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Income Inequality and Redistribution in Canada: 1976 to 2004

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Note of appreciation:
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Abstract

Using data from the 1976-to-1997 Survey of Consumer Finances and the 1993-to-2004 Survey of Labour and Income Dynamics, we examine developments in family income inequality, income polarization, relative low income, and income redistribution through the tax-transfer system. We conclude that family after-tax-income inequality was stable across the 1980s, but rose during the 1989-to-2004 period.

Growth in family after-tax-income inequality can be due to an increase in family market-income inequality (pre-tax, pre-transfer), or to a reduction in income redistribution through the tax-transfer system.

We conclude that the increase in inequality was associated with a rise in family market-income inequality. Redistribution was at least as high in 2004 as it was at earlier cyclical peaks, but it failed to keep up with rapid growth in family market-income inequality in the 1990s.

We present income inequality, polarization, and low-income statistics for several well-known measures, and use data preparations identical to those used in the Luxembourg Income Study in order to facilitate international comparisons.

Keywords: income inequality, income, transfers, taxes, redistribution

Executive summary

After remaining stable across the late 1970s and 1980s, family after-tax-income inequality rose during the 1990s. This increase occurred at the same time as a reduction in the generosity of several income transfer programs, including the Employment Insurance and Social Assistance Programs (in some provinces), and decreases in income tax rates. This potentially reflects a weakening of the redistributive role of the Canadian state.

However, while rising after-tax-income inequality can result from a weakening redistribution system, it can also result from rising inequality in family market (pre-tax, pre-transfer) income. In this report we address the following question: Is income redistribution playing a smaller equalizing role in recent years than it did in the past, or is increasing inequality being driven by rising family market-income inequality?

We document trends in family after-tax-income inequality since 1976 using updated survey data covering all Canadians. We also examine how income redistribution through the tax-transfer system affects the level and growth rate of after-tax inequality, and ask if this has changed in recent years.

When examining the income of families, it is important to account for family size. In this study, before any other computations are made, family income is adjusted for family size using the widely accepted method of assigning each person in the family an amount of income equal to the square root of the total family income. This compensates for economies of scale present in larger families and yields indicators that reflect family income defined on a per-person basis. Therefore, any reference to income in this study refers to 'adjusted family income per person' unless otherwise noted.

It is also important to compare results to those from other datasets. We compare our results to census and income-tax data and these yield similar conclusions.

We examine inequality and redistribution using several well-known scales and widely accepted methods. For the purposes of this summary, we focus on levels and trends in the following indices:

- Inequality (1): The decile ratio, which is the ratio of the average family income of those in the top 10% of income to those in the bottom 10% of income.
- Inequality (2): The Gini coefficient, which is perhaps the most widely used index on income inequality. It ranges from 0 to 1, with 0 representing complete equality and 1, complete inequality.
- Polarization: The share of persons with family income from 75% to 150% of the overall median, to give a sense of what is happening to the size of the middle class.
- Low income: The share of persons with income less than one half of the 1979 median family after-tax income, which gives a sense of trends among those with the lowest income.

While the latter two indicators do not measure inequality, they allow us to focus on what is happening in the middle and bottom of the family income distributions respectively.

Trends in after-tax-income inequality

Values of these indicators are shown in Table A for 2004. Also, for comparative purposes, we show values for 1979 and 1989. These years, which are near to business cycle peaks, are good points of comparison to evaluate trends.

Table A Trends in after-tax-income inequality, 1979 to 2004

	Inequality (1)	Inequality (2)	Polarization	Low income
	Ratio of top 10% to bottom 10%	Gini	Share of persons with income from 75% to 150% of the median	Share of persons with income less than one half of 1979 the median
1979	7.46	0.283	0.512	0.129
1989	6.58	0.277	0.521	0.093
2004	8.85	0.315	0.473	0.102
1989 minus 1979	-0.88	-0.006	0.009	-0.036
2004 minus 1989	2.27	0.038	-0.048	0.009
2004 minus 1979	1.39	0.032	0.039	0.027

Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

The results show that family income became more equally distributed across the 1980s. The ratio of after-tax income of the top 10% to the bottom 10% fell from 7.46 in 1979 to 6.58 in 1989, and the Gini also fell. However, from 1989 to 2004, income inequality rose. The ratio of after-tax income of the top 10% to the bottom 10% rose from 6.58 in 1989 to 8.85 in 2004 (up by 35%), and the Gini also rose. The results indicate that after-tax-income inequality was higher in the post-2000 period than at any other point since 1976.

A close examination of after-tax income reveals that from 1989 to 2004, income fell for lower-income families but grew for middle- and higher-income families. Average income in the bottom 10% fell by 8% over this period, but rose by 8% at the median and by 24% in the top 10%. As a result, the absolute range between those with income in the bottom 10% and those in the top 10% also rose. In real dollars, after-tax income for a four-person family[1] was stable at about $110,000 higher in the top decile compared to the bottom decile all through the 1976-to-1995 period, but grew thereafter, reaching $147,600 by 2004. This indicates that the increase in after-tax-income inequality is of significant absolute magnitude as well as relative magnitude.

Income polarization also rose over the 1990s. The share of Canadians with family after-tax income from 75% to 150% of the median after-tax income fell from 52.1% in 1989 to 47.3% in 2004, a drop of 4.8 percentage points. Closer inspection of the data reveals that the trend away from the middle class (defined by income) was both towards lower-income and higher-income persons. The share of persons with after-tax income below 75% of the median rose by 2.6 percentage points, while that share with income above 150% of the median rose by 2.0 percentage points.

1. To estimate the gap for a four-person family, the difference in adjusted income per person between the top and bottom deciles is multiplied by the square root of four. This removes the adjustment for family size described earlier.

The share of persons with adjusted income below one half of the 1979 level of adjusted family median income fell across the 1980s but rose in the 1990s, ending at 10.2% in 2004, which is slightly higher than it was in 1989.

Trends in income redistribution

Is the increase in inequality described above the result of income redistribution playing a smaller equalizing role in recent years than it did in the past, or is increasing inequality being driven by other sources? (For the purposes of this summary, we only examine the effect of redistribution on inequality, but note that the effect was similar on other indicators we examined.)

There are several reasons to suspect that the role of the tax-transfer system in equalizing incomes may be different in the 2000s than in earlier decades. While the paper does not go in to these in great detail, we note that changes in social assistance (SA) and employment insurance (EI) eligibility and entitlement levels (these generally became more generous across the 1980s and then less across the 1990s), the introduction of new programs such as the Canada Child Tax Benefit (CCTB) and the Goods and Services Tax (GST) credit, as well as the maturation of the Canada Pension Plan (CPP) and the Québec Pension Plan (QPP) were important developments which may have affected the amount of income redistribution that is done through the transfer system. Moreover, increases in real tax rates across the 1980s, followed by their reduction in the 1990s, may have had implications for redistribution through the tax system.[2]

To understand how much of a role redistribution is playing in the 2000s relative to earlier decades, we start by examining family market-income inequality (market income includes wages, salaries, self-employment income, investment income, private pensions and other 'market-based sources'). Then we ask how the state redistributes income through income transfers (such as the CPP and the QPP, EI, SA, Workers' Compensation, the CCTB, the GST credit, and other direct government transfers) and taxes (federal and provincial income taxes), thereby reducing market-income inequality. The difference between inequality in family market income and inequality in family after-tax income is an indicator of how much the state redistributes family income and reduces income inequality.[3]

Moreover, there are two ways to think about the impact of redistribution on inequality. One is to ask how redistribution has affected the level of inequality. The second is to ask what role redistribution has played in inequality growth. Both of these perspectives can be observed by looking at Table B.

We begin by examining the effect of redistribution on the level of inequality. In 2004, the Gini index based on family market income was 0.428 while on family after-tax income it was 0.315, meaning that the direct effect of redistribution was to reduce inequality (as measured by the Gini) by 0.113. In 1989, redistribution lowered income inequality by 0.104, and in 1979, redistribution lowered inequality by 0.078. Thus, redistribution lowered inequality by more in 2004 than it did in either 1989 or 1979. The study shows that changes in transfers and taxes

2. In this study, we look at the transfer system and the tax system as a whole and do not attempt to quantify the impact of particular transfer programs or taxes.
3. To gauge the impact of redistribution on after-tax-income inequality, we look at the difference in after-tax-income inequality and market-income inequality, which we call the 'direct effect' of redistribution on inequality. This difference is called the direct effect because it measures only the observed effects of the tax-transfer system on income without attempting to quantify any indirect effects of taxes and transfer programs on the outcomes, for example through influencing work intensity.

together contributed to the rise in redistribution across the 1980s. During the 1990s, our results show that the changes in taxes and transfers described above had little net effect on overall redistribution, which remained as strong in 2004 as it was in 1989.

