Family income inequality, 1970-1995

Abdul Rashid

Income is related to a number of factors, among them, education, work experience and asset holdings. As these are not distributed uniformly across the population, an equal distribution of income cannot be expected. Even so, the degree of inequality in income distribution concerns many researchers, policy makers and interest groups. This article examines the extent of, and changes in, family income inequality between 1970 and 1995 (see *Definitions*).

Family structure

Husband-wife families in which the wife reports employment income (dual-earner families)[1] have higher incomes than others. A small proportion of these families have very low incomes and a significant proportion have very high incomes. In 1995, only about 5% had a total income of less than $20,000, while 14% had a total income of at least $100,000. In contrast, husband-wife families in which the wife has no earned income have, in general, smaller incomes. In 1995, while less than 5% had a total income of $100,000 or more, 21% had less than $20,000.

These different income distributions are evident in the Lorenz curves for the two groups (Chart A). The curve representing dual-earner families lies closest to the diagonal; hence, these families experienced the least income inequality. The curve for families in which the wife had no earned income lies farther away, displaying a greater degree of inequality of income distribution.

The Lorenz curve for female lone-parent families shows the most inequality of income distribution.[2]

Abdul Rashid is with the Income Statistics Division. He can be reached at (613) 951-6897 or rashabd@statcan.ca.

Chart A
The Lorenz curve reveals income inequality among families.

Cumulative distribution of family income (%)

Cumulative distribution of families (%)
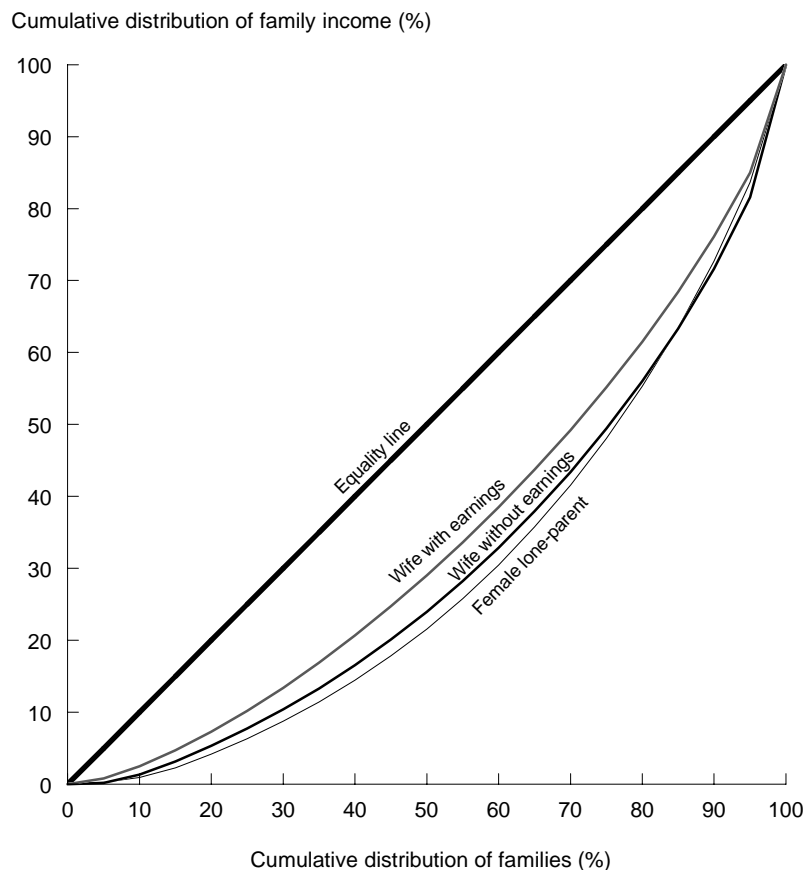
Source: Census of Canada, 1996

The Lorenz curve provides a simple visual picture of income inequality. The horizontal axis represents the cumulative percentage of income units (families) arranged in order of income size, while the vertical axis represents the cumulative share of these units in the aggregate income. If all families received the same income, their Lorenz curve would coincide with the diagonal. The farther the curve from the diagonal, the more unequal the income distribution.

This is to be expected, since these families consist not only of those headed by young mothers (under 45 years of age) with small children, but also of those headed by older lone mothers (45 years and over) with grown-up children. The first group's average total family income in 1995

was $21,200. The second group's was $37,600 (77% higher), enhanced substantially by the income of adult children.

Transfers and taxes

Government transfer payments augment, in general, the incomes of families at the lower end of the income spectrum, thus reducing the gap between their incomes and those of families at the upper end. Personal income taxes have a similar effect on income distribution, since the average rate of such taxes is significantly higher for families in the upper income brackets. Both these measures change income distributions.

