be used to calculate the headline index. Users who would want to create alternative aggregations of CPI data would need to use the unlinked data.

For the linking of the new CPI and old CPI, an index for October 2020 was computed using the old CPI (base February 2011), while the new CPIs (base October 2020) were all set to 100.0. Using these indices, a linking coefficient was calculated. This linking coefficient is the ratio of the  $CPI_{Oct2020=100}$  for the month of



October 2020 to the  $CPI_{Feb2011=100}$  for the month of October 2020. This coefficient is multiplied by the CPI for each month of the old index series to derive their adjusted values (see Table 3). Inflation rates for previous time periods do not need to be recomputed.

**Table 3. Example of Use of Linking Coefficient to Rebase a CPI Series**

Time Period	Index Category	$CPI_{Feb2011=100}$ (1)	Linking coefficient (2)	$CPI_{Oct2020=100}$ (1*2)
October 2020	Food	104.5	0.9569	100.00
September 2020	Food	104.0	0.9569	99.52
August 2020	Food	103.8	0.9569	99.33
July 2020	Food	105.2	0.9569	100.67
June 2020	Food	104.8	0.9569	100.29
May 2020	Food	103.9	0.9569	99.43
April 2020	Food	104.0	0.9569	99.52
March 2020	Food	103.6	0.9569	99.14
February 2020	Food	102.8	0.9569	98.37