Table B Trends in income redistribution, 1979 to 2004

	Family market-income inequality	Family after-tax-income inequality	Total impact of redistribution	Increase in market inequality offset by redistribution
	Gini-M	Gini-AT	Gini-AT minus Gini-M	percent
1979	0.361	0.283	-0.078	...
1989	0.381	0.277	-0.104	...
2004	0.428	0.315	-0.113	...
1989 minus 1979	0.020	-0.006	-0.026	130
2004 minus 1989	0.047	0.038	-0.009	19
2004 minus 1979	0.067	0.032	-0.035	52

... not applicable
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

As noted before, another perspective is to ask what role redistribution has played in inequality growth. Again, to understand this, it is useful to first look at developments in family market-income inequality. The Gini for family market-income inequality rose from 0.361 in 1979 to 0.381 in 1989 (up 0.020) and then rose faster across the 1990s, reaching 0.428 by 2004 (up 0.047). In 1989, redistribution reduced the Gini by 0.026 more that it did in 1979, more than offsetting the rise in market-income inequality in that decade. Hence, family after-tax-income inequality fell across the 1980s. By 2004, redistribution reduced the Gini by only 0.009 more than in 1989, so the lion's share of the increase in market-income inequality from 1989 to 2004 was converted to an increase in after-tax-income inequality.

Said differently, redistribution grew enough in the 1980s to offset 130% of the growth in family market-income inequality—more than enough to keep after-tax income inequality stable. However, in the 1990-to-2004 period, redistribution did not grow at the same pace as market-income inequality and offset only 19% of the increase in family market-income inequality. To get a scale of redistribution necessary to stabilize income, we note that, other things equal, redistribution would have needed to expand enough to reduce the Gini by more than twice as much in the 1990s as it did in the 1980s in order to prevent after-tax-income inequality from rising in that decade.

It is difficult to conclude exactly how changes in particular tax or transfer programs may have contributed to these results from the analysis presented in this paper. However, we can make three general conclusions:

(1) Family after-tax income inequality rose across the 1990s, driven by rising family market-income inequality.
(2) The tax-transfer system reduced income inequality by as much in 2004 as it did in 1989. This is true even though the unemployment rate was lower in 2004 than it was in 1989. Other things equal, one would expect redistribution to have been lower when unemployment was lower. This suggests that, considered as a group, changes to the tax-transfer system over the 1990s did not increase income inequality.
(3) This rise in family market-income inequality in the 1990s reflects the continuation of a trend that was also occurring in the 1980s. After-tax income inequality did not also rise in

the 1980s because taxes and transfers both changed in that decade, increasing the share of income redistributed by the state from high- to lower-income families. The tax-transfer system would have needed to continue becoming more redistributive into the 1990s to neutralize the effect of rising family market-income inequality in that decade.

While this study does not investigate why family market-income inequality rose, one factor which likely plays a role in this is a widening inequality in family earnings (from wages, salaries and net self-employment income). A key driver of this is the rising earning power of the two-earner family, especially when both earners are highly educated. (Preliminary results suggest that individual earnings inequality is not driving this trend.) The report also notes that market income has fallen significantly at the bottom of the income distribution: average family market-income in the bottom decile fell by 18.7% from 1979 to 1989 and by a further 10.7% from 1989 to 2004. This suggests that low earnings and unemployment may also be playing a role. This may be particularly important among lone-parent families and unattached individuals who are more vulnerable to interruptions in employment.

Conclusion

This study shows that, after remaining stable for several decades, family after-tax-income inequality rose in the 1990s, settling at a higher level in the 2000s. At the same time, the share of middle-income families was reduced and the share of low- and high-income families grew larger. The absolute gap between bottom- and top-income families also increased in a substantive way, indicating that these increases in inequality have an important magnitude. These trends appear to have been driven by rising inequalities in income received from market sources (wages, salaries, self-employment income, private pensions and investment income) among families.

Many industrialized countries experienced an increase in after-tax-income inequality across the 1990s. For example, in the United States, after-tax-income inequality rose by 0.033 from 1986 to 2000, which is a slightly larger increase than the one that was observed in Canada over the same period. Moreover, similarly to Canada, the increase in U.S. after-tax-income inequality was driven by an increase in market-income inequality, and not a reduction in redistribution. After-tax-income inequality also rose in Finland, Germany, Norway, Sweden, and the United Kingdom over a similar period (Mahler and Jesuit, 2005). This suggests that, in part, an explanation common to many countries might be sought to understanding the rise in inequality, although this does not rule out country-specific causes as well.

Trends in income inequality are certainly something we should continue to monitor. Presently, Canada has a level of family market-income inequality that sits near the middle level of the market-income inequality of Western countries (Mahler and Jesuit, 2005). In the absence of increases in government transfers to lower-income families or increases in taxes to higher-income families, further increases in family market-income inequality would continue to be directly converted to increases in family after-tax-income inequality.

1. Introduction

In recent years, a number of papers have attempted to place the subject of income inequality and income redistribution back onto policy makers' radar screens. For example, a recent paper by Keith G. Banting (2005) argues that public policy has shifted away from an emphasis on income redistribution as a means to achieve economic security, leaving many Canadians vulnerable to unemployment, illness and divorce, among other things. One piece of evidence presented by Banting is the trend in family after-tax-income inequality in Canada, which rose in the 1990s. This increase occurred at the same time as a reduction in the generosity of several income-transfer programs, including Employment Insurance and Social Assistance (in some provinces) and income tax rates. This potentially reflects a weakening of the redistributive role of the Canadian state. However, while rising family after-tax-income inequality can result from a weakening redistribution system, it can also result from rising inequality in family market (pre-tax, pre-transfer) income. In this report we address the following question: Is income redistribution playing a smaller equalizing role in recent years than it did in the past, or is increasing inequality being driven by rising family market-income inequality?

We use the 1976-to-1997 Survey of Consumer Finances and the 1993-to-2004 Survey of Labour and Income Dynamics to examine these questions. Our approach is to document trends in family after-tax-income inequality, income polarization, low income and fiscal redistribution using up-to-date data and well-known indices and methodological approaches. This will allow us to quantify the amount of fiscal redistribution achieved through the tax-transfer system over the period and quantify any changes in the extent to which it has reduced inequality and low income in level and trend.[4]

It should be acknowledged that there are numerous other studies on inequality in Canada.[5] Moreover, Statistics Canada regularly releases inequality statistics similar to some that are presented in this paper as part of its income statistics program. However, it is hoped that this paper is a useful addition to the literature for four reasons. First, it emphasizes the effects of the tax-transfer system on the income distribution, a subject that is often covered in less depth in other studies.[6] Second, along with a relatively standard set of inequality measures such as the Gini, this paper examines relative low income in a manner consistent with most international studies, and presents some lesser known but useful indicators of low income, such as the Sen-Shorrocks-Thon index of low-income intensity, and indices of income polarization. Third, in 2005 Statistics Canada made important revisions to its income statistics data, with the result that lower-income respondents tended to get a higher weight in the revised data (Lathe, 2005). The impact of this reweighting on the distribution of income is not well known, so this paper fills a gap by providing a full analysis of up-to-date income inequality statistics. Finally, as described in Section 3, this study uses an identical methodological approach to the study of income as does the Luxembourg Income Study (LIS). The advantage of this approach is that it yields income inequality statistics that are comparable to those of other countries participating in the LIS program.

4. As discussed further below, this is done on a direct-effects basis, and does not consider behavioural responses resulting from the incentives the tax-transfer system places on market effort.
5. Most notably, a book edited by Jonathan R. Kesselman and David A. Green, entitled *Dimensions of inequality in Canada*, and published in 2006. Earlier Canadian research was summarized in Heisz, Jackson and Picot (2001).
6. A recent exception is Kesselman and Cheung (2006) who also examine redistribution through taxation and transfers in Canada.

In this paper, we follow the lead of Kenworthy and Pontusson (2005) who studied redistribution in several countries that are members of the Organisation for Economic Co-operation and Development, including Canada, for the period from 1980 to 2000. They found, in contrast to the "widespread rhetoric about the decline of the welfare state, redistribution increased in most counties during this period, as existing social-welfare programs compensated for the rise in market inequality" (p. 1). This paper is partly an updating and development of this other work, focussing on trends in Canada, and offering substantially more descriptive evidence. Readers interested in more of an international perspective could also look at Mahler and Jesuit (2005) or Picot and Myles (2005), although the data for Canada in those papers do not reflect the updates described above.

Section 2 provides background for the study by describing the context of change in family income: changes in the economy, the labour market, the institutional context and the family. Section 3 of the paper describes the data and methodological approach in detail. Section 4 describes trends in family after-tax-income inequality and relative low income. Section 5 describes trends in fiscal redistribution. Section 6 concludes.

2. The context of change: The economy, the labour market, the institutional framework, and the family

2.1 The economy

Before turning to the discussion of income inequality and redistribution, we first offer a context for these changes by looking at broad developments in the economy, the labour market, the institutional framework, and the family.