Without government transfer payments and income taxes, inequality of income distribution among all families would be greater (Chart B). Expressed visually, the effect of government transfer payments is clear: the Lorenz curve excluding government transfer payments from total family income lies below the curve for total income and farthest from the income equality line – indicating the most income inequality. Without transfer payments, the very small share of lower income families in the aggregate income becomes even smaller, while that of families in the upper income groups increases.

In contrast, the Lorenz curve for the distribution of family income after taxes lies above the total income curve.[3] By reducing the gap between the shares of the lowest and highest income groups, taxes shift the Lorenz curve closer to the income equality line.

Changes in inequality

The Lorenz curve enables comparison of income inequality among a limited number of groups, especially if the differences are substantial. However, when the curves not only lie close to each other but also cross each other, their interpretation becomes difficult.[4] Therefore, a quantitative measure is needed to provide
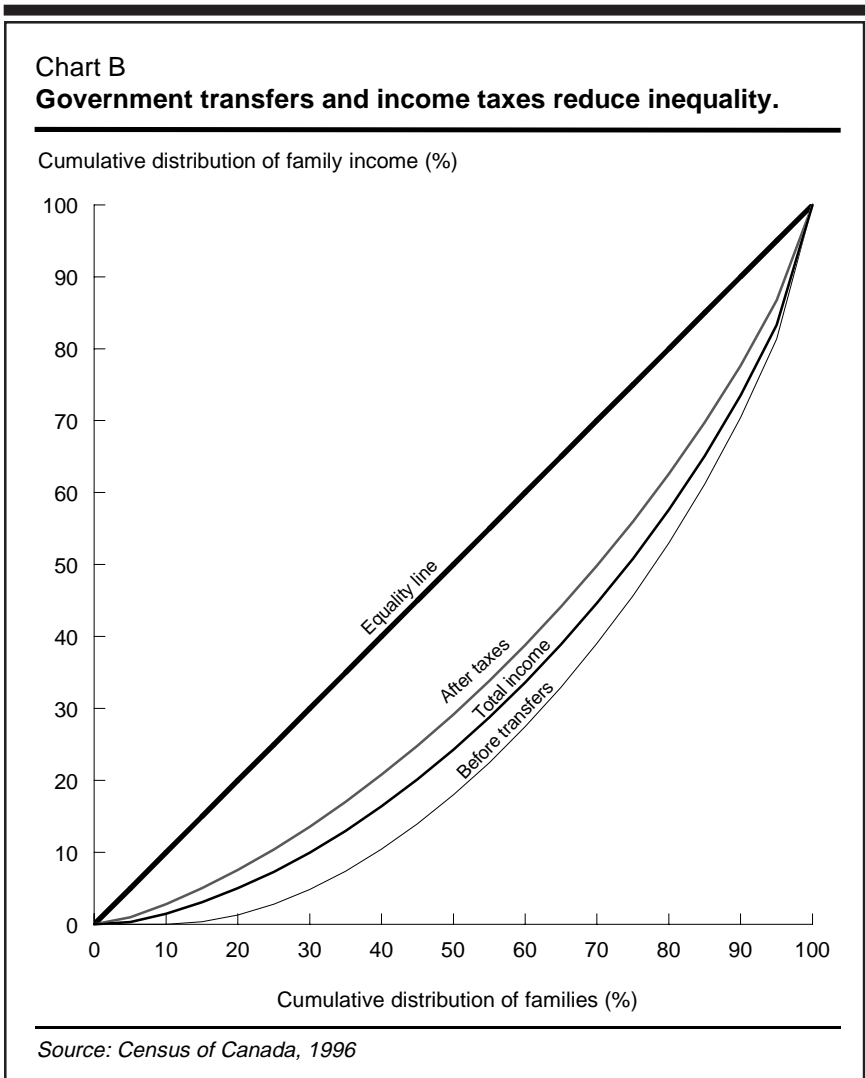
Chart B
Government transfers and income taxes reduce inequality.

Cumulative distribution of family income (%)

Source: Census of Canada, 1996

an estimate of differences in income inequality among several groups, or changes in inequality over time. The most widely known and used measure for this purpose is the Gini coefficient.[5] (This number lies between zero and one, denoting, respectively, total equality [all families receive equal income] and total inequality [one family receives all income].)

Over 25 years, inequality in overall family income increased by 2 percentage points, the Gini coefficient rising from .352 in 1970 to .373 in 1995 (Table). On the whole, income inequality changed little during times of economic stability – 1970 to 1980 and 1985 to 1990. Most of the increase occurred following the two recessions – in the early 1980s and again in the early 1990s (see *Using the Gini coefficient*).

