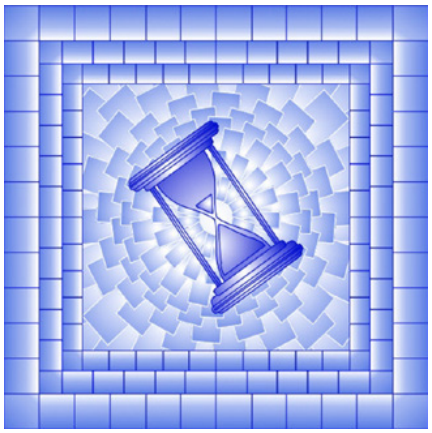
Catalogue no. 62F0014M
ISSN 1706-7723

Methodology of the Commercial Rents Services Price Index



Release date: September 10, 2020

Statistics Canada Statistique Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website, www.statcan.gc.ca.

You can also contact us by

Email at STATCAN.infostats-infostats.STATCAN@canada.ca

Telephone, from Monday to Friday, 8:30 a.m. to 4:30 p.m., at the following numbers:

- Statistical Information Service 1-800-263-1136
- National telecommunications device for the hearing impaired 1-800-363-7629
- Fax line 1-514-283-9350

Depository Services Program

- Inquiries line 1-800-635-7943
- Fax line 1-800-565-7757

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca under "Contact us" > "Standards of service to the public."

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Published by authority of the Minister responsible for Statistics Canada

An HTML version is also available.

Cette publication est aussi disponible en français.

Methodology of the Commercial Rents Services Price Index

1 Introduction

The Commercial Rents Services Price Index (CRSPI) measures monthly changes in the net effective rent for the occupied commercial building space in Canada. Since its inception in 2006, both monthly and quarterly indexes at the Canada level have been made available to the public. The national level index is part of the Producer Prices Division's (PPD) Service Producer Price Indexes (SPPIs). The annualized Canada-level index is also used as a deflator by the System of National Accounts.

Following the latest global financial crisis, real estate price indexes have been identified as an important financial soundness indicator. The growing significance of the commercial real estate industry in the overall economy, coupled with increasing demand for more granularity and relevance, led to the development of indexes for census metropolitan areas (CMA) which will be produced and disseminated with the publication of the second quarter 2020 of the CRSPI. The aggregation of retail, office, and industrial buildings and warehouses is published for CMAs across Canada, all provinces as well as the combined territories. Indexes by building type are published at the national level and for the four largest provinces (British Columbia, Alberta, Ontario and Quebec) as well as for Montréal, Toronto, Calgary, and Vancouver.

2 Concepts and Definitions

Concepts and definitions for the CRSPI

Concept	Definition
Target population	All active establishments leasing retail, office, or industrial buildings and warehouses in a given month and classified to NAICS 531120 - Lessors of non-residential buildings (except mini-warehouses) in Canada, engaged in the provision of space to others for rent.
Sample	See section 3.
Price	Average monthly price per square foot, calculated as the value of rent for all tenants in a building per square foot of space occupied by tenants in a building.
Index base period	The period for which the index equals 100. The current base period for the CRSPI is 2019 = 100.

3 Data Sources

3.1 Sampling

Data for the CRSPI are collected from a longitudinal survey of commercial property lessors. The target population consists of all active establishments in a given month leasing retail, office, or industrial buildings and warehouses classified to NAICS 531120 - Lessors of non-residential buildings (except mini-warehouses) in Canada, engaged in the provision of space to others for rent.[1] The sampling frame is Statistics Canada's Business Register for establishments classified to NAICS 531120; a new sample is drawn roughly every 5 years.

To draw the sample, establishments in the sampling frame are first stratified by province, with the three territories grouped together and treated as one province. Within each province, establishments with revenue at or above the 5th percentile are sampled according to size-stratified simple random sampling without replacement (SRS).[2] The measure of size used to form sample strata is an establishment's revenue, ensuring that large lessors are included in the sample. Under SRS sampling, each unit in a stratum has the same probability of selection, and this makes it easy to replace units after attrition as all replacement units would have the same chance of selection as

1. Other types of commercial properties are excluded largely for reasons of data quality; this includes 100% owner occupied buildings, amusement facilities, arenas and play houses, auditoriums, banquet halls, buildings on farm land, concert halls, conference centers, convention centers, dance halls, docks, indoor flea markets, government-owned buildings, hotels and motels, mini warehouses, piers, self-storage buildings, stadiums, and theaters.
2. This replaces the former probability proportional to size sample design, as it is easier to sample new units with an SRS design, and consequently reduce the impact of attrition in the sample. Within each province, the frame of remaining establishments is divided into 3 strata based on establishment revenue: take all, take medium, and take small. Stratifying by revenue ensures that the biggest contributors to the economy are still represented under the new sample design. Within each stratum, every unit has an equal chance of selection.

the replaced units.[3] The average response rate for the survey is around 85%. The average annual attrition rate is around 5%.