Although it has been growing steadily in the long run, cyclical movements in the gross domestic product (GDP) per capita index reflect the two large recessions of the 1981-to-1982 and 1991-to-1993 periods (Figure 1). While the economy recovered quickly from the former recession, effects of the latter lingered on through 1996 before the economy really started to take off again. The fastest period of growth was from 1996 to 2000 when growth in GDP per capita averaged 3.8% per year and exceeded 4% in 1999 and 2000. Income from market sources (labour income, net unincorporated business income and interest and investment income) generally outgrew the economy up to 1989, but lagged behind the economy after 1989 as corporate profits began to take a larger share of GDP. From 1989 to 2005, income to labour, unincorporated business and investments fell from 66% of GDP to 60% while corporate profits rose from 9% to 14% of GDP. Disposable income per capita (after taxes) followed GDP per capita growth steadily up to 1993, but lagged behind the economy after 1993, posting an average annual growth of 1.0% per year compared to the economy-wide growth of 2.4% (from 1994 to 2005).

2.2 The labour market

Labour market indices reflect strong cyclical movements, although by the early 2000s the unemployment rate was at its lowest level since 1976 and the employment rate was higher than at the peak of previous cycles (Figure 2-1)[7]. Weekly hours worked declined steadily across the last quarter of the 20th century (Figure 2-2), but this is explained partly by transformation from

7. Some groups such as the less educated have experienced increase in unemployment over the 1971-to-2005 period. See Morissette and Hou (2006).

part-year (seasonal), full-time work to full-year, part-time work. Hence, annual work hours per worker, while lower in 2004 than their peak level observed in 1999, remained higher than in 1979 and on an equal status in 1989, the two previous cyclical peaks (Figure 2-3). Declining unemployment rates coupled with high employment rates, and long work-years suggest reduced income from transfers in 2004 compared to earlier cyclical peaks. Most notably, high employment rates, high average annual work hours and rising disposable income (noted in the previous section) suggest that Canada's economy and labour markets were strong in the 2000s, although it does not say how outcomes were distributed among persons.

Distributional issues in the labour market would be reflected in trends in inequality in work hours or wages, or in a combined fashion, by trends in inequality in annual earnings. The annual earnings distribution is characterized by an absolute widening, but relative stability (Figures 3-1 and 3-2). The real gap in earnings between the 10th and 90th percentiles was fairly stable from 1976 to 1995 at about $60,000, but rose to $68,000 by 2004. However, the relative gap was more stable, with annual earnings at the 90th percentile at about 20 times the earnings in the 10th percentile in 2004, 1989 and 1979.[8]

2.3 The institutional context

A bundle of different programs make up Canada's income security system. According to tax data, Canadians received 11.8% of their 2004 before-tax income from government transfers, with the majority of this targeted for seniors (3.6% in Canada Pension Plan [CPP] and Québec Pension Plan [QPP], and 3.3% in Old Age Security [OAS]). Of the remaining programs, 1.6% were in Employment Insurance (EI), 1.1% in Canada Child Tax Benefit (CCTB), 1.0% in Social Assistance (SA), 0.6% in Workers' Compensation, 0.4% in Goods and Services Tax (GST) credits, and 0.3% in provincial tax credits.[9] However, from the perspective of examining changes in redistribution over time, more important is the fact that this institutional landscape is constantly changing. This can be because of revision, as in the case of EI and SA, because of the

8. This examines annual earnings inequality among men and women combined. Earnings include wages and salaries and net self-employment income. Other research shows an increase in earnings inequality across the 1980s when you restrict the sample to full-year, full-time workers. There are also differential trends among men and women. Because our interest is in reflecting factors underlying changes in family after-tax inequality, we do not make such distinctions here. Trends are similar if we restrict the sample to only those earnings of more than $500 in 1992 constant dollars. Wolfson and Murphy (2000) examine trends in individual and family earnings inequality up to 1997, which reflected a rise in individual annual earnings inequality up to 1997. Post-1996 trends suggest a fall in individual earnings inequality. Earnings inequality is studied in more detail in Beach and Slotsve (1996); Morissette, Myles and Picot (1994); Picot (1998); Green (1999); and Wolfson and Murphy (2000).
9. Dependency profiles, Statistics Canada, Small Area and Administrative Data Division.

development of a new program such as the CCTB, the GST credit, or because of the maturation of a program, as in Canada's retirement security program.[10]

Although a complete overview of government transfers is well beyond the scope of this study, a discussion of the largest programs is warranted. According to Banting (2005), "[w]hile pension programs for the elderly have changed little, virtually every program with more direct implications for labour market performance has been restructured in important ways, reducing the levels of economic security provided to beneficiaries" (p. 423).[11] This is particularly evident in EI and SA programs. The generosity of the EI program has steadily eroded since the 1970s, due to successive reductions in benefit levels and tightening of eligibility requirements. One indicator of EI generosity is the beneficiaries-to-unemployed ratio (BU ratio) which fell from 82.9% in 1990 to 43.9% in 2004 (Battle, Mendelson and Torjman, 2005). Average SA for a single parent with a child fell from about $13,000 in 1989 to about $10,000 in 2004. At the same time, "eligibility rules have been tightened...and administrative rules were toughened" (Banting, 2005, p. 423). Child benefit programs, such as the CCTB,[12] and various provincial child benefit programs also exist outside the SA system, offsetting some of the decline in SA benefits. However, lone parents in all but three provinces still are eligible for less welfare benefits (SA plus child benefits) in 2005 than in 1997 (the year before the introduction of the CCTB), even though federal spending on child benefit programs has increased steadily since 1998 (National Council on Welfare, 2006). Altogether, the bundle of transfer programs to low-income families, including SA, child benefits and various other means-tested federal and provincial benefits, have fallen since 1987, but particularly since 2000 (National Council on Welfare, 2006).

While pension programs targeting seniors have changed little in recent decades, their coverage and the amounts paid out under these programs have steadily risen in recent decades. The CPP and QPP were implemented in 1966, and the first retired cohort to receive full benefits turned 65 in 1979 (Myles, 2000). However, the percentage of Canadians aged 65 or older receiving CPP and QPP benefits continued to increase, reaching 84.6% by 1999, driven by the maturation of the program and increasing labour force participation rates among women. At the same time, average CPP and QPP benefits received by Canadians over 64 have risen by 10% from 1990 to 1999. The other major retirement income program, OAS,[13] came to being in 1952 and is a near-universal program, providing income to 97.6% of Canadians over the age of 64, and the coverage and amounts paid out in this program were relatively unchanged over the 1990-to-1999 period (Statistics Canada, 2003).

10. Government transfers as a share of personal income have risen steadily from decade to decade. Statistics Canada national accounts data indicate that government transfers as a percentage of personal income was 7.8% in 1968, 9.8% in 1979, 11.9% in 1989, 13.5% in 1999 and 13.1% in 2005 (Statistics Canada, CANSIM Table 38-0019). Recent years have seen Employment Insurance (EI) and Social Assistance (SA) as a share of personal income fall sharply. EI was 2.1% of personal income in 1989 and 1.4% in 2004, while SA fell from 1.1% to 0.7% of personal income over the same period. These declines in transfers were in part offset by increases in benefits to children (as the amounts transferred under the Canada Child Tax Benefit exceeded those transferred under the old family and youth allowance benefits), the Goods and Services Tax credit and increases in other smaller transfers (Statistics Canada, CANSIM Table 384-0009).
11. An anonymous referee pointed out that an alternative concept of economic security could also account for opportunities offered by the labour market. In this case, if unemployment were low then social programs would be less crucial for economic security.
12. The Canada Child Tax Benefit (CCTB) includes the CCTB basic benefit and the National Child Benefit Supplement.
13. Old Age Security includes the Guaranteed Income Supplement and Allowances.

Taxes represent the other side of the redistributive framework. The implicit income tax rate (the ratio of average family federal and provincial income taxes paid to average family pre-tax income) rose from 1980 to 1990, from 15.3% to 19.5% (Figure 4). Taxes remained near 19.5% through 2000, and then fell to 17.7% in 2001. From 2000 to 2001, both federal and some provincial tax rates fell, while several provinces adopted a 'tax on income' model which may have further reduced provincial income taxes by opening up provincial tax credits to individuals. Most importantly for the present study, tax rates fell differentially across the income distribution. From 2000 to 2001, the federal tax rate on income under $30,000 was lowered from 17% to 16%, the tax rate on income between $30,000 and $60,000 fell from 25% to 22%, the tax rate on income between $60,000 and $100,000 fell from 29% to 26%, and the tax rate on income above $100,000 remained at 29%. The Ontario tax rate fell by 2.1 percentage points for income below $30,000, 0.4 percentage point for income between $30,000 and $60,000, and remained the same for income above $60,000. The Quebec tax rate fell by 2.0 percentage points below $26,000, 1.3 percentage points between $26,000 and $52,000, and 0.5 percentage point over $60,000. It is not obvious how these changes in tax rates would have affected national-level income inequality. On balance, they seem to reflect a shift towards a more progressive tax system.[14]

Because of the changing landscape of tax and transfer programs, a study that describes the whole of the redistribution package, such as this one, may be particularly useful to evaluate the net effect of changes in transfers and taxes on income inequality.

