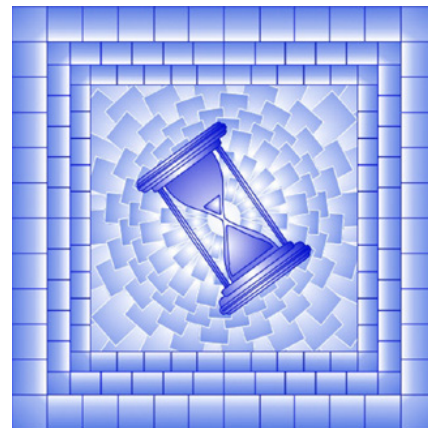


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Technical Supplement for the February 2021 Consumer Price Index



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Technical Supplement for the February 2021 Consumer Price Index

Beginning in April 2020, the collection and compilation of the Consumer Price Index (CPI) have been impacted by measures designed to limit the spread of COVID-19, as in-person field collection was conducted remotely, and imputation strategies were required to address an increased number of temporary business closures and out-of-stock products. These strategies were implemented according to international guidelines, and following consultation with other national statistical organizations.

Where outlets remained temporarily closed, items were out of stock at a higher rate than usual or products and services remained unavailable for consumption, the imputation treatments for the February CPI were the same as those used since the onset of the pandemic.¹

Tables reflecting product and outlet availability (Table 1), imputation donors for unavailable products and services (Table 2) and CPI sub-components with an out-of-stock rate above 30% (Table 3) have been updated to reflect February data.

Table 1
Consumer Price Index product and outlet availability, field, scanner and web scraped data collection modes, February 2021 and February 2020

	Basket weight at link month	Average rate of out of stock product offerings		Average rate of temporarily closed outlets		Average rate of prices received as scheduled	
		February					
		2021	2020	2021	2020	2021	2020
				percent			
Total	100.00	8.9	4.0	1.5	0.1	89.6	95.9
Food and non-alcoholic beverages	16.48	7.7	1.7	0.4	0.0	91.9	98.2
Shelter	27.36	4.5	0.8	0.3	0.0	95.3	99.2
Household operations, furnishings and equipment	12.80	10.3	4.0	0.3	0.2	89.4	95.8
Clothing and footwear	5.17	11.0	12.3	3.2	0.6	85.8	87.2
Transportation	19.95	0.0	0.0	0.0	0.0	100.0	100.0
Health and personal care	4.79	16.3	9.2	2.9	0.0	80.8	90.8
Recreation, education and reading	10.24	9.2	6.7	9.4	0.2	81.4	93.1
Alcoholic beverages, tobacco products and recreational cannabis	3.21	9.7	4.6	7.9	0.1	82.4	95.3

Source: Consumer Prices program.

1. Imputation treatments for the CPI in a given reference month are outlined in the technical supplements available through the [Prices Analytical Series](#).

Table 2
Imputation donors for select products and services unavailable, or partially unavailable for consumption in December 2020, January 2021 and February 2021¹

		Affected sub-component basket weight at link month (%)	Imputation donor	Affected geography
December 2020				
Transportation	Air transportation	0.35	Affected sub-components imputed from parent, air transportation	All
Health and personal care	Personal care services	0.20	All-items	Parts of Ontario, including Toronto, Man., Iqaluit
Recreation, education and reading	Recreational services	0.13	All-items	All
	Travel tours	1.21	All-items	All
	Spectator entertainment (excluding video and audio subscription services)	0.33	All-items	All
	Use of recreational facilities and services	0.12	All items	P.E.I., N.S., Que., parts of Ontario, including Toronto, Man.
Alcoholic beverages, tobacco products and recreational cannabis	Beer served in licensed establishments	0.15	Beer purchased from stores	P.E.I., N.S., Que., parts of Ontario, including Toronto, Man., Iqaluit
	Wine served in licensed establishments	0.06	Wine purchased from stores	P.E.I., N.S., Que., parts of Ontario, including Toronto, Man., Iqaluit
	Liquor served in licensed establishments	0.07	Liquor purchased from stores	P.E.I., N.S., Que., parts of Ontario, including Toronto, Man., Iqaluit
January 2021				
Transportation	Air transportation	0.35	Affected sub-components imputed from parent, air transportation	All
Health and personal care	Personal care services	0.60	All-items	Que., Ont., Man.
Recreation, education and reading	Recreational services	0.13	All-items	All
	Travel tours	1.21	All-items	All
	Spectator entertainment (excluding video and audio subscription services)	0.35	All-items	All
	Use of recreational facilities and services	0.25	All items	Que., Ont., Man., Alta.
Alcoholic beverages, tobacco products and recreational cannabis	Beer served in licensed establishments	0.26	Beer purchased from stores	Que., Ont., Man., Alta.
	Wine served in licensed establishments	0.10	Wine purchased from stores	Que., Ont., Man., Alta.
	Liquor served in licensed establishments	0.14	Liquor purchased from stores	Que., Ont., Man., Alta.