Once a lessor is identified as in scope for the survey, they are asked to select their largest property in terms of revenue. At this point the building is classified as retail, office, or industrial and warehousing, based on their predominant source of leasing revenue and is assigned to a CMA. Buildings that do not belong to a CMA are grouped together and treated as a distinct geography group within a province.[4] An electronic questionnaire is used quarterly to collect the rental prices of these buildings for each month in the quarter. In the event of a building being sold, the respondent is asked to report on an equivalent building in the same CMA. Incoming data are manually reviewed for consistency and completeness, and certain records may be edited or removed based on judgement.

3.2 Weights

Weights for aggregation are establishments' revenue in the population at the time of sample selection. There are two sets of weights associated to each sampling unit: the economic weight and the design weight. The economic weight is the establishment's revenue at the time of sample selection. The design weight is the inverse of the establishment's selection probability, this is the weight induced by the sample design. The product of the economic weight and the design weight represents the relative importance of the corresponding sampling unit in the population.

4 Estimation

The CRSPI is a fairly standard matched-model price index, with prices stratified by lessor to produce a collection of price relatives for each building in the survey. Provided that the physical and locational characteristics of a building, the compositions of tenants within a building, and the terms of a lease do not change over time, this collection of price relatives has a constant-quality interpretation.

4.1 Elemental Index

Calculating the CRSPI starts with the elemental index calculation, which measures the month-over-month change in prices received by lessors, grouped by geography (CMA and non-CMA), sector (retail, office, industrial and warehousing), and size stratum from the sampling process. These elemental indexes are calculated with a geometric Young index.

Letting p_{lt} be the price received by lessor l in period t, the elemental index between period $t-1$ and t for buildings in sector b in stratum s in geography c is

$$I_t^{t-1}(c,b,s) = \prod_{l=1}^{L_{cbs}} \left(\frac{p_{lt}}{p_{lt-1}} \right)^{\omega_l / \sum_{k=1}^{L_{cbs}} \omega_k},$$

where L_{cbs} is the number of lessors in geography c, leasing a buildings in sector b in sampling stratum s, and where ω_l is the weight for lessor l.[5] This month-over-month index is chained with the previous period's index value, $I_{t-1}(c,b,s)$, to produce an index $I_t(c,b,s) = I_{t-1}(c,b,s) \cdot I_t^{t-1}(c,b,s)$ running from the base period to period t.

Missing price data for a lessor are imputed using parental imputation, which is equivalent to assuming that data are missing at random. In particular, this means making the assumption that lessors that sell their building and become out of scope for the survey, or replace the building in the sample, do so for reasons unrelated to the rental price of this building.

3. Replacement units are drawn at the time of sample selection, and rotated into the sample as needed.
4. An establishment must have a building in the province for which it is sampled to be in scope for the survey.
5. As detailed in section 3.2, these weights are the product of a lessor's revenue at the time that the sample is drawn and the design weight corresponding to the sampling stratum for that lessor. Since the design weight does not vary within a stratum, it does not affect the calculation for the elemental indexes. The design weights, however, are important for aggregating across sampling strata.

4.2 Upper-level Index

The CMA-level indexes are a weighted average of the elemental indexes for each CMA, calculated with a Laspeyres index

$$I_t(c) = \sum_{b=1}^{B_c} \sum_{s=1}^{S_{cb}} \frac{w_{cbs}}{\sum_{b=1}^{B_c} \sum_{s=1}^{S_{cb}} w_{cbs}} I_t(c,b,s),$$

where B_c is the number of sectors (retail, office, industrial and warehousing) in CMA c, S_{cb} is the number of sampling strata for CMA c and sector b, and $w_{csb} = \sum_{l=1}^{L_{cbs}} \omega_l$ is the total weight for lessors with a building in sector b in stratum s in CMA c. The building-level indexes for each province are calculated the same way, except the outer sum is taken over geographies instead of sectors. For Montréal, Toronto, Calgary, and Vancouver, the building-level indexes are simply

$$I_t(c,b) = \sum_{s=1}^{S_{cb}} \frac{w_{cbs}}{\sum_{s=1}^{S_{cb}} w_{cbs}} I_t(c,b,s).$$

The provincial-level and Canada-level indexes are a weighted average of the building-level indexes. As with the lower-level indexes, these indexes are calculated as a Laspeyres index.

4.3 Quarterly Index

The quarterly CRSPI is calculated as the average of the monthly index values for each month in a quarter. That is, for the quarter q starting in month t,

$$I_q = \frac{1}{3} \sum_{t=q}^{q+2} I_t.$$

The index has a five quarter revision period.