2.4 The family

The family of the 2000s is very different from the family of the 1970s, and many of these differences would be expected to affect income inequality. Among the most relevant trends for the present study are the aging of the population, the rising share of persons in lone-parent families, and trends in marital earnings correlations. From 1970 to 2005, the share of the population aged 65 and over has steadily increased from 8% to slightly more than 13%. Seniors have lower average after-tax income than others and receive a larger share of their income from transfers, and less from market sources. Moreover, the senior population places some downward pressure on after-tax-income inequality.[15] Thus, an increasing share of seniors in the population may influence both inequality and income redistribution. A rise in the share of lone-parent families will, all else equal, affect the bottom end of the distribution more as lone parents tend to have lower income: it will also affect trends in redistribution, as lone parents tend to receive more from transfers than others. Finally, rising correlations in income among spouses will tend to increase family-income dispersion, and greater increases in hours among wives of high-wage men than among others would also increase inequality (Zyblock, 1996; Wolfson and Murphy, 2000). The net effect of these changes would be ambiguous, as some are expected to increase inequality and others decrease it.

Interestingly, changes in the family do impact trends in family earnings inequality. While it was shown above that individual earnings inequality was about the same in the 2000s as in the late 1980s and late 1970s, trends at the family level were different. If we examine family earnings among families with some employment, family earnings rose at the 90th percentile each decade from the 1980s to the 1990s and to the 2000s, ending in 2004 at a level $20,000 above that seen in 1976 (Figure 5-1). Meanwhile, family earnings at the 10th percentile fell across decades. The

14. The amount of redistribution from taxes will be related to the progressivity of the tax system (the amount by which it diverges from proportionality), and the 'height' of the average tax rate (Kesselman and Cheung, 2006).
15. The after-tax Gini for 2004 was 0.315 among all persons, and 0.318 among all non-senior-headed families.

net result is that family earnings in the 90th percentile was from 12 to 14 times that of family earnings in the 10th percentile in the 2000s, compared to just 8 times in the late 1970s (Figure 5-2).[16] This suggests that the rise in family after-tax-income inequality was associated with changes in family earnings inequality rather than a rising inequality in earnings of workers. More research would be needed to determine why family earnings inequality has risen.

3. Data and methods

3.1 Data

The data used in this study come from the 1976-to-1997 Survey of Consumer Finances (SCF) and the 1993-to-2004 Survey of Labour and Income Dynamics (SLID). The SCF was the main source of household income statistics produced by Statistics Canada from 1976 to 1995, while SLID has been the main source since 1996, and a short period of overlap exists from 1993 to 1997 when both surveys were active. The SCF was a cross-sectional survey conducted annually in April, collecting income data for the previous year. The number of households sampled in the SCF ranged from 12,000 to 14,000 in 1976, 1978, 1980, and 1983, and from 30,000 to 43,000 in other years. SLID is a longitudinal survey featuring 6-year panels with a new panel started every 3 years. While it is a longitudinal survey, annual representative cross-sectional versions are produced for the purposes of calculating annual income statistics. The sample sizes were about 17,000 households from 1993 to 1995, and expanded to about 34,000 households after 1996.

The study examines family market, total and after-tax income (defined below). Data are collected at the economic family level, and a number of edits are made to the data before generating results. (Unattached individuals are included as economic families of one person.) These edits are done to adjust for high and low outliers and to equivalize the economic families into adult-equivalent-adjusted (AEA) units. To improve the transparency of the edits, and to facilitate international comparisons, we adopt a set of procedures that are identical to those used in the processing of Luxembourg Income Study data. Specifically, the following procedures are followed:

(1) observations with zero after-tax income are dropped;[17]
(2) economic families with more than one census family are dropped;
(3) family income values (market, total and after-tax) are top-coded to 10 times their median value;
(4) family income values are transformed to an 'adult equivalent' scale by dividing through by the square root of the total family income;
(5) data are bottom-coded to 1% of their mean AEA value;
(6) person weights are derived by multiplying economic family weights by the number of persons in the economic family.

Thus it is extremely important to note that in this study, before any other computations are made, family income is adjusted using an equivalency scale to adjust for family size. This process

16. Inequality in adult-equivalent-adjusted family earnings is less pronounced, but trends are similar. In the 1970s, the p90/p10 earnings ratio was about 7, compared to between 10 and 11 in the 2000s.
17. This convention is based on the assumption that observations with zero after-tax income are erroneous. This affects fewer than 0.5% of observations in most years. In many studies, households with negative income are also dropped since they cause problems for inequality indices based on a log-transformation of income. These procedures remove this need by bottom-coding income at 1% of average AEA income, which is positive.

creates an AEA income value, which compensates for economies of scale present in larger families, and yields indicators that reflect family income defined on a per-person basis. Therefore, any reference to income in this study refers to 'adjusted family income per person' unless otherwise noted.

3.2 The distribution of income, inequality, polarization and low income

The study uses several indices to characterize the income distribution. The indices are described briefly in this section.

Range, inequality, polarization and low-income statistics each attempt to describe the income distribution. The *range* can be defined as the absolute difference between two points in the income distribution—say the largest and smallest incomes, or between two percentiles. For example, if over some period of time income at the 10th percentile doubled from $5,000 to $10,000 and income at the 90th percentile doubles from $50,000 to $100,000 then the range (between the 10th and 90th percentiles) can be said to have increased from $45,000 to $90,000.[18] While not usually discussed in inequality studies, the range may be important from the perspective that it reflects absolute differences in consumption ability.[19] Hence this report discusses the range in terms of the $90-10$ percentile difference, the $90-50$ percentile difference and the $50-10$ percentile difference.

Inequality statistics are summarized in Jenkins (1991) and Wolfson (1986). These statistics summarize the shape of a distribution, and trends in inequality represent changes in the shape of a distribution over time. A number of inequality statistics are used in the literature. This study, like many others, examines the *Gini*, *exponential,* and *squared coefficient of variation (CV)* inequality measures.[20] These indices are, respectively, sensitive to changes in the middle, bottom and top of the income distributions; hence together they describe, most completely, changes in the shape of the income distribution over time.

This report also presents a series of polarization statistics. Polarization statistics allow one to answer questions such as "Is the middle class declining?" or "Is there an increasing difference between the rich and poor?" While inequality statistics also describe changes in the shape of a distribution, they do not necessarily describe changes in the polarization of a distribution, as it is shown in Wolfson (1997) that it is possible to increase the polarization of a distribution without affecting its inequality. Polarization indices used in this study are the share of the population

18. The range of a distribution is discussed briefly in Jenkins' (1991) review of inequality statistics, but it is not properly considered an inequality statistic because it is not mean-independent.
19. This may be important if, as argued by Frank (2005), rising high incomes will increase the consumption of 'positional goods'—conspicuous consumption of non-welfare-enhancing items such as larger homes or expensive cars—among not just the rich, but because of envy, also among the middle class and the poor. Not only is such consumption not welfare enhancing, but it reduces the money available for spending on welfare-enhancing goods and increases the debt carried by the middle class and the poor.
20. The Gini is defined in Jenkins (1991). The exponential measure is $\exp = \sum_i \frac{1}{N} \exp(\frac{-y_i}{\bar{y}})$ while the squared CV is $squared\,CV = \frac{\sum_i (y_i - \bar{y})^2}{\bar{y}^2}$ where N is the number of observations, y_i is the income of the *ith* individual and $\bar{y}$ is the average income.

with income from 75% to 150% of the median, the share of the population with income from 60% to 225% of the median, and *P*, a statistic derived for the purpose of measuring polarization in Wolfson (1997).

