

Catalogue no. 75F0002M
ISSN 1707-2840
ISBN 978-0-660-74098-0

Income Research Paper Series

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Release date: November 28, 2024



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Preliminary poverty estimates in Canada: A new modelling approach

by **Burton Gustajtis, Amanda Halladay, Christian Olivier Nambu, Eric Olson and Lily Yin**

Introduction

Official poverty estimates in Canada are determined using the Market Basket Measure (MBM).¹ The MBM is a basket of costs based on five main components: food, clothing, shelter, transportation and other basic necessities.² According to the MBM, individuals or families are considered to live in poverty if their disposable income is insufficient to purchase a predetermined basket of goods and services required to achieve a modest, basic standard of living given their family size and area of residence.

Canada's annual poverty estimates are produced using the Canadian Income Survey (CIS).³ The CIS is a cross-sectional sample survey that collects information during the first six months of a calendar year (i.e., January to June). As is the case with many statistical programs, there is a trade-off between the timeliness and the accuracy of the published estimates. For example, income estimates, including poverty estimates, are not typically available until about 16 months following the reference year. More specifically, the 2022 CIS reference year ends in December 2022, while the income estimates were released in April 2024. The main reason for the delay in producing official estimates is the CIS's dependence on tax files, and especially the T1 file. Because most of the income data from the CIS are derived by tax linkages to respondents, the tax data must be complete and cleaned before they can be used in the CIS production.

Typically, throughout the year following the reference year, the Canada Revenue Agency will provide Statistics Canada with different versions, or "cuts," of the tax data. As the year progresses, the data become more complete. For example, late tax filers and self-employed individuals (who have a later filing deadline) are often missing from the initial versions of the files, but as new tax data become available later in the year, the files become more complete.

This paper proposes a method of producing preliminary poverty estimates up to seven months before the official release by using preliminary tax slips (approximately 9 months after the end of the reference year), while ensuring the estimates maintain reasonable revision limits. Following the release of this paper, Statistics Canada will continue to provide preliminary poverty estimates each fall following the reference year using the methodology described in this paper.⁴ The official poverty estimates will continue to be released in the spring of the year after the reference year.

Method

To produce preliminary poverty estimates, the proposed methodology uses the sample of CIS respondents from the previous year and either their tax slips for the current year (where available) or historical imputation to derive an estimate of disposable income for the current year. The previous year's sampling weights will be retained, with adjustments for non-response and calibration to the current reference year's population totals for certain subgroups to address coverage issues (e.g., emigration or immigration, deaths or births),⁵ and to mitigate the risk of bias. Finally, the CIS respondents' age will be adjusted to reflect the current year.

Official poverty estimates use T1 Income Tax and Benefit Return data and data from various tax slips.⁶ The final T1 data for a given reference year are not available until near the end of the calendar year following the reference year. However, tax slips are issued by employers and banking institutions, and they are generally available in the early

1. [Report on the second comprehensive review of the Market Basket Measure.](#)

2. [Dictionary, Census of Population, 2021 – Market Basket Measure \(MBM\).](#)

3. [Surveys and statistical programs – Canadian Income Survey \(CIS\).](#)

4. This methodology will replace the provisional poverty rate methodology described in [Modelled Market Basket Measure poverty rates for 2022 and 2023.](#)

