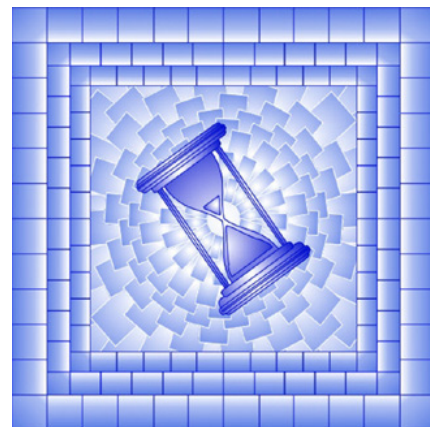


New approach for estimating the mortgage interest cost index

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New approach for estimating the mortgage interest cost index

The Consumer Price Index (CPI) measures the change of prices of consumer goods and services over time. To accurately reflect trends in the market and in consumer behaviour, Statistics Canada periodically reviews and updates the methods applied to various components of the CPI.

The release of the October 2017 CPI (published on November 17, 2017) marks the implementation of new data sources and methodological changes for the calculation of the mortgage interest cost index (MICI).

The MICI represents 3.41% of the 2015 CPI basket and is part of Shelter, one of the major CPI components.

This new approach uses administrative data to replace data from the Survey of Household Spending (SHS). It reduces the survey's response burden, while better reflecting the Canadian residential mortgage market, and allowing for a simplified estimation process.

This document describes the new data sources and their implementation in estimating the MICI price movements¹.

New approach for estimating the MICI price movements

The mortgage interest cost is intended to measure price-induced changes in the amount of mortgage interest owed by the target population. Two factors contribute to these changes through time. First, changes in dwelling prices affect the initial amount of debt and, consequently, the amount of principal outstanding in subsequent periods. Second, given the amount of principal outstanding, the amount of mortgage interest payments is determined by changes in the price of credit (that is, mortgage interest rate).

Consequently, the mortgage interest cost index, $C_{t/t-1}$, is defined as a product of two indices:

$$C_{t/t-1} = H_{t/t-1} \times I_{t/t-1},$$

where:

$H_{t/t-1}$ is an index that estimates the effect of changes in dwelling prices between t and $t-1$ on the amount of principal outstanding, assuming a fixed stock of mortgaged dwellings and constant conditions of their financing, and;

$I_{t/t-1}$ is an index that estimates the effect of changes in interest rates between t and $t-1$ on the amount of mortgage interest owed, assuming a fixed amount of principal outstanding.

Index H

Previously, calculations for the H index involved comparing the weighted average housing prices over the 300-month period preceding the observed period against that for the 300-month before the reference period. The weights represented the amount of principal outstanding by mortgage age as reported in the SHS.

The new approach still involves comparing weighted average housing prices over 300 months between the two periods. The major difference is that the SHS principal outstanding is no longer used for weighting. Instead, the assumption is that of a standard mortgage amortized over 25 years (300 months) at a fixed rate.

1. Sections 10.13 to 10.23 of the Canadian Consumer Price Index Reference Paper (<http://www.statcan.gc.ca/pub/62-553-x/62-553-x2015001-eng.htm>), which present an in-depth description of the MICI, will be updated later to reflect these changes.

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

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

where:

p_{t-g} is the New Housing Price Index for month $t-g$,

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 SHS and henceforth would be the only data still obtained from that survey. It is approximated as of the date on which the household moved into the dwelling.

Index I

Index I was previously calculated by using SHS data to simulate trends in new mortgage loans, to which interest rates posted by the banks were applied. These rates were provided by the Canada Mortgage and Housing Corporation (CMHC). One of the limitations of this approach is that the CMHC collects information on fixed interest rates with 1-year, 3-year and 5-year terms only, thus excluding variable rates and over 5 years term fixed rates. The other limitation is that mortgage balance by terms (1 year, 3-year and 5-year) was taken from the SHS, which is an annual survey, therefore not allowing for the monthly update, which better reflects the households' behaviour on the mortgage market.

The new approach better represents the Canadian mortgage market by drawing from the A4 data collected monthly by the Bank of Canada. This dataset provides the amounts of new mortgage loans as well as the corresponding interest rates for the country's nine largest banks. In addition to allowing for monthly updates of mortgage loans by term, this information covers a broader spectrum of interest rates, including variable rates and over 5 years term fixed rates.

Estimation for index I under the new approach therefore relies on a standardized function of the amounts of residential mortgage interests charged by banks, A_t , defined as follows:

$$A_t = \sum_{j=1}^9 \left[(B_j - L_{j,t}) \times r_{j,t-1}^{eff} \right] + \sum_{j=1}^9 (L_{j,t} \times r_{j,t}) ,$$

where:

B_j is the balance of mortgage loans for bank j . The amount B_j is taken from the bank's statement, as provided by the Office of the Superintendent of Financial Institutions (OSFI), which gathers and publishes financial statements for all chartered banks operating in Canada.

The balance of mortgage loans B_j remains fixed throughout the period of the CPI basket to ensure that changes in A_t are solely the result of changes in interest rates and in the distribution of mortgage loans by term. $L_{j,t}$ represents the amount of new loans issued by bank j in month t ; it is obtained from the Bank of Canada's A4 database.

$r_{j,t-1}^{eff}$ is the effective interest rate in the previous month ($t-1$), for bank j . It is calculated by establishing the ratio between the interest amount for the previous month and the loan balance. Lastly, $r_{j,t}$ indicates the interest rate negotiated by bank j for its new mortgage loans. This information is also obtained from the Bank of Canada's A4 data.

Thus, the index $I_{t/t-1}$, which measures the impact of changes in mortgage interest rates on interest amounts, can be calculated as follows:

$$I_{t/t-1} = \frac{A_t}{A_{t-1}}.$$

It should be noted that, owing to the availability of Bank of Canada's data, $L_{j,t}$ and $r_{j,t}$ use data from month $t-1$.

Overall, the new approach better reflects the trends in Canada's mortgage market, reduces the SHS response burden significantly and greatly simplifies the estimation process.