Finally, the report presents a series of low-income statistics. Consistent with most international studies, the report offers a low-income rate computed using a cut-off defined as one half of the median income, commonly called a LIM (low-income measure). In this measure, the low-income cut-off is allowed to change over time with increases or decreases in median income; thus the low-income rate (LI-LIM) reflects relative income deprivation at a point in time. It may also be desirable to evaluate the income distribution against a fixed income standard. Some would argue that a change in the income distribution that affected the median, but not the lower tail of the distribution, should not affect the low-income rate: a person is either in low income or not, and changes in the incomes of relatively well-off individuals should not change that. This paper establishes a fixed low-income cut-off as one half the median income observed in 1979. Low-income statistics derived from this cut-off will be called LI-fLIM. Finally, low-income statistics defined using either a fixed or varying cut-off suffer from the fact that they do not incorporate any information on the depth of poverty. For example, a transfer program which improved the incomes of those below the cut-off, but did not raise anyone above the cut-off, would not register any improvement in the low-income rate. Hence this paper also computes the Sen-Shorrocks-Thon index of low-income intensity (SST). This measure combines information of the low-income rate and the low-income gap into a single index which is responsive to both the incidence and depth of low income. The SST is calculated using both the conventional (varying) cut-off (SST) and the fixed cut-off (fSST).[21]

3.3 Redistribution

One of the objectives of the report is to examine the redistribution associated with the tax-transfer system. This is done through an examination of 'direct effects' of transfers and taxes on after-tax income. These are called direct effects because they measure only the observed effects of the tax-transfer system on income, without attempting to quantify any indirect effects of taxes and transfer programs on the outcomes, for example through influencing work intensity. Direct effects of taxes and transfers on inequality, polarization, and low income are presented.

The study identifies the direct effects of transfers and taxes through the examination of income defined in three ways:

(1) market income: wages, salaries, self-employment, and private pension plans and investment income,
(2) total income: market income plus government transfers, and
(3) after-tax income: market income plus transfers minus provincial and federal income taxes.

Taking inequality as an example, defining inequality as σ_i where *i* is one of market, total or after-tax income, this study defines the direct effect of taxes and transfers as $\sigma_{after\text{-}tax} - \sigma_{market}$, the direct effect of transfers is $\sigma_{total} - \sigma_{market}$, and the direct effect of taxes is $\sigma_{after\text{-}tax} - \sigma_{total}$. It is also possible to measure redistribution in percentage terms (relative to initial levels), rather than absolute terms, but following Kenworthy and Pontusson (2005) we measure redistribution in absolute terms. This yields results that are much easier to understand and more sensible, as a

21. Details on the computation of the Sen-Shorrocks-Thon index of low-income intensity can be found in Osberg and Xu (1997) and Picot, Morissette and Myles (2001).

given change in absolute redistribution should be equally important regardless of whether it is happening in a more or less egalitarian context.

In studying the direct effects of redistribution, we examine trends among all families but also disaggregate trends for families headed by persons in various age categories, specifically families headed by someone aged 18 to 24 (young families), aged 25 to 59 (prime-aged-headed families) and aged 60 or over (older families). This is done for two reasons. First, as noted above, the share of persons 65 and over in Canada has begun to increase notably. A compositional shift such as this will have the effect of boosting the importance of transfers, as the Canada Pension Plan, Québec Pension Plan, Old Age Security, and Guaranteed Income Supplement become a more important part of family income. However, in this study, we do not want to examine the change in the direct effect of transfers which is resulting from the aging of society. Second, the institutional changes to transfer programs that were described above (Social Assistance, Employment Insurance and Canada Child Tax Benefit) mainly impact persons in families headed by individuals who are in their prime working years or younger. Thus, if there has been an important decline in the effectiveness of transfers, then we would most likely see it in these groups.[22]

3.4 Recent revisions and comparability of survey data to administrative and census data

A recent revision of income statistics data by Statistics Canada makes an up-to-date study of income trends all the more necessary. The details of the revision are outlined in Lathe (2005), but the most relevant for this study is a reweighting of data going back to 1990, based upon the overall distribution of annual earnings from the T4 file (the administrative file which reports annual earnings at paid jobs for tax purposes). The sense is that Statistics Canada household surveys have traditionally under-represented people with low earnings and high earnings, and over-represented people with middle earnings. Results shown in the Appendix Table A.4 and Figures A.1-1 and A.1-2 indicate that the reweighting did not affect inequality in 1990, but affects the post-1990 trend in a significant manner. Comparisons of Gini inequality with inequality measured using the squared CV indicate that this appears to be due to the fact that the reweighted data better reflect the fast growth in income at the top of the income distribution.

Unfortunately, data before 1990 were not reweighted, raising some concerns about the comparability of results across decades, which are impossible to directly address in this study. However, as shown in Figures A.1-1 and A.1-2, reweighting had little effect in the early 1990s, suggesting that reweighting is having more important effects in more recent years. Importantly, reweighting does not appear to have affected levels or trends in redistribution as defined in the previous subsection (Appendix Table A.4, and Appendix Figures A.1-1 and A.1-2). That is, statistics on redistribution were not affected by reweighting, at least up to 2000 when our observations on (pre-reweighting) historical survey data run out.

A final issue that needs to be discussed arises from a series of papers that compare pre-revision income data from the SCF and SLID to income data from the census and administrative data based on tax records (Frenette, Green and Picot, 2004; Frenette, Green and Milligan, 2006). The major critiques of the survey data were that under-representation of the top and bottom tails of

22. In studying direct effects of redistribution, many studies focus on prime-aged-headed households. Often this is done to facilitate an international comparison where the reliance of retired persons on public versus private pensions is often widely different (for example, as in Kenworthy and Pontusson, 2005).

the income distribution results in an understatement of income inequality, and that a lower growth in inequality was observed in the survey data in the 1990s. While the understatement of inequality is important, it appears to be mostly related to the extreme top and bottom of the income distribution, so estimates of inequality with survey data still reflect the experiences of the majority of individuals. Moreover, the differences in the growth rates in inequality between the historical survey data and the tax or census data were primarily in the 1990s. As a result of the reweighting, the increase in inequality during the 1990s is much higher in the revised survey data, is now above that seen in the census, and is closer to that seen in the tax data (Appendix Table A.4 and Figures A.1-1 and A.1-2).[23] Finally, the level and trend in redistribution appears not to be affected by choice of dataset (if anything, tax data suggest more redistribution in 2000 than in the early 1990s, reinforcing conclusions drawn below from the survey data).

4. After-tax-income inequality and relative low income

4.1 The distribution of income: Income percentiles, percentile ranges, and percentile ratios

The study begins by examining trends in the distribution of family after-tax income for all persons. After-tax income is commonly regarded as the income measure most closely related to well-being, as it reflects total purchasing power after transfers are received and personal income taxes are paid. Figure 6-1 shows trends in adult-equivalent-adjusted (AEA) family after-tax income[24] at selected percentiles (data is found in Appendix Table A.1). It shows a clear widening of the income distribution, particularly during the period of economic expansion after 1995. Especially notable are increases in after-tax income observed in the 50th, 80th and 90th percentiles. Comparing 2004 to 1989 (which represents the 1980s cyclical peak just before the 1990/92 recession) after-tax income grew 8%, 12% and 15% at the 50th, 80th and 90th percentiles respectively, but fell 3% at the 10th percentile. Other common percentile measures are shown in Figure 6-2. Average after-tax income in the bottom decile fell 8%, but rose 24% in the top decile from 1989 to 2004. Changes in the bottom and top quintiles were -4% and 20% respectively.

Changes in the income distribution over the 1980s were very different to those seen in the 1990s. From 1979 to 1989, AEA family after-tax income rose faster at the bottom of the income distribution than at the top. It rose 16.4% at the 10th percentile, 9.5% at the 20th percentile, 4.4% at the median, 4.7% at the 80th percentile, and 5.1% at the 90th percentile. More detail is shown in Figure 7, where growth in average income within each of 100 centiles is graphed for growth rates from 1979 to 1989 and from 1989 to 2004 (growth rates are approximated by log-differences). During the earlier period, income grew for all centiles, but grew faster for centiles below the 40th. During the latter period, growth in after-tax income was negative at lower centiles and growth rates increased almost monotonically, becoming positive at about the 20th centile and rising particularly quickly at the 98th and higher centiles. Since income inequality is affected by changes in relative income, one would expect that a faster rise in income at the bottom of the income distribution than the top would lead to falling inequality in the 1980s,

23. Absolute growth in the after-tax Gini from 1995 to 2000 in the historical survey, the reweighted survey, the census, and the tax data were 0.0131, 0.0183, 0.0025 and 0.0225 respectively. The value for the reweighted survey uses the Survey of Consumer Finances for 1995 and the Survey of Labour and Income Dynamics (SLID) for 2000. If we had used the much smaller sample from SLID for 1995, the absolute growth in the reweighted survey would have been 0.0164.
24. All income figures in Sections 4 and 5 are on an adult-equivalent-adjusted basis.

while a faster rise at the top than at the bottom would lead to rising inequality in the 1990s. Considering the whole period, only the first centile shows a decline in income, which is perhaps related to sampling issues in the bottom tail. Otherwise, growth is observed across the entire income distribution, with growth rates increasing at a growing rate above the 30th percentile or so. Again, a faster increase in income at the top of the income distribution will indicate a higher level of income inequality in 2004 than in 1979.