Table 2
Imputation donors for select products and services unavailable, or partially unavailable for consumption in December 2020, January 2021 and February 2021¹

		Affected sub-component basket weight at link month (%)	Imputation donor	Affected geography
February 2021				
Transportation	Air transportation	0.35	Affected sub-components imputed from parent, air transportation	All
Health and personal care	Personal care services	0.36	All-items	Ont.
Recreation, education and reading	Recreational services	0.13	All-items	All
	Travel tours	1.21	All-items	All
	Spectator entertainment (excluding video and audio subscription services)	0.35	All-items	All
	Use of recreational facilities and services	0.24	All items	Que., Ont., Alta.
Alcoholic beverages, tobacco products and recreational cannabis	Beer served in licensed establishments	0.20	Beer purchased from stores	Que., Ont.
	Wine served in licensed establishments	0.08	Wine purchased from stores	Que., Ont.
	Liquor served in licensed establishments	0.10	Liquor purchased from stores	Que., Ont.

1. Imputation treatments for the CPI in a given reference month are outlined in the technical supplements available through the [Prices Analytical Series](#).

Source: Consumer Prices program.

Adjustments for imputed classes following the resumption of their availability to consumers

Products that are not available for consumption in a region for one or more months are imputed as described in Table 2. When a product becomes available for consumption again, an adjustment factor is calculated to ensure the index reflects only observed price movements. The price relative in the month when availability resumes will be the ratio between the current observed price over the last observed price adjusted for the impact of imputations. As a result, the impact of the imputed price movements is limited only to the months when the product was not available for consumption.

For example, for a given product / geography, if,

- in March 2020, it was **available** for consumption and prices were observable
- in April 2020, it was **unavailable** for consumption and prices were not observable
- in May 2020, it was **unavailable** for consumption and prices were not observable
- in June 2020, it was **available** for consumption again and prices were observable,

then

- in April 2020, the price index between March 2020 and April 2020, $I^{202003:202004}$, was imputed.
- in May 2020, the price index between April 2020 and May 2020, $I^{202004:202005}$, was imputed.

in June 2020,

- ▶ the price index between March 2020 and June 2020, $I^{202003:202006}$, is calculated using prices observed in March 2020 and June 2020,

- ▶ the price index based on observed prices is adjusted by the sequence of imputations, so that the final price index between May 2020 and June 2020 is calculated as

$$I^{202005:202006} = I^{202003:202006} / (I^{202003:202004} * I^{202004:202005}).$$

This treatment corresponds to the approach used for the re-introduction of seasonal products in the CPI in the first month of their in-season period.² For products/services that have not been available for consumption for many consecutive months, and are seasonal in nature, alternative treatments may be required.

Table 3
CPI sub-components with an out-of-stock rate above 30%, February 2021

Sub-component	Basket weight at link month (%)
Purchase of recreational vehicles and outboard motors	0.65

Source: Consumer Prices program.

Enhancement: resale housing prices incorporated into the Mortgage Interest Cost Index

With the release of the February 2021 Consumer Price Index (CPI), the Mortgage Interest Cost Index (MICI) has been enhanced by incorporating the resale house price index from Statistics Canada's [Residential Property Price Index \(RPPI\)](#) into its house sub-index.

