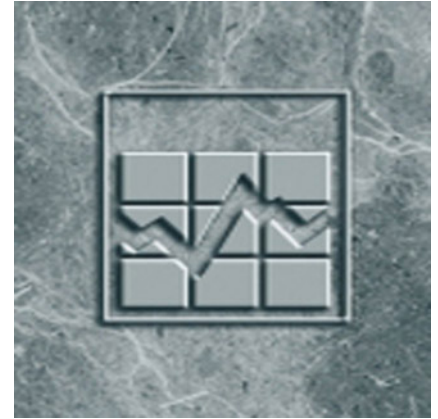## Research Paper

Income research paper series

Low Income Measurement in Canada

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Low Income Measurement in Canada

Abstract

The measurement of low income in Canada has a long history. This paper consolidates existing information into one document and indicates the current status of the three measures of low income in Canada: the Low Income Cutoffs (LICOs), the Low Income Measures (LIMs) and the Market Basket Measure (MBM). The methodology of each of the three measures is presented in this paper. Future developments with respect to low income measurement in Canada are also included in this paper.

Table of Contents

1.   Introduction

The measurement of low income in Canada has a long history. In the mid 1960s, research at Statistics Canada led to the development of the Low Income Cutoffs (LICOs). These lines were developed to indicate an income threshold below which a family is likely to spend significantly more of its income on food, shelter and clothing than the average family.

Released in 1967, the first LICOs used the 1959 Survey of Family Expenditures (FAMEX). There were 5 cutoffs, corresponding to families of sizes 1, 2, 3, 4 and 5 or more. The 1959 cutoffs were updated annually using the Consumer Price Index. A new set of LICOs were generated using data from the 1969 FAMEX. The methodology was identical except that the number of lines was extended from 5 to 35, based on family sizes up to 7 and over, that were each crossed by 5 geographical areas.   The geographical areas corresponded to the size of area of residence, from rural to large urban. Subsequent LICO base years were 1978, 1986 and 1992.

The other measure of low income generated by Statistics Canada, the Low Income Measures (LIMs) have been produced since 1991 (although the time series has been extended back). The LIM is defined as half the median family income (income is adjusted for the family size). LIMs are the most frequently used measure internationally, particularly when making comparisons between countries. The primary reason for its popularity is its simplicity of calculation, unfortunately not because of a sound scientific justification.

Starting in 1997, the Market Basket Measure (MBM) was developed by Human Resources Development Canada in consultation with a Federal-Provincial-Territorial Working Group of officials on Social Development Research and Information. As its name implies, the Market Basket Measure is a "goods and services" rather than a "relative" indicator of low income. The MBM estimates the cost of a specific basket of goods and services for the reference year, assuming that all items in the basket were entirely provided for out of the spending of the household. Any household with a level of income lower than the cost of the

basket is considered to be living in low income. The MBM lines have been released for reference year 2000. Low income rates and other statistics have been produced using these lines. To date, statistics for this one year only have been released.

This paper pulls together information from a number of documents. The contribution it makes is to consolidate existing information into one document and to indicate the current status of each of the measures. The most recent of the source documents are listed below. In turn, these documents reference previous reports on the topic of low income measurement in Canada. For those who find the content of this paper is not sufficiently detailed, these papers contain more detail than is included here.

- **Low income cutoffs from 1994 - 2003 and low income measures from 1992 - 2001**
  Income Statistics Division, Statistics Canada, 2004
  Statistics Canada Catalogue no. 75F0002MIE2004002
  http://www.statcan.ca/english/research/75F0002MIE/75F0002MIE2004002.pdf
  http://www.statcan.ca/francais/research/75F0002MIF/75F0002MIF2004002.pdf

- **Exploration of methodological issues in the development of HRDC's Market Basket Measure**
  Sylvie Michaud, Cathy Cotton and Kevin Bishop
  Income Statistics Division, 2004
  Statistics Canada Catalogue no. 75F0002MIE2004001
  http://www.statcan.ca/english/research/75F0002MIE/75F0002MIE2004001.pdf
  http://www.statcan.ca/francais/research/75F0002MIF/75F0002MIF2004001.pdf