Before turning to examine income inequality, we first look at the absolute range of AEA family after-tax income. Figure 8 shows the absolute differences between the 10th, 50th and 90th percentiles over the 1976-to-2004 period. It is clear that in an absolute sense, income in the top half of the income distribution rose sharply compared to the bottom half of the income distribution. The absolute gap between the 90th and 10th percentiles has increased from $37,500 in 1989 to $45,800 in 2004 (up $8,300), with most of this increase happening after 1995. This increased range is due in part to rising median income, which increased the range over the 10th percentile by $2,800 over the same period, but it was mainly due to a rising gap between the 90th and 50th percentiles. Over the 1980s these ranges were comparatively stable.

As a result, the absolute range between those with income in the bottom 10% and those in the top 10% rose substantively over the period. Income values in the graphs are adult equivalent adjusted (AEA), but can be converted to the equivalent value for a family of four by multiplying AEA income value by 2. Moreover, we can also look at the gap between average family after-tax income in the bottom and top deciles. In these terms, after-tax income for a four-person family was stable at about $110,000 higher in the top decile compared to the bottom decile all through the 1976-to-1995 period, but grew thereafter reaching $147,600 by 2004. This indicates that the increase in after-tax-income inequality is of significant absolute magnitude as well as relative magnitude (AEA after-tax-income data are from Figure 6-2).

4.2 Income inequality

Our discussion of inequality begins with a graphical examination of the family after-tax-income distribution for all persons in 1979, 1989 and 2004. Figure 9-1 shows the Lorenz curve derived for 1979, 1989 and 2004. This was computed by generating income shares for 100 centiles and accumulating them starting at the first centile and moving towards the 100th centile such that the 100th centile has a cumulative sum of 100% of income. A Lorenz curve of complete equality would be reflected in a 45-degree line—all centiles have exactly 1% of income. Lorenz curves which fall farther away from the 45-degree line than other lines indicate a higher level of inequality in that year. Lorenz curves are the 'gold standard' of inequality measurement (Wolsfon, 1997), and so long as they do not cross anywhere, an income distribution with a Lorenz curve farther from the 45-degree line than another is of an unambiguously higher level of inequality. Following this line of reasoning, it can be seen that income inequality fell from 1979 to 1989, and rose from 1989 to 2004, such that inequality in 2004 was even higher than it had been in 1979. Since the 2004 line lies everywhere below the 1979 and 1989 ones, after-tax-income inequality was unambiguously higher in 2004 than in 1989 or 1979.

To identify exactly how the income distribution has changed over the period, we examine changes in income shares for each centile in Figure 9-2. From 1979 to 1989, income shares below the 30th percentile rose, while income shares at higher percentiles fell slightly (a bump in the line above the 97th centile potentially reflects sampling error at the top of the income distribution). From 1989 to 2004, income shares fell for all centiles below the 75th centile and

rose at all centiles above the 75th, with income shares rising especially fast at the 95th and higher centiles. The net result over the 1979-to-2004 period is that income shares at about the 10th centile and lower were stable, and rose above the 85th centile, with income shares falling through the rest of the distribution—especially between the 20th and 50th centiles.

Summary indices of family after-tax-income inequality are shown in Figures 10-1 to 10-3 (data are found in Appendix Table A.2). Indeed, as indicated by the Lorenz curves shown in Figure 9-1, after-tax-income inequality fell from 1979 to 1989 and rose from 1989 to 2004. The Gini and exponential measures show a decline across the 1980s, followed by an increase in the 1990s, with the turnaround point in 1989. The squared CV did not register a decline across the 1980s, perhaps reflecting the top-sensitivity of that index.[25] After 2000, inequality remained high but showed little further change in all indices. The Gini coefficient was 0.283 in 1979, fell to 0.277 in 1989 and rose to 0.312 by 2000. The Gini ended the period at 0.315 in 2004, which was 0.032 higher than 1979 and 0.038 higher than in 1989.

Taken together, results for the family after-tax income centiles and family after-tax-income inequality indices paint a clear picture of changes in the income distribution in recent decades. From 1979 to 1989, income rose across the income distribution, but more so at the bottom than at the middle or top. The absolute dispersion of the income distribution remained unchanged, but a rise in mean income meant that in relative terms after-tax-income inequality fell. From 1989 to 2004, income fell in the bottom 20%, but rose at an increasingly faster rate at higher percentiles. As a result, the income distribution spread out, as the absolute range between the 90th and 10th percentiles grew by more than one fifth—mostly due to an increase in after-tax income at the 90th percentile. A larger income share was captured by families at the 75th percentile and higher, the remainder of the income distribution lost income share, and after-tax-income inequality rose.

4.3 Income polarization

As noted in Wolfson (1997), an increase in income inequality does not necessarily mean that there has also been a rise in polarization. Hence, it is useful to also examine statistics directly related to income polarization. Three views of income polarization are offered in Figures 11-1 to 11-3. Figure 11-1 shows the share of the population with AEA after-tax income from 75% to 150% of the median for that year. From 1976 to 1989, the share of population in that range was fairly steady at between 0.50 and 0.52. However, after 1989 the share of the population with income in this range began to decline, and was between 0.46 and 0.47 from 2001 to 2004. At the same time, increases were observed in both the share with less than 75% of the median, and the share with more than 150% of the median. If we take the arbitrary view that the 50% to 52% of the population with incomes from 75% to 150% of the median represented the middle class in the 1980s, then we can say that the middle class declined across the 1990s, although the magnitude of the decline was modest.

A second view of polarization is offered in Figure 11-2. Here, income polarization is reflected in the share of the population with income from 66% to 225% of the median. As with Figure 11-1, this share fell from levels nearing 75% in the 1980s to 70% by 2004.

25. Note that in Figure 9-1 the Lorenz curves for 1979 and 1989 are very close together above the 60th percentile. This is consistent with the notions that changes across the 1980s mainly affected the bottom of the income distribution and that transfers may have played an important role in this.

Finally, Figure 11-3 shows the polarization index *P* proposed by Wolfson (1997). This index is closely related to the Gini coefficient reported below, but makes further allowance for the 'spreadoutness' and 'bi-modality' of the income distribution. In practise, *P* follows a very similar path to the Gini, indicating that increases in inequality during the 1990s were characterized by a rise in income polarization, and a decline in the middle of the income distribution.[26]

4.4 Low income

In studying low income, a decision needs to be made as to where to put the threshold (or cut-off) below which persons are deemed to be in low income. In this report, we use relative low-income cut-offs defined as one half of the median income. Two alternative cut-offs are used—one where the cut-off is redefined in each year, and another where the threshold is fixed at its 1979 value. The former threshold will rise and fall more with the business cycle, hence it will present a less cyclically sensitive view of low income. With this threshold, the incidence of low income is determined relative to a contemporaneous median, which allows us to know whether income in the lower tail is keeping up with developments at the median. Said differently, we can answer if the incomes of lower-income persons rise or fall with those of the median-income persons; does a rising tide raise all boats equally? The latter will allow us to mark absolute income progression made in the lower tail of the income distribution, but will not allow us to know whether income in the lower tail is improving or deteriorating relative to the median of the distribution. Low income is then measured in three complimentary ways: the incidence, the depth, and the intensity.

The upper lines in Figure 12-1 show the incidence of low income, using both a low-income measure (LIM) fixed to its 1979 value (LI-fLIM) and the conventionally defined LIM (LI-LIM). Unsurprisingly, the fixed LIM incidence shows larger cyclical fluctuations, but otherwise shows similar trends up to 1996. Both incidence measures show a falling low-income rate up to 1989 (with a temporary bump-up in 1982 and 1983) followed by an increase in the low-income rate up to 1996. However, the two series diverge after 1996, with the conventional LIM rising, and the fixed LIM falling. This divergence results from the fact that income rose much faster at the median than it did in the lower tail after 1996. When income growth in the lower tail does not keep up with growth at the median, then the incidence of low income (using the conventional LIM) will rise. However, income in the lower tail did rise more slowly, resulting in a falling incidence of low income using a fixed LIM. To summarize these results, in the 1980s, income in the lower tail of the income distribution increased in both absolute and relative senses, resulting in a fall in low income under either measure. However, in the first half of the 1990s, income in the lower tail fell in both an absolute and relative sense, resulting in a rising low-income rate under either measure. During the latter half of the 1990s, income in the lower tail rose in an absolute sense, but fell in a relative sense. The rising tide of 1990s growth did not raise all boats equally.

Figure 12-2 shows the low-income gap—the average percentage shortfall between the income of low-income persons, and the low-income cut-off. The low-income gap fell across the 1980s but began to rise after 1993. By the 2000s, the low-income gap had returned to similar levels as observed in the late 1970s. The low-income gap is not affected by the choice of threshold.

Low-income intensity is shown in the lower lines of Figure 12-1. Low-income intensity is an index which combines information about the incidence and depth of low income; hence it shows

26. The correlation between *P* and the Gini was 0.96.

a much larger improvement in low income across the 1980s and deterioration across the 1990s (in percentage terms).