5. See Table A.1 in the Appendix for the full breakdown.

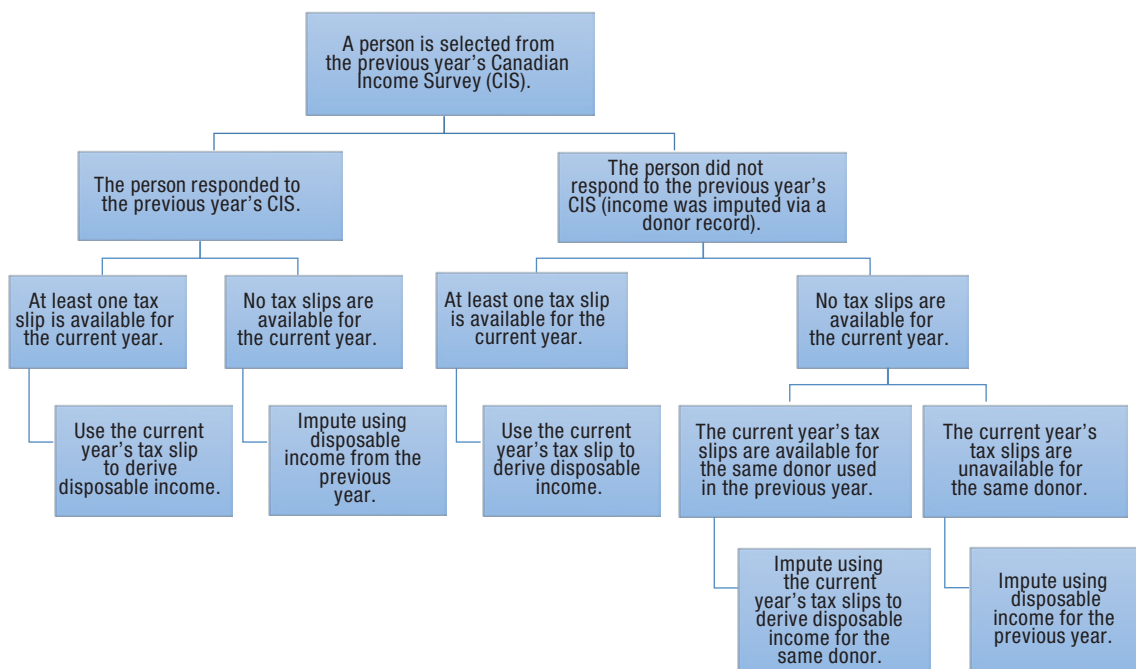
6. [Improvements to the Canadian Income Survey Methodology for the 2021 Reference Year.](#)

fall of the year following the reference year. Therefore, only tax slips are used for this approach. The following tax slips will be used:

- T4 Statement of Remuneration Paid
- T4A Statement of Pension, Retirement, Annuity, and Other Income
- T4E Statement of Employment Insurance and Other Benefits
- T4A(OAS) Statement of Old Age Security
- T4A(P) Statement of Canada Pension Plan Benefits
- T5007 Statement of Benefits
- T3 Statement of Trust Income Allocations and Designations
- T5 Statement of Investment Income
- T5013 Statement of Partnership Income.

When tax slips are unavailable for a respondent in the reference year, their disposable income is either imputed using the value from the previous year or derived from the tax slips of a donor record. The figure below illustrates the imputation strategy based on tax slip availability for the current year.

Figure 1
Imputation strategy



Source: Authors' visualization.

Table 1 shows the number of CIS respondents for selected reference years, along with the availability of their tax slips and donor tax slips used for imputation.

Table 1
Number of respondents per sample and number and rate of donor tax slips, 2017 to 2022

CIS reference year (T-1)	Number of respondents ¹	Tax slips available ² for year T			CIS donor imputation for reference year T-1		
		Yes/No	number	percent	Yes/No	number	percent
2017	79,335	Yes	72,628	91.6	...	72,628	91.6
		No	6,707	8.5	Yes	2,251	2.8
					No	4,456	5.6
2018	77,194	Yes	69,591	90.2	...	69,591	90.2
		No	7,603	9.9	Yes	2,124	2.8
					No	4,456	5.6
2019	59,851	Yes	54,040	90.3	...	54,040	90.3
		No	5,811	9.7	Yes	1,775	3.0
					No	4,036	6.7
2020	102,713	Yes	91,939	89.5	...	91,939	89.5
		No	10,774	10.5	Yes	3,531	3.4
					No	7,243	7.1
2021	75,008	Yes	66,784	89.0	...	66,784	89.0
		No	8,224	11.0	Yes	6,620	8.8
					No	1,604	2.1
2022	232,639	Yes	201,226	86.5	...	201,226	86.5
		No	31,413	13.5	Yes	26,133	11.2
					No	5,280	2.3

... not applicable

1. Respondents aged 16 years and older in the reference year (except for 2022 which includes respondents aged 15 years and older). For the 2022 reference year, the increase in the number of respondents was largely due to the fact that, for the first time, CIS estimates were based on an expanded twelve-month sample of all Labour Force Survey (LFS) rotate-out records.

2. Tax slip availability in this context refers only to the tax slips used in the disposable income adjustment.

Note: CIS = Canadian Income Survey.

Source: Statistics Canada, custom tabulations.

The disposable income is derived for a specific year based on all available tax slips. An estimate (or proxy) of disposable income is derived by integrating tax slips from the previous and current years. In addition, adjustments by type of tenure were applied to the current year after adapting for inflation. Once an estimate of disposable income for the current year is available, the percentage of Canadians who fall below the MBM threshold represents the preliminary poverty rate.