- **Understanding the 2000 low income statistics based on the Market Basket Measure**
  Applied Research Branch, Strategic Policy, Human Resources Development Canada, 2003
  HRDC Catalogue no. RH63-1/569-03-03
  http://dsp-psd.pwgsc.gc.ca/Collection/RH63-1-569-03-03E.pdf
  http://dsp-psd.pwgsc.gc.ca/Collection/RH63-1-569-03-03F.pdf

2.   Comparison of measures of low income

The methodology for each of the measures is described in more detail in subsequent sections. However, a few noteworthy comments are appropriate here:

All three measures use the "economic family" as the entity in which economic resources are shared. The economic family is defined as the group of persons living in the same household who are related by blood, marriage, common-law or adoption. So three generation families are considered one economic family, but three unrelated persons sharing a dwelling as room-mates would be considered to be three economic families.

All three measures use income as the basis for defining the low income population. While income is frequently used in this way, primarily due to data availability, alternative approaches to measurement of low income could use such other characteristics such as expenditures, assets, stage of life (full-time student, parent with young children, retired) or a combination of these to assess whether a particular person or family is in low income.

So the basic approach to defining low income is the same for each of the measures; i.e., a cutoff is determined and is compared to the income of an economic family (derived as the sum of the income of each individual in the family). A family with income less than the cutoff is defined as being in low income; otherwise not. All persons within an economic family are assigned the low income characteristic of the family in which they live.

Although there are many similarities among the measures, there is one significant difference. Different income concepts are used. For the LICO and LIM, two different income measures are used: before-tax income and after-tax income. Before-tax income is the sum of income from employment (both paid and self employment), investment income, retirement income and income from

government transfer programs. After-tax income is before-tax income with income taxes paid deducted.

Statistics Canada highlights the use of after-tax income for low income measurement. There are several reasons for this. First, both income taxes and transfers are methods of income redistribution. The before-tax rates only partly reflect the entire redistributive impact of Canada's tax/transfer system, by including the effect of transfers but not the effect of income taxes. Second, since the purchase of necessities is made with after-tax dollars, it is logical to use people's after-tax income to draw conclusions about their overall economic wellbeing. However, the before-tax measures are also produced as this was the measure originally used, prior to the time when good quality data on income taxes paid was available.

The MBM takes this concept a step further by moving closer to a measure of disposable income. The MBM income measure is after-tax income with additional non-discretionary expenditures deducted. (These additional deductions are: the personal portion of payroll taxes; other mandatory payroll deductions such as contributions to employer-sponsored pension plans, supplementary health plans and union dues; child support and alimony payments made to another household; out-of-pocket spending on child care; and non-insured but medically-prescribed health-related expenses such as dental and vision care, prescription drugs and aids for persons with disabilities.)

For LICOs and LIMs, the low-income rates are higher when using before-tax income. This result may appear inconsistent at first glance, since income after-tax cannot be any higher than they are before-tax, considering that all transfers, including refundable tax credits, are included in the definition of "before tax" total income. However, with relative measures of low income such as the LICO and LIM, this result is to be expected with any income tax system which, by and large, taxes those with more income at a higher rate than those with less. "Progressive" tax rates, as they are often called, make the distribution of income more compressed. Therefore, some families defined to be in low income before

taking taxes into account are relatively better off and are not in low income on an after-tax basis.

For reference year 2000 (the only year when MBM data are now available), the overall rates for the various measures are:

- LICO (after-tax income) = 10.9%
- LICO (before-tax income) = 14.7%
- LIM (after-tax income) = 11.1%
- MBM (disposable income) = 13.1%

These are person-level prevalence rates.