During the period under review, changes in social attitudes, family laws and social security provisions led to significant changes in the structural composition of families. Between the 1971 and 1996 Censuses, the total population increased by 34% while the number of census families increased by 55%. The fast growth of female lone-parent families contributed considerably to this difference in growth rates. And the aging of the population led to an increase in the proportion of elderly families.

Irrespective of changes in income levels, these changes resulted in a greater proportion of families at the lower rungs of the income ladder and, therefore, greater overall inequality. The sharp increase in the participation of wives in the labour market was another major development during the period under review. The structural changes, coupled with changes in economic activity, have had strong, sometimes conflicting influences on income distributions.

Income inequality among families of different characteristics followed the overall pattern; that is, it increased following recessionary periods and remained stable otherwise. However, the degree of inequality and the changes within various groups over the period were greater than the total change.

Income inequality among dual-earner families increased consistently from 1970 to 1995. At the beginning of the period, the Gini coefficient for the income distribution of these families

was lowest, at .270. Although still lowest in 1995, it had increased by 4 percentage points. Compared with an overall growth of 55%, families with earning wives increased by 132% over the period. Because a group loses some of its homogeneity as it grows, the increase in income inequality among these families is not surprising.

In the case of families in which the wife had no earned income, inequality declined somewhat in 1980, but moved back to the 1970 level (.376) in 1990 and then increased to .383 in 1995. Inequality among husband-wife families overall was identical in 1970 and 1990 (.338), in spite of a significant increase in the inequality among dual-earner families. This was primarily the effect of the growing proportion of the latter families, whose income distribution displayed the

lowest Gini coefficient in 1995. However, income inequality among all husband-wife families had moved up over a percentage point by then.

Inequality of income distribution among male lone-parent families moved with the business cycle. It declined between 1970 and 1980 and between 1985 and 1990, and increased between 1980 and 1985 and between 1990 and 1995, reflecting both recessions. The Gini coefficient for their income distribution in 1995 (.383) was about the same as in 1970 and identical to that of husband-wife families in which the wife had no employment income.

The largest decline in income inequality occurred among female lone-parent families. Beginning at .440 in 1970, the Gini coefficient for their income distribution dropped

Using the Gini coefficient

It would be useful to note some features of Gini ratios before proceeding further. First, the Gini coefficient never reaches its limits of 0 and 1. It usually ranges between .2 (low inequality) and .5 (high inequality).

Second, changes in the index take place only when the relative shares of total income change for different groups. For instance, assuming two equal groups of families, if one group receives 20% of all income and the other group, the remaining 80%, the Gini coefficient will be .300. If the share of the first group increases by one percentage point to 21%, the Gini coefficient will decline by one percentage point, to .290. The coefficient will increase to .310 if the group's share in total income declines to 19%.

Third, changes in income inequality take place at a very slow pace. A change of one percentage point, for example, from .345 to .355 or .335, would be considered significant.

Fourth, a change in the general level of income would not necessarily result in a change in inequality. For example,

other things being equal, an increase or decrease of 10% in income shared equally by all income units will not change the Gini ratio. The ratio will change only if income changes have not been uniform across different groups, thus leading to a change in their relative shares in total income.

Fifth, even if income levels do not change, demographic and structural changes will alter the shares of different groups, thus affecting the overall income distribution. This will result in changes to Gini ratios.

Finally, these changes take place concurrently. Some of these may reinforce each other and affect overall inequality; others may cancel the effect of each other, leaving the inequality measure unchanged.

In view of these factors, caution has to be exercised in the interpretation of changes in Gini coefficients over time. To help keep the ratios in perspective, demographic and structural changes and changes in average real incomes of families between 1970 and 1995 are noted for different groups[6] (Table).

Table
Gini coefficients for the income distribution of families by selected characteristics