Results

National official poverty rates and estimated preliminary poverty rates for selected family types and demographic groups from 2018 to 2023 are presented in Table 2.⁷ The preliminary poverty rates were produced using the most recently available tax slips from late September of each year. According to the modelling methodology previously described the preliminary poverty rate for Canada was estimated at 10.6% in 2023. This would suggest that the poverty rate will continue its recent upward trend in 2023, which began in 2021 (7.4% in 2021; 9.9% in 2022). The modelled rates suggest that the increase should impact all the selected age groups and those in families. For the preliminary estimates of the number of people in poverty, please see the tables in Appendix A.2.

7. Given the improved robustness, potential for modelling other income-based estimates and disaggregation capability of the methods detailed in this paper, previously published modelled poverty estimates will no longer be produced (i.e., [Modelled Market Basket Measure poverty rates for 2022 and 2023](#)).

Table 2
Preliminary and official estimates of the percentage of people in poverty by selected family type and age group, Canada, 2018 to 2023

	2018		2019		2020		2021		2022		2023	
	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary
Geography	percent											
Canada	11.2	10.8	10.3	10.4	6.4	8.3	7.4	7.4	9.9	10.5	..	10.6
Age group	percent											
Under 18 years	10.6	10.9	9.4	10.5	4.7	8.4	6.4	6.7	9.9	10.4	..	11.0
18 to 64 years	12.8	11.8	11.8	11.4	7.8	9.1	8.2	8.5	11.1	10.8	..	11.8
65 years and over	6.0	6.7	5.7	6.7	3.1	5.3	5.6	4.3	6.0	9.3	..	6.5
Family type	percent											
People in an economic family	7.6	7.9	7.0	7.4	3.4	5.6	4.4	4.9	6.6	7.5	..	7.6
People not in an economic family	29.1	25.3	26.9	25.6	20.9	21.9	21.9	19.7	26.0	24.8	..	25.1

.. not available for a specific reference period
Source: Statistics Canada, custom tabulations.

Table 3 presents the preliminary poverty rates by province. The majority of provinces (7-out-of-10) are predicted to have an increase in their 2023 poverty rate compared to the previous year, with Quebec (1.1 percentage points) and Alberta (1.0 percentage points) projected to have the largest increases.

Table 3
Preliminary and official estimates of the percentage of people in poverty, Canada and the provinces, 2018 to 2023

	2018		2019		2020		2021		2022		2023	
	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary
Canada	11.2	10.8	10.3	10.4	6.4	8.3	7.4	7.4	9.9	10.5	..	10.6
Newfoundland and Labrador	11.4	12.5	11.2	12.5	7.0	12.0	8.1	8.0	9.8	11.9	..	9.7
Prince Edward Island	13.4	11.3	12.3	12.3	7.6	10.0	7.4	9.1	9.8	9.5	..	10.6
Nova Scotia	13.8	14.9	12.0	13.4	7.7	9.5	8.6	9.4	13.1	14.6	..	13.6
New Brunswick	10.8	11.1	9.9	11.3	7.6	9.0	6.7	7.8	10.9	10.1	..	11.2
Quebec	9.8	9.0	8.9	8.5	4.8	7.4	5.2	6.6	6.6	8.2	..	7.7
Ontario	11.8	11.0	10.9	11.4	6.8	8.3	7.7	7.6	10.9	11.4	..	11.5
Manitoba	11.1	10.4	11.5	10.8	6.8	8.8	8.8	7.5	11.5	11.7	..	11.4
Saskatchewan	10.8	11.4	11.9	10.2	6.7	8.7	9.1	7.6	11.1	11.4	..	10.4
Alberta	8.8	8.7	7.7	9.3	5.5	8.0	7.8	6.8	9.7	9.8	..	10.7
British Columbia	13.3	13.8	11.9	10.9	7.6	9.1	8.8	7.9	11.6	10.8	..	12.4

.. not available for a specific reference period
Source: Statistics Canada, custom tabulations.

Preliminary poverty rates by selected economic family types are presented in Table 4.⁸ According to the model, persons in economic families experienced an increase in their 2023 poverty rate (1.0 percentage points) from 2022 (6.6%), with non-elderly families experiencing a relatively larger increase in 2023 (1.1 percentage points) compared to the previous year (7.1% in 2022).

8. The MBM methodology uses the economic family concept. An economic family is defined as a group of two or more people who live in the same dwelling and are related to each other by blood, marriage, common-law union, adoption or a foster relationship. A person not in an economic family is a person living either alone or with others to whom they are unrelated, such as roommates or a lodger.