3.   Methodology of the Low-income cutoffs (LICO)

A low income cutoff (LICO) is an income threshold below which a family is likely to spend significantly more of its income on food, shelter and clothing than the average family. The starting point for producing a set of cutoffs is the Family Expenditure Survey (FAMEX), which was redesigned and renamed the Survey of Household Spending (SHS) in 1997. Both surveys produce family expenditures on a wide variety of items, including food, shelter and clothing, which are of interest for LICOs. The relationship between income and the necessities of food, shelter and clothing is at the heart of the low income cutoffs.

Chart 1 uses data from the 1992 FAMEX to illustrate how a LICO is calculated. Each dot in the chart represents the after-tax income and the percentage of after-tax income spent on food, shelter and clothing for a family of four living in an urban area with a population of 30,000 to 99,999. Generally, families with high incomes tend to spend a smaller proportion of their income on the necessities. They spend more dollars than families with lower incomes, but they spend less as a percentage, and have more left over for spending on items that are not necessities. The curved line in Chart 1 is a regression line that has been fitted to the distribution to show the typical relationship between income and spending on food, shelter and clothing. The horizontal line in Chart 1 shows the average spent on food, shelter and clothing by all households. In 1992 this was 43.6% of after-tax income. The LICO methodology then adds 20 percentage points to this

average, representing the situation of a family that is spending significantly more than the average on necessities. Therefore, the income at which a family typically spends 63.6% of its after-tax income on the basics is the low income cutoff. This can be seen graphically by following the upper horizontal line across to the regression line and reading off the LICO from the after-tax income axis – about $21,300 in 1992.

Chart 1 Calculation of a Low Income Cutoff
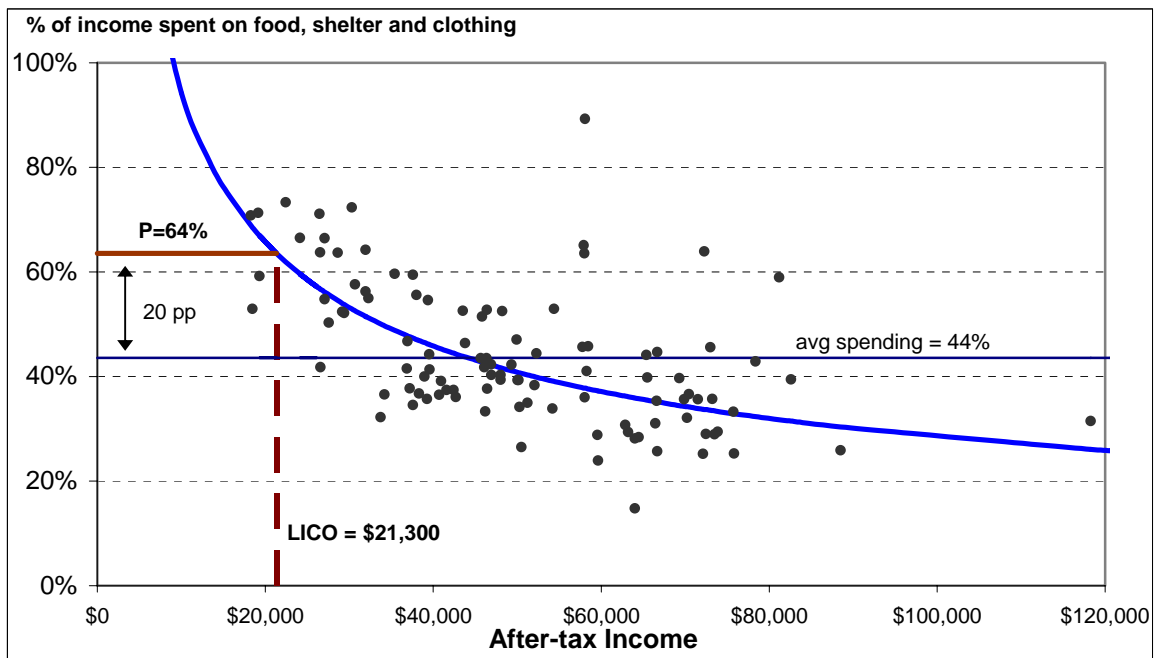
A family with an income below the cutoff is counted as being in low income. Note that the relationship between spending and income is used only in the production of the cutoffs, not in the determination of low income status. A family's low income status depends solely on its income, not on its spending. A family spending 90% of a $60,000 income on food, shelter and clothing would not be counted in low income. Even though this family's spending exceeds 63.6%, its low income status depends on its income, which is above the cutoff. Conversely, a family that spends 50% of a $20,000 income would be considered in low income, even though its spending would put it below the 63.6% line.