	Change: 1970 to 1995		Gini coefficient				
	Number of families	Real family income	1970	1980	1985	1990	1995
	%						
All families	**55.1**	**32.0**	**0.352**	**0.351**	**0.359**	**0.357**	**0.373**
Family structure							
Husband-wife families	46.2	36.8	0.338	0.332	0.339	0.338	0.352
Wife with employment income	132.4	37.8	0.270	0.284	0.294	0.298	0.309
Wife without employment income	-12.7	9.1	0.376	0.371	0.371	0.375	0.383
Male lone-parent families	93.3	19.3	0.389	0.376	0.386	0.375	0.383
Female lone-parent families	155.5	19.1	0.440	0.435	0.425	0.405	0.406
Under age 45	243.1	31.3	0.438	0.432	0.417	0.393	0.393
45 and over	84.3	29.5	0.405	0.385	0.380	0.358	0.358
Age of husband/lone parent							
15 to 24	-36.5	-21.3	0.309	0.335	0.371	0.376	0.406
25 to 34	26.1	16.9	0.291	0.303	0.315	0.316	0.346
35 to 44	83.3	28.4	0.323	0.324	0.326	0.325	0.348
45 to 54	63.6	39.1	0.343	0.338	0.343	0.338	0.351
55 to 64	44.5	34.1	0.382	0.364	0.384	0.379	0.387
65 and over	104.5	47.5	0.427	0.376	0.367	0.373	0.358
Province/territory							
Newfoundland	44.5	49.7	0.381	0.353	0.360	0.356	0.374
Prince Edward Island	48.3	57.0	0.374	0.346	0.340	0.330	0.331
Nova Scotia	41.5	36.5	0.353	0.340	0.350	0.344	0.355
New Brunswick	48.4	39.9	0.350	0.343	0.352	0.346	0.358
Quebec	44.1	23.6	0.351	0.350	0.357	0.351	0.367
Ontario	56.1	30.4	0.332	0.342	0.349	0.355	0.374
Manitoba	25.2	34.8	0.364	0.351	0.354	0.350	0.356
Saskatchewan	20.9	56.9	0.406	0.371	0.372	0.358	0.357
Alberta	88.1	39.3	0.367	0.354	0.364	0.355	0.366
British Columbia	89.7	31.1	0.336	0.346	0.357	0.353	0.373
Yukon	102.3	28.2	0.320	0.318	0.345	0.318	0.337
Northwest Territories	128.5	69.5	0.421	0.379	0.380	0.384	0.393
Government transfer payments and personal income taxes							
Total income	...	...	0.352	0.351	0.359	0.357	0.373
Income before transfers	...	...	0.388	0.401	0.425	0.425	0.458
Income after taxes *	...	...	0.316	0.293	0.304	0.295	0.300

Sources: Census of Canada; Survey of Consumer Finances (SCF)
* The coefficients for income after tax are derived from the data collected by the SCF. See notes 3 and 8.

steadily over the years. The large reduction in the 1980s can be attributed to the growth in their incomes in the second half of that decade. Although the recession of the early 1990s had a negative effect on the incomes of these families, income inequality among them remained virtually unchanged between 1990 and 1995, at .406.

The degree of income inequality among families headed by female lone parents under age 45 was high over the period. In 1970, the Gini coefficient for their income distribution exceeded that of other families, at .438. Although still highest, it dropped between 1980 and 1990 to .393, where it remained in 1995. Families headed by female lone parents aged 45 or

over experienced a decline of about 5 percentage points in income inequality. The Gini coefficient for their income distribution decreased from .405 in 1970 to .358 in 1990, with no further change in 1995.

By age of husband or lone parent, all families except the elderly saw an increase in income inequality between

1970 and 1995. Young families (husband or parent aged 15 to 24) experienced the largest increase over the period. The Gini coefficient for their income distribution increased by nearly 10 percentage points, from .309 in 1970 to .406 in 1995. Like husband-wife families in which wives had no earned income, the number of young families also decreased. However, this is the only group whose average real family income declined between 1970 and 1995. The earnings of young persons have been more adversely affected by economic recessions than have those of other age groups.[7] This is reflected in the increasing Gini coefficients for their income distribution.

Families in the next age group (25 to 34 years) also experienced sizeable increases in income inequality, although their Gini coefficient remained the lowest of all age groups.

The Gini coefficient for elderly families was highest, at .427, in 1970. It declined by 5 percentage points between 1970 and 1980, and by another point between 1980 and 1985, to .367. Although it increased between 1985 and 1990, it decreased to .358 in 1995. The large drop in the 1970s was the result primarily of major improvements in social security. That inequality among these families is still greater than among other age groups is not surprising. Families in the older group are not as homogeneous as the label "65 years and over" might suggest. While the main sources of income for many are old age pensions and other transfer payments, the group also includes many families that may be active in the labour market or that may be enjoying large retirement benefits and investment income.

Provincial picture

Between 1970 and 1995, real income of all families increased, on average, by 32%. Provincially, these increases ranged from 24% in Quebec to 70% in the Northwest Territories. Family income inequality increased, to varying degrees, in the areas that experienced below average increases.

Throughout the period, the two Territories showed extreme positions. The Gini coefficient for families in the Yukon was second lowest at .337 in 1995, while that in the Northwest Territories was highest at .393 (Table).