Table 4
Preliminary and official estimates of the percentage of people in poverty by selected economic family type, Canada, 2018 to 2023

	2018		2019		2020		2021		2022		2023	
	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary
	percent											
All persons	11.2	10.8	10.3	10.4	6.4	8.3	7.4	7.4	9.9	10.5	..	10.6
Persons in economic families	7.6	7.9	7.0	7.4	3.4	5.6	4.4	4.9	6.6	7.5	..	7.6
Persons in elderly families	4.6	4.1	4.0	4.4	2.0	2.9	3.0	2.7	4.3	5.4	..	4.7
Persons in non-elderly families	8.1	8.5	7.5	7.9	3.7	6.0	4.7	5.2	7.1	7.9	..	8.2
Persons in couples	7.6	7.6	7.9	7.4	4.3	5.8	4.5	5.3	6.0	6.7	..	7.7
Persons in couple families with children	7.3	7.7	6.6	7.3	2.9	6.0	4.0	4.9	6.3	6.9	..	7.6
Persons in lone-parent families	25.6	24.0	22.0	22.2	13.5	15.7	16.1	13.5	22.6	24.3	..	22.0
Persons not in an economic family	29.1	25.3	26.9	25.6	20.9	21.9	21.9	19.7	26.0	24.8	..	25.1
Elderly persons not in an economic family	13.7	13.0	12.0	13.4	7.4	10.8	13.0	8.0	13.8	18.6	..	12.7
Non-elderly persons not in an economic family	35.8	30.2	33.8	30.6	27.3	26.7	26.2	25.1	31.0	28.0	..	29.8

.. not available for a specific reference period

Source: Statistics Canada, custom tabulations.

Next steps

Statistics Canada's intention is to continually improve the methodology presented in this paper. Resources will be put in place to enhance data quality indicators, expand the availability of preliminary estimates and determine whether timeliness can be improved. Efforts will be made to expand the preliminary estimates from poverty to sources of income and other income-based estimates that are currently available.⁹ Finally, further improvements to timeliness will be evaluated to determine whether earlier versions of tax slip files can be enhanced and used instead.

Limitations

Several assumptions were required when applying this method, including the assumption that all sociodemographic characteristics of respondents in the previous year's CIS sample—such as region of residence, type of tenure and family composition—had not changed for the current year. However, this assumption, which may not hold true, could lead to an incorrect estimate of disposable income. Additionally, some components of disposable income were not adjusted, as they were unavailable on tax slips. These components include net income from self-employment; income tax; capital gains tax adjustments; and various expenses excluded from disposable income, such as employment insurance contributions, Canada Pension Plan or Quebec Pension Plan contributions, registered pension plan contributions, child care expenses, alimony paid, and direct medical expenses. Future studies are planned to evaluate the effects of these limitations.

Conclusion

This paper marks the first time Statistics Canada has produced preliminary poverty estimates using a probabilistic sample and tax slips. By using a methodology similar to the one presented in this paper, preliminary poverty estimates will continue to be produced in a timelier manner (e.g., seven months earlier, or approximately 9 months after the end of the reference year), compared with the official poverty estimates. While this method has effectively produced poverty estimates that require relatively few revisions compared with the historically produced official estimates, work to improve this methodology will continue.

9. For a complete list of tables available through the CIS, see the [CIS data tables](#).

Appendix

Table A.1
Control totals for year T and calibration groups used to calibrate weights for year T-1

Control totals	Year (T-1)	
	2018 to 2021	2022
	Calibration groups	Calibration groups
Number of people by gender and age group	0 – 6 (<i>both sexes</i>) $\left. \begin{array}{l} \{Men\} \\ \{Women\} \end{array} \right\} \times \left\{ \begin{array}{l} 7-17 \\ 18-24 \\ 25-44 \\ 45-54 \\ 55-64 \\ 65+ \end{array} \right\}$	0 – 6 (<i>both sexes</i>) $\left. \begin{array}{l} \{Men\} \\ \{Women\} \end{array} \right\} \times \left\{ \begin{array}{l} 7-17 \\ 18-24 \\ 25-44 \\ 45-54 \\ 55-64 \\ 65+ \end{array} \right\}$
Number of household members	1, 2, and 3 or more	1, 2, and 3 or more
Number of households by housing occupancy	Owner Tenant	Owner Tenant
Number of economic families	1, 2, and 3 or more	1, 2, and 3 or more
Number of people in a census metropolitan area	Montréal Toronto Winnipeg Calgary Edmonton Vancouver	Montréal Toronto Winnipeg Calgary Edmonton Vancouver
Number of people by labour force activity	Full-time employee Part-time employee Unemployed Not in the labour force Not applicable (member of the Canadian Armed Forces or under 15 years old)	Full-time employee Part-time employee Unemployed Not in the labour force Not applicable (member of the Canadian Armed Forces or under 15 years old)
Number of people by employment category	Public or private sector employee Self-employed or unpaid worker Not applicable	Public or private sector employee Self-employed or unpaid worker Not applicable
Number of people by employment status	Permanent employment Non-permanent, seasonal, temporary, casual or other employment Not applicable	Permanent employment Non-permanent, seasonal, temporary, casual or other employment Not applicable