The MICI represents 3.57% of the 2017 CPI basket and is part of the shelter component of the CPI. The MICI measures price-induced changes in the amount of mortgage interest owed by the target population. It is the product of two sub-indexes:

- the house sub-index, which estimates the effect of changes in dwelling prices on the amount of principal outstanding, assuming a fixed stock of mortgaged dwellings and constant conditions of their financing, and;
- the interest sub-index, which estimates the effect of changes in interest rates on the amount of mortgage interest owed, assuming a fixed amount of principal outstanding.

The inclusion of the resale house price index to the MICI model affects only the inputs to the house sub-index. There is no change to the interest sub-index.

Prior to the February 2021 CPI, the MICI model used only the [New Housing Price Index \(NHPI\)](#) as a measure of the change in residential housing prices. The NHPI measures the change over time in builders' selling prices of newly built houses (single/semi-detached and row) in 27 census metropolitan areas (CMA).

With this CPI release, the resale house price index from the RPPI is incorporated into the house sub-index along with the NHPI for six CMAs: Montreal, Ottawa, Toronto, Calgary, Vancouver and Victoria. This enhancement ensures that the MICI is more representative of both new and resale residential housing prices. For the remaining 21 CMAs, where the resale house price index is not available, the house sub-index will continue to rely on the NHPI.

For the six affected CMAs, monthly resale house price index data and NHPI data are combined using a weighted average prior to entering the MICI model. The weights used are those calculated by the RPPI program, which are outlined in the [Residential property price index, annual weights table](#). Due to constraints around the timeliness and frequency of the RPPI's condominium apartment data, the new and resale condominium apartment components of the RPPI are not incorporated into the MICI model. The weights of the new and resale condominium apartment indexes are allocated to the comparable new and resale house price indexes. In general, the resale house price index is allocated a weight of approximately two-thirds, with the remaining one-third assigned to the NHPI. These weights are updated annually.

2. *Consumer Price Index Manual: Concepts and Methods 2020*. [Chapter 11.19](#): "An additional recommendation is that the method applied to deal with seasonal products, should ideally be "self-correcting". For example, if the item after the out-of-season period reappears at the same price as it left the market, then the method should ensure that this will take the index back to 100; similarly, if the price reappears 10 percent higher, it should take the index to 110."

The calculation of the house (H) sub-index involves comparing the weighted average of housing prices over the 300-month period preceding the observed period against that for the 300 months before the reference period. For the six affected CMAs, the price movement for each of the 300 months in this weighted average is itself a weighted average of price movements from the new and resale housing price indexes. To construct the 300-month history required by the MICI model, data from the published Teranet-National Bank House Price Index are used for the period prior to the availability of Statistics Canada’s resale house price index. This approach ensures coherence since both indexes use the same data source and similar method of index calculation, as described in the [Methodology of the Residential Property Price Index \(RPPi\)](#) paper.

The sub-index $H_{(t/t-1)}$ can therefore be written as follows:

$$H_{(t/t-1)} = \frac{\sum_{g=1}^{300} p_{t+1-g} \times (\gamma_g \times \varphi_g)}{\sum_{g=1}^{300} p_{t-g} \times (\gamma_g \times \varphi_g)}$$

where:

p_{t+1-g} represents either the New Housing Price Index or Hybrid Index for month $t + 1 - g$, where the Hybrid Index is a weighted average of the New Housing Price Index and the resale house price index.

γ_g represents the proportion of principal that remains to be paid on a mortgage initiated g months ago. This proportion is based on a standard mortgage amortized over 300 months at a fixed interest rate, and;

φ_g is the proportion of households that hold a mortgage initiated g months ago. This information is taken from the [Survey of Household Spending](#). It is approximated as of the date on which the household moved into the dwelling.

Additional questions about how the CPI accounts for outlets remaining temporarily closed, items out of stock at a higher rate than usual, or products and services remaining unavailable for consumption due to COVID-19, or the MICI enhancement can be directed to statcan.cpddisseminationunit-dpcunitedediffusion.statcan@canada.ca.