5. Income redistribution

5.1 Family market income

As noted earlier, income redistribution can be represented by the difference between market and after-tax income. This way of looking at redistribution does not consider any of the possibly important incentive effects that the transfer or tax system may have upon market income; rather it is a simple accounting approach.

The logical place to start a discussion of redistribution is to look at trends in the distribution of family market income. This is income received from wages, salaries, self-employment, private pension plans and investment income. Percentiles of market income are shown in Figures 13-1 and 13-2. (Market income is adjusted for family size in the same way as after-tax income.) As with after-tax income, there has been a significant widening in the spread of the market-income distribution. This is particularly notable at the 80th and 90th percentiles, where market income has risen. Less clear from Figure 13-1 is the fact that there has also been a sizable drop in market income at the 10th and 20th percentiles. Unlike the case with after-tax income where the widening was concentrated in the 1990s, the increasing gap between the bottom and top of the market-income distribution took place in the 1980s and 1990s. Average market income in the bottom decile fell by 18.7% from 1979 to 1989 and by a further 10.7% from 1989 to 2004. Average market income in the top decile rose by 12.7% in the 1980s and by 21.6% in the 1989-to-2004 period.

Before discussing redistribution in more detail, it should be noted that trends in family market income will be affected by demographic shifts in society, including the rise of dual-earner and lone-parent families. Also important for the study of redistribution is the aging of society. As society ages, a larger share of persons fall into retirement ages, naturally increasing the share of individuals with low market earnings, and increasing the relative and absolute amount of income received from transfers (especially retirement-related transfers such as the Canadian Pension Plan, the Québec Pension Plan, the Old Age Security and the Guaranteed Income Supplement). To isolate trends in redistribution that are not affected by aging, we also examine trends among prime-aged-headed families (Figure 13-2). The widening of the income distribution is at least as pronounced among persons in prime-aged-headed families.

5.2 Trends in redistribution

In this section, we quantify the direct effect of the tax-transfer system on inequality and low income. As stated earlier, we do this through examining the direct effect of taxes and transfers on the income distribution. To abstract from changes in redistribution that were driven by the aging of the Canadian population, we also show trends in income redistribution among three groups of families: those with heads aged 18 to 24 (younger families), those with heads aged 25 to 59 (prime-aged-headed families) and those with heads aged 60 or more (older families). Figures 14-1a to 14-2d show the impact of redistribution on inequality measured using the Gini. Results for all persons using other measures of inequality, as well as measures of polarization and low income, are presented in Table 1.

Figures 14-1a to 14-1d show Gini coefficients calculated using market income, total income and after-tax income for 1976 to 2004. Family market-income inequality is higher than total-income inequality, which in turn is higher than after-tax-income inequality, indicating that both transfers and taxes have important redistributive effects. The effect of transfers on inequality appears larger for young families and especially older families than for prime-aged-headed families, since the difference between market-income and total-income inequality is larger for the older and younger families than for prime-aged-headed families.[27]

But are the redistributive roles played by transfers and taxes rising or falling? Figures 14-2a to 14-2d show the point reduction in the Gini coefficient associated with the direct effects of transfers and taxes. The redistributive impact of transfers and taxes rose over the period (that is, they further reduce the Gini in more recent years). In 1979, the direct effect of transfers was to reduce the Gini by 0.078, compared to 0.104 in 1989 and 0.113 in 2004. The larger Gini reduction occurs despite the fact that the unemployment rate in 2004 was lower than in 1989 or 1979, which, other things equal, would be expected to reduce redistribution. Increases in the direct effects of transfers accounted for about three fourths of the total increase in redistribution while taxes accounted for about one fourth, with the latter effect concentrated in the 1980s. Results were similar among prime-aged-headed families, although in this case changes in taxes and transfers played about equal roles in the increase in redistribution. Among younger families, transfer redistribution played a much larger role than tax redistribution, and total redistribution rose across the 1980s, rose quite dramatically during the 1990s recession, but by the 2000s was at about the same level again as in the late 1980s. Likewise, transfers took on the lion's share of redistribution among older families, and total redistribution was, in the 2000s, at about the same level as in the late 1980s.

Table 1 shows the transfer, tax and total redistribution effect on other measures of inequality, polarization and low income for all persons. Redistribution played an equal or larger equalizing role in 2004 than in 1989 for most indices, with the exception of the low-income gap (using either a conventionally defined or a fixed cut-off). Redistribution reduced the low-income gap in 1989 more than in 2004. Measured in other ways, redistribution was higher in 2004 than in 1989 (or in 1979). This indicates that this conclusion is not sensitive to the choice of inequality measure.

While data in Table 1 show that redistribution in the 2000s was no lower than in early decades, another perspective on redistribution relates to the extent to which it mitigated increases in market-income inequality. From 1979 to 1989, family market-income inequality (measured by the Gini) rose from 0.361 to 0.381, an increase of 0.020. However, family after-tax income actually fell over the same period, from 0.283 to 0.277. Thus, redistribution increased by more than market- income inequality, resulting in a drop in inequality.

The situation during the 1990s was quite different. From 1989 to 2004, family market-income inequality rose from 0.381 to 0.428, which (at 0.047) was a much larger increase than in the 1980s. To offset this increase in market-income inequality, redistribution through the tax-transfer system would have had to increase across the 1990-to-2004 period by more than it did across the 1979-to-1989 period. However, it remained stable, so virtually all of the increase in market-

27. The trends in inequality among persons in prime-aged-headed families was similar to those seen among all persons in the 1980s, but not the 1990s. After-tax-income inequality rose more in the 1990s for persons in prime-aged-headed families. The Ginis in 1979, 1989 and 2004 were 0.283, 0.277, and 0.315 respectively for all persons and 0.269, 0.267, and 0.313 respectively for persons in prime-aged-headed families.

income inequality translated into an increase in family after-tax-income inequality (up 0.038, from 0.277 in 1989 to 0.315 in 2004).

5.3 Importance of changes in market income and redistribution

Altogether, the results in the previous section support the argument that the tax and transfer system is having a larger redistributive effect in the 2000s than in earlier decades. Following from this is the conclusion that the increase in inequality observed since 1989 has been driven not by falling redistribution, but instead by rising family market-income inequality. However, these results could be misleading because they are based upon unconditional movements in market, transfer and tax income. It is possible that the long-term trend rise in market-income inequality has naturally triggered an increase in redistribution, yielding the false conclusion that changes in the tax-transfer system have not resulted in a decline in redistribution. For example, the rise in market-income inequality would be expected to raise transfers as transfer programs are triggered by falling market income at lower percentiles. Moreover, rising market income at higher percentiles would raise redistribution due to progressive tax rates. Even if transfers became less generous and taxes became less progressive over the period, we could still see stability in redistribution as more individuals move into a state of transfer eligibility (because of declining market income) and higher tax brackets (because of rising market income). Ideally one would want to examine changes in redistribution conditionally—holding the market-income distribution constant—or else examine the importance of changes in market income holding redistribution constant. This section of the paper uses two simple 'what if' experiments based on holding either market income or redistribution constant to further examine trends in redistribution.

The first experiment involves holding the market-income distribution constant at a point in time, and then calculating changes in inequality based upon observed changes in redistribution. Market income can be held constant by reweighting observations in 1979 and 2004 to replicate the market-income distribution observed in 1989. This experiment allows us to compare what the after-tax-income distribution would have looked like had there only been changes in redistribution.

Alternatively, one can judge the relative importance of changes in market income by calculating conditional tax-transfer values for various levels of market income, and fixing these to be constant at a point in time. Estimated after-tax-income distributions can then be computed using actual market income and the conditional tax-transfer values. Conditional tax-transfer values were computed for each centile of the 1989 market-income distribution. Then hypothetical indices were constructed, based on the distribution of income in 1979, 1989 and 2004 generated by matching market income in that year, with the tax and transfer values (averaged within a centile) observed for that level of income in 1989. This experiment allows us to compare what we actually observed with what we would have observed had there been no changes in conditional redistribution.

In both of these experiments, we additionally account for the aging population by computing the conditional redistribution rates separately by market-income centile for three groups of families based upon the age of their household head (16 to 24, 25 to 59, 60 or more), and compute the hypothetical inequality indices holding the age distribution constant across these three groups. This is done to remove changes in the distribution of income that are associated with the aging population.

Results of the experiments are shown in Table 2 for the Gini index. The top panel shows actual inequality estimates, confirming the discussion above. The second panel shows estimates holding the age distribution constant within the three broad age groups identified above. The trend increase in redistribution is somewhat muted both from 1979 to 1989 and from 1989 to 2004, confirming the suggestion that the increase in redistribution is, in a small part, associated with the aging population.