Low income cutoffs are produced for seven family sizes and five sizes of area of residence, forming a set of 35 cutoffs. The whole exercise is carried out using both before-tax and after-tax income. These two sets are produced independently. There is no simple relationship, such as the average tax paid, which connects the two sets.

There are many published sets of low income cutoffs, so it may be useful to list three characteristics that distinguish one set from another.

1) **Base year:** The relationship between families' income and spending is associated with a specific point in time, i.e. the year of the expenditure survey used to derive the cutoffs. That particular year is referred to as the base year for the set of cutoffs. The most recent base year is 1992, though cutoffs also exist for 1986, 1978, 1969 and 1959 base years. At the present, the 1992 base is the most frequently used. Statistics Canada has traditionally maintained cutoffs based on the two most recent bases.

2) **Income reference year:** It has been the practice to update the cutoffs each year by applying the annual Consumer Price Index (CPI). This takes inflation into account, but ignores any changes that might have occurred in the spending pattern of families. For example, a set of 1998 cutoffs (1992 base) takes account of inflation between 1992 and 1998, but reflects the spending pattern of 1992.

3) **After-tax or Before-tax:** As mentioned above, any set of cutoffs can be derived from after-tax income or before-tax income, and should be applied to that same income concept. The 1959, 1969 and 1978 based LICOs are available only for pre-tax low income since the Survey of Consumer Finances (SCF) did not at that time collect information on post-tax income.

To give an idea of the variation of the LICO cutoffs by family size and size of area of residence, here are the after-tax LICOs for reference year 2000. (This year was chosen as it is the only year for which MBM cutoffs are currently available.)

Table 1	Size of area of residence				
	Rural areas	Urban areas, population under 30,000	Urban areas, population 30,000 to 99,999	Urban areas, population 100,000 to 499,999	Urban areas, population 500,000 and over
Family size					
1 person	$9,947	$11,498	$12,583	$12,780	$15,172
2 persons	$12,138	$14,030	$15,353	$15,594	$18,513
3 persons	$15,352	$17,745	$19,419	$19,723	$23,415
4 persons	$19,120	$22,101	$24,186	$24,565	$29,163
5 persons	$21,371	$24,701	$27,031	$27,456	$32,595
6 persons	$23,622	$27,301	$29,877	$30,346	$36,027
7 persons or more	$25,872	$29,902	$32,722	$33,237	$39,459

4. Methodology of the Low income measures (LIM)

The low income measure (LIM) is a fixed percentage (50%) of median adjusted family income, where "adjusted" indicates that family needs are taken into account. There is no geographic component to the LIM, as there is with the LICO and MBM. Another difference with the LIM as compared to the other two measures is that the cutoffs are estimated from the income survey used to determine the low income statistics, whereas the others use external data sets.

Adjustment for family sizes reflects the fact that a family's needs increase as the number of members increases. Most would agree that a family of five has greater needs than a family of two. Similarly, the LIM allows for the fact that it costs more to feed a family of five adults than a family of two adults and three children.

To take family size and economies of scale into account, it is common to use an "equivalence scale" to adjust family incomes. Instead of implicitly assuming equal costs for additional family members as a per capita approach would do, the equivalence scale is a set of decreasing factors assigned to the first member, the second member, and so on. The adjusted income amount for the family is

derived by dividing the income value by the sum of the factors assigned to each member. There is no single equivalence scale in use in Canada (or internationally). The one used in the low income measure (LIM) has, however, achieved a high degree of acceptance. In this equivalence scale, the factors are as follows:

- the oldest person in the family receives a factor of 1.0;
- the second oldest person in the family receives a factor of 0.4;
- all other family members aged 16 and over each receive a factor of 0.4;
- all other family members under age 16 receive a factor of 0.3.