The experience of the four provinces in the Atlantic region was mixed. Family income inequality declined between 1970 and 1995 in Newfoundland and Prince Edward Island, while it eventually returned to 1970 levels in Nova Scotia and New Brunswick after the last recession. The only other province experiencing a significant drop in income inequality was Saskatchewan, where the Gini coefficient decreased from .406 to .357.

Quebec's position remained virtually unchanged between 1970 and 1990. Then the Gini coefficient increased from .351 to .367 in 1995. In contrast, income inequality in Ontario grew consistently over the years, with the Gini coefficient rising from .332 in 1970 to .374 in 1995. The only other province experiencing an increase of that magnitude was British Columbia, where the Gini coefficient rose from .336 to .373.

Role of transfer payments and taxes

The effect of government transfer payments and personal income taxes is evident in the Gini coefficients (Table). The coefficient for total income remained below .360 between 1970 and 1990, and then increased to .373 between 1990 and 1995.

The inequality of income distribution would have been significantly greater in each year considered had it not been for government transfer payments. The Gini coefficient would have been .458 as opposed to .373, a difference of over 8 percentage points. More important, inequality

would have increased significantly over the period. The Gini coefficient (and, therefore, inequality of income) would have risen by 7 percentage points without government transfer payments, instead of 2 points.

Personal taxes further reduced income inequality. In 1971, the Gini coefficient for the distribution of income after tax was .316.[8] Although small increases followed the two recessions, the index dropped to .300 in 1995, over 7 percentage points below the Gini coefficient for total income. Furthermore, while inequality in the distribution of total income increased over the period, that of income after tax declined.

The combined effect of these two measures – government transfer payments and personal income taxes – has not only substantially reduced income inequality, it has done so to an increasing degree over the years. In 1995, the difference in the Gini coefficients for income before transfers (.458) and after taxes (.300) was nearly 16 percentage points.

Summary

During the period under review, significant demographic and structural changes took place. The number of dual-earner, female lone-parent and elderly families increased substantially. Although average family income increased, two recessions also occurred. These developments had both positive and negative effects on income inequality. Income inequality among families increased between 1970 and 1995 as a result of the recessions of the early eighties and nineties. It increased significantly among dual-earner families, young families and families in Ontario and British Columbia. It declined among female lone-parent families, elderly families and families in Saskatchewan and the Northwest Territories. Both government transfer payments and personal income taxes have played a major role in reducing income inequality. ☐

■ *Notes*

1   In 1995, only 8% of families with earning wives had husbands with no employment income; in the remaining 92%, both spouses were earners.

2   The Lorenz curve for male lone-parent families was almost identical to that of husband-wife families in which the wife had no employment income.

3   The census does not collect information on personal taxes. The curve for income after tax is derived from the data collected in the annual Survey of Consumer Finances. While the income and family concepts are identical in the census and the survey, the latter does not cover the two Territories. However, this difference is not significant at the national level. The survey publishes data on different income concepts in its annual publications. (See, for example, text Table VI in Statistics Canada, 1998.)

4   For example, income inequality is clearly greater among female lone-parent families than among husband-wife families in which the wife had no earnings (Chart A). However, the two curves cross at a point that indicates a greater concentration of income at high levels among the latter families.

5   The Gini coefficient is associated with the Lorenz curve. It expresses the area between the diagonal and the Lorenz curve as a proportion of the area under the diagonal.

6   An upcoming article in *Perspectives* will examine the changes in the total income shares of different family groups between 1970 and 1995, along with changes in the composition of these groups by different family characteristics.

7   See *The Daily* (Statistics Canada, Catalogue no. 11-001-XPE) May 12, 1995 for details.

8   The coefficient relates to 1971 incomes. The Survey of Consumer Finances was not undertaken to collect 1970 incomes. (See also note 3.)

■ *References*

Love, R. and M.C. Wolfson. *Income Inequality: Statistical Methodology and Canadian Illustrations*. Catalogue no. 13-559-XPB. Ottawa: Statistics Canada, 1976.

Rashid, A. *Family Income in Canada*. Focus on Canada. Catalogue no. 96-318-XPE. Ottawa: Statistics Canada, 1994.

Statistics Canada. *Income and Earnings, 1990 and 1995*. Dimension Series. Catalogue no. 94F0005XCB. Ottawa, forthcoming.

---. *Income after Tax, Distributions by Size in Canada*, *1996*. Catalogue no. 13-210-XPB. Ottawa, 1998.

---. *Family Incomes, Census Families 1995*. Catalogue no. 13-208-XPB. Ottawa, 1997.