Source: Authors' visualization.

Table A.2.1
Preliminary and official estimates for the number of persons in poverty by selected family types and demographic groups, 2018 to 2023, Canada

	2018		2019		2020		2021		2022		2023	
	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary
in thousands												
Geography												
Canada	4,065	3,886	3,793	3,822	2,357	3,073	2,762	2,753	3,772	3,951	..	4,135
Age group												
Under 18 years	744	769	665	744	333	598	462	477	735	750	..	784
18 to 64 years	2,952	2,718	2,760	2,663	1,817	2,135	1,917	1,981	2,607	2,534	..	2,873
65 years and over	369	398	369	415	207	340	383	295	430	667	..	478
Family type												
People in an economic family	2,308	2,390	2,144	2,275	1,055	1,732	1,377	1,508	2,090	2,363	..	2,456
People not in an economic family	1,757	1,497	1,649	1,547	1,301	1,342	1,385	1,245	1,682	1,588	..	1,679

.. not available for a specific reference period

Source: Statistics Canada, custom tabulations.

Table A.2.2
Preliminary and official estimates of the number of people in poverty, Canada and the provinces, 2018 to 2023

	2018		2019		2020		2021		2022		2023	
	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary
in thousands												
Canada	4,065	3,886	3,793	3,822	2,357	3,073	2,762	2,753	3,772	3,951	..	4,135
Newfoundland and Labrador	59	65	58	64	36	62	42	41	51	62	..	51
Prince Edward Island	20	17	19	19	12	16	12	15	16	16	..	18
Nova Scotia	129	139	113	127	74	91	83	91	130	143	..	139
New Brunswick	81	83	75	85	58	68	51	60	85	79	..	91
Quebec	816	738	748	712	407	623	439	554	561	698	..	670
Ontario	1,676	1,548	1,574	1,627	988	1,205	1,131	1,115	1,618	1,684	..	1,748
Manitoba	142	132	148	139	87	114	115	97	151	154	..	153
Saskatchewan	118	124	131	112	74	96	101	83	125	128	..	119
Alberta	372	366	332	397	240	344	342	295	437	434	..	493
British Columbia	651	673	596	540	382	455	447	403	597	553	..	653

.. not available for a specific reference period

Source: Statistics Canada, custom tabulations.

Table A.2.3
Preliminary and official estimates of the number of people in poverty by selected economic family type, Canada, 2018 to 2023

	2018		2019		2020		2021		2022		2023	
	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary	Official	Preliminary
in thousands												
All persons	4,065	3,886	3,793	3,822	2,357	3,073	2,762	2,753	3,772	3,951	..	4,135
Persons in economic families	2,308	2,390	2,144	2,275	1,055	1,732	1,377	1,508	2,090	2,363	..	2,456
Persons in elderly families	200	161	177	174	90	119	146	118	232	241	..	239
Persons in non-elderly families	2,108	2,229	1,967	2,101	965	1,613	1,231	1,390	1,858	2,122	..	2,217
Persons in couples	340	343	355	336	195	267	197	243	246	305	..	330
Persons in couple families with children	956	1,032	848	1,009	379	823	529	671	848	960	..	1,052
Persons in lone-parent families	409	457	369	405	231	304	288	265	498	479	..	497
Persons not in an economic family	1,757	1,497	1,649	1,547	1,301	1,342	1,385	1,245	1,682	1,588	..	1,679
Elderly persons not in an economic family	251	217	234	232	148	201	268	161	256	394	..	232
Non-elderly persons not in an economic family	1,506	1,279	1,415	1,315	1,153	1,141	1,117	1,084	1,426	1,194	..	1,447

.. not available for a specific reference period

Source: Statistics Canada, custom tabulations.

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