For example, a couple without children or a single-parent family with one child both have a conversion factor of 1.4. A single-parent family with two children has a conversion factor of 1.8, and so on. Note that this equivalence scale is very similar to the frequently-used "square root of family size" scale, particularly for families with fewer than 8 persons.

It is also useful to note that LICOs deal with different family sizes by having a separate cutoff for each size, so the equivalence scale is implicit and differs across the various cells in the LICO matrix.

The LIM cutoffs for reference year 2000 are given in Table 2 below. (This year was chosen as it is the only year for which MBM cutoffs are currently available.)

Table 2	Number of children					
	0	1	2	3	4	5
Number of adults						
1	$12,468	$17,455	$21,196	$24,936	$28,676	$32,417
2	$17,455	$21,196	$24,936	$28,676	$32,417	$36,157
3	$22,442	$26,183	$29,923	$33,664	$37,404	-
4	$27,430	$31,170	$34,910	-	-	-
5	$32,417	$36,157	-	-	-	-
6	$37,404	-	-	-	-	-

The basic LIM value that is calculated is the 1-adult 0-children value. The cutoffs in the other cells are derived by multiplying this basic value by the appropriate

value of the equivalence scale. Empty cells are those for which the sample in the survey was not large enough to calculate reliable low-income rates.

5. Methodology of the Market Basket Measure (MBM)

The concept underlying the Market Basket Measure (MBM) of low income, as specified by the Federal/ Provincial/Territorial Working Group on Social Development Research and Information, falls within the family of absolute measures. It attempts to identify a standard of living lying between the poles of subsistence and social inclusion. It goes beyond a *subsistence* standard of living, allowing for the acquisition of resources necessary for taking part in the life of the community.

The measure is intended to be:
- credible in its approach to poverty measurement
- easy to understand
- sensitive to geographic cost differences
- reflect changes in costs rather than changes in income

The objectives of the basket are to identify goods and services to allow a family to :
- eat a nutritious diet
- buy clothing for work and social occasions
- house themselves in their community
- satisfy basic transportation needs for work, school, shopping and participation in community activities
- pay for other necessary expenses

To do this, the following choices were made:
- a nutritious diet as described by the 1998 version of Health Canada's Nutritious Food Basket
- the basket of clothing and footwear defined by the Social Planning Council of Winnipeg's 2000 Acceptable Living Level (A.L.L. 2000) clothing list

- the median rental unit in each community size in each province and territory
- transportation, using public transportation when available in a region
- other necessary goods and services.

These choices were based on very pragmatic reasoning. To the extent possible, it was decided to use "baskets" that had already been developed and to use currently existing data on prices.

So, each year the price of the items covered under food, shelter, clothing and transportation are used. The fifth category, "Other necessary goods and services", is derived in a different fashion.

To balance effort spent with benefits returned, the methodology for pricing other expenses avoids the costly task of pricing, then updating estimates for the numerous items categorized as other expenditures. Therefore, using data on families from the household expenditures survey (Survey of Household Spending), the average total annual expenditures on the selected "other expenses" items are calculated as a proportion of expenditures on food and clothing, for families in the second lowest decile of after-tax income. This value is then applied to the estimated costs of the food and clothing components of the MBM to produce a dollar amount for other expenses.

It is important to note that the MBM is using data on prices of a basket, not expenditures. These are conceptually different: the basket price represents the cost of a fixed selection of goods and services, while expenditure data represent the amount spent and therefore reflect the behaviours and choices or spending patterns of Canadians.

The basket has been priced to reflect the cost of living for a family of two adults and two children. In theory, a basket could be defined for other family sizes and priced separately. However, to save effort, the equivalence scale used for the LIM is used.

The MBM expands on the geographic detail used in the LICOs. The basket is costed by province and the size of area of residence currently used for the LICOs. Both dimensions are desirable because they reflect differences in the cost of living in different parts of Canada and allow the comparison of urban and rural areas within a province.

The MBM cutoffs for reference year 2000 are provided in the following table. (Provinces are indicated in bold; cities with their own cutoff are listed in italics.)

Table 3	MBM Cutoff
Newfoundland	
Rural areas	$25,556
Urban areas, population under 30,000	$26,281
St. John's	$24,095
Prince Edward Island	
Rural areas	$23,572
Urban areas, population under 30,000	$24,656
Charlottetown	$25,434
Nova Scotia	
Rural areas	$25,182
Urban areas, population under 30,000	$25,429
Urban areas, population 30,000 to 99,999	$23,331
Halifax	$24,607
Sydney	$22,606
New Brunswick	
Rural areas	$24,299
Urban areas, population under 30,000	$24,632
Fredericton	$23,940
Saint John	$22,233
Moncton	$22,940

Québec	
Rural areas	$23,161
Urban areas, population under 30,000	$23,260
Urban areas, population 30,000 to 99,999	$21,182
Urban areas, population 100,000 to 499,999	$21,797
Québec City	$22,156
Montréal	$22,441
Ontario	
Rural areas	$25,117
Urban areas, population under 30,000	$25,091
Urban areas, population 30,000 to 99,999	$23,059
Urban areas, population 100,000 to 499,999	$24,539
Ottawa	$26,503
Hamilton/ Burlington	$23,745
Toronto	$27,343
Manitoba	
Rural areas	$22,932
Urban areas, population under 30,000	$24,135
Brandon	$21,745
Winnipeg	$22,750
Saskatchewan	
Rural areas	$23,237
Urban areas, population under 30,000	$24,220
Urban areas, population 30,000 to 99,999	$21,658
Saskatoon	$22,894
Regina	$22,442
Alberta	
Rural areas	$24,509
Urban areas, population under 30,000	$25,719
Urban areas, population 30,000 to 99,999	$23,677
Edmonton	$23,571
Calgary	$24,180

British Columbia	
Rural areas	$28,376
Urban areas, population under 30,000	$28,752
Urban areas, population 30,000 to 99,999	$26,892
Urban areas, population 100,000 to 499,999	$26,635
Vancouver	$27,791

6. Future developments

Since the MBM is relatively new, the basic plan is to wait until a few years of data have been released. At that time, the reactions of the user community will be important in determining whether to change directions. This could mean modifying the methodology for one or more of the current measures or deciding to feature the MBM over the after-tax LICOs in Statistics Canada's income releases.

Having said this, some ideas are currently being researched related to the LICO methodology. With one exception (the addition of a geographical component and the expansion of family sizes in 1969), the LICO methodology has not changed since its original inception. The three proposals under evaluation are:

- Should we publish an annually updated LICO series?

Although more recent expenditures surveys are available, the primary LICO series is based on the 1992 survey. In fact, the expenditures survey used be conducted approximately every 4 years but has been annual since 1997. So it is possible to develop a LICO series that uses the most recent year of expenditures data for every reference year. The percentage of spending on food, shelter and clothing is decreasing over time, so the choice of base year has an impact on the low income rate.

- Should we take payroll taxes or other "non-discretionary" expenses into account?

Just as there is an argument for preferring after-tax income to before-tax income, there is an argument for moving closer to a measure of disposable income. Due to data availability, one consideration is that the income surveys would not be able to calculate disposable income (no matter how it is defined) prior to 1999. This means that the time series would be much shorter than that using the current LICO series.

- Should we restructure the LICO matrix?

Toronto, Montréal and Vancouver are, by far, the three largest cities in the country. Arguably, each is unique enough to warrant separate consideration in the LICO matrix (as is done with the MBM). Although the population of the country has greatly increased, and the ratio of urban dwellers to rural dwellers is much higher, the LICO matrix continues to use the same size of area of residence groups as originally conceived. In a similar vein, family sizes are, on average, lower than they were in the 1960s. So, while still maintaining a two-dimensional matrix, geography by family size, should the categories be modified?