The third panel shows the estimated Gini coefficients computed after holding the 1979, 1989 and 2004 market-income distributions to be the same as they were in 1989. Unsurprisingly, in this example, there was no increase in market-income inequality over the period, and so, inequality fell after 1979, corresponding to the increased redistribution of the tax-transfer system in the 1980s. Furthermore, Gini redistribution was about the same in 2004 as it was in 1989, confirming that redistribution was no smaller in 2004 than in 1989.

The fourth panel shows the estimated Gini coefficients under the assumption that (conditional on market income) tax-transfer values remained steady in 1979, 1989 and 2004, at 1989 levels. Estimates show a different path for inequality over the 1979-to-1989 period, as the experiment increases redistribution in 1979, reducing inequality in that year. More notably, the increase in inequality from 1989 to 2004 was virtually the same in this experiment as it was in reality. Since redistribution did not change, this means that the entire increase in after-tax-income inequality was due to increased market-income inequality. It is also notable that redistribution was largely insensitive to these trends in market income. From 1979 to 2004, market-income inequality rose from 0.367 to 0.426, while redistribution was estimated to be -0.116 in both years. This means that long-term increases in market-income inequality did not trigger an automatic increase in redistribution.

6. Conclusion

The study shows that, after remaining stable in the 1980s, family after-tax-income inequality rose over the 1990s. At the same time, the share of persons in middle-income families became smaller and the gap between high- and low- income families increased substantively.

Rising family after-tax-income inequality can be associated with (1) a reduction in how effectively the tax transfer system reduced income inequality, or (2) a rise in family market-income (pre-tax, pre-transfer) inequality. For example, inequality may rise if income-transfer programs or taxes on high incomes are reduced, or if there are large discrepancies in wages and salaries earned by families.

This paper finds that the tax-transfer system reduced income inequality by as much in 2004 as it did in 1989. What drove rising inequality in family after-tax income was rising family market-income inequality.

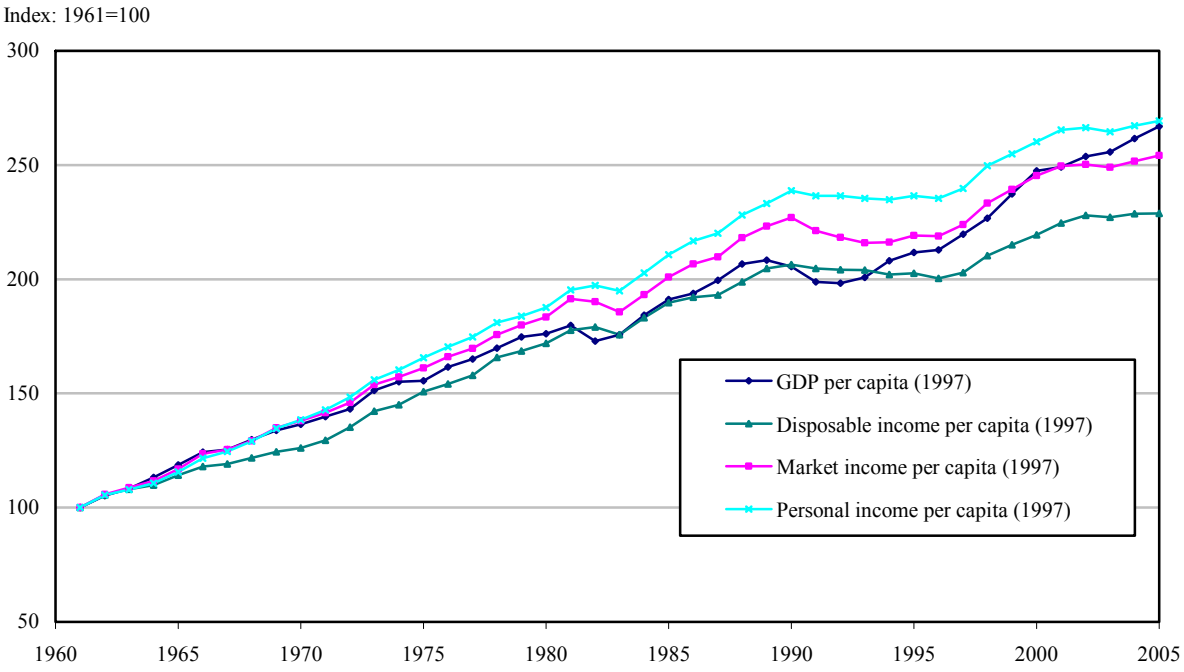
This rise in family market-income inequality in the 1990s reflects the continuation of a trend that was also occurring in the 1980s. After-tax-income inequality did not also rise in the 1980s because the taxes and transfers both changed in that decade, increasing the share of income redistributed by the state from high- to lower-income families. The tax-transfer system would have needed to continue becoming more redistributive into the 1990s to neutralize the effect of rising market-income inequality in that decade.

While this study does not investigate why family market-income inequality rose, one factor which likely plays a role in this is a widening inequality in family earnings (from wages, salaries and net self-employment income). A probable driver of this is the rising earning power of the two-earner family, especially when both earners are highly educated. (Preliminary results suggest that individual earnings inequality is not driving this trend.) The report also notes that market income has fallen significantly at the bottom of the income distribution. This suggests that low earnings and unemployment may also be playing a role. This may be particularly important among lone-parent families and unattached individuals who are more vulnerable to interruptions in employment.

Many industrialized countries experienced an increase in family after-tax-income inequality across the 1990s. For example, in the United States, after-tax-income inequality rose by 0.033 from 1986 to 2000, a slightly larger increase than the one that was observed in Canada over the same period. Moreover, similarly to Canada, the increase in U.S. after-tax-income inequality was driven by an increase in market-income inequality, and not a reduction in redistribution. After-tax-income inequality also rose in Finland, Germany, Norway, Sweden, and the United Kingdom over a similar period (Mahler and Jesuit, 2005). This suggests that, in part, an explanation common to many countries might be sought to understanding the rise in inequality, although this does not rule out country-specific causes as well.

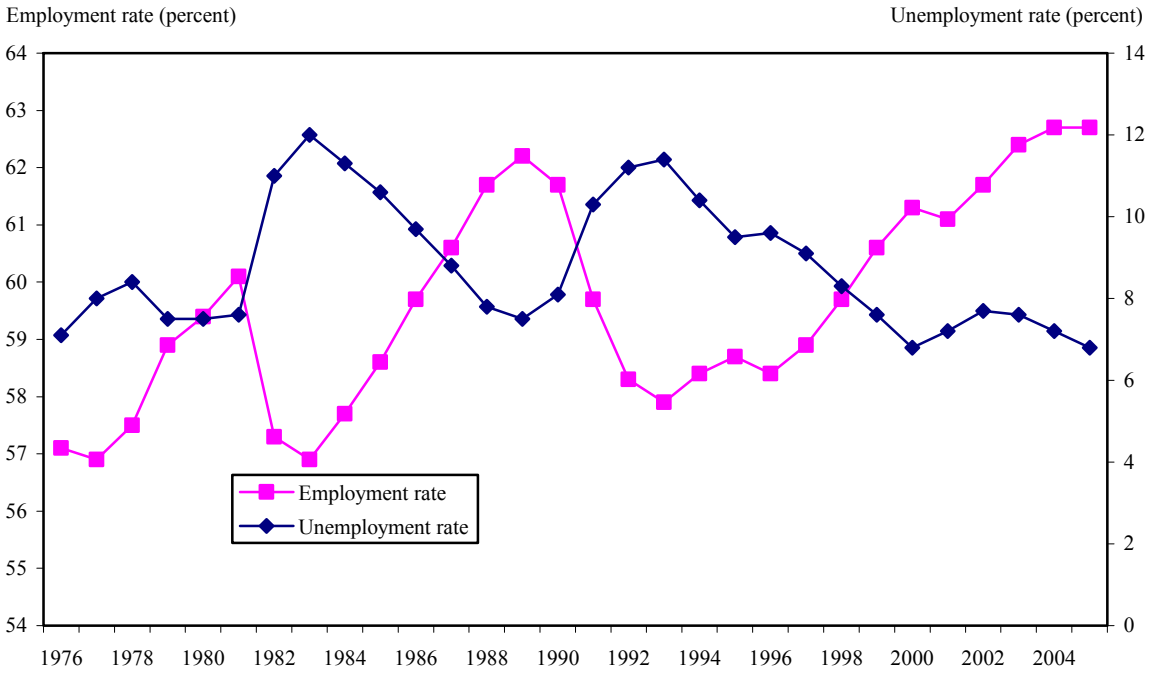
Trends in income inequality are certainly something we should continue to monitor. Presently, Canada has a level of family market-income inequality that sits near the middle level of market-income inequality of Western countries (Mahler and Jesuit, 2005). In the absence of increases in government transfers to lower-income families or increases in taxes to higher-income families, further increases in family market-income inequality would continue to be directly converted to increases in family after-tax-income inequality.

Figure 1 Per capita indices of GDP[1], disposable income, market income and personal income, 1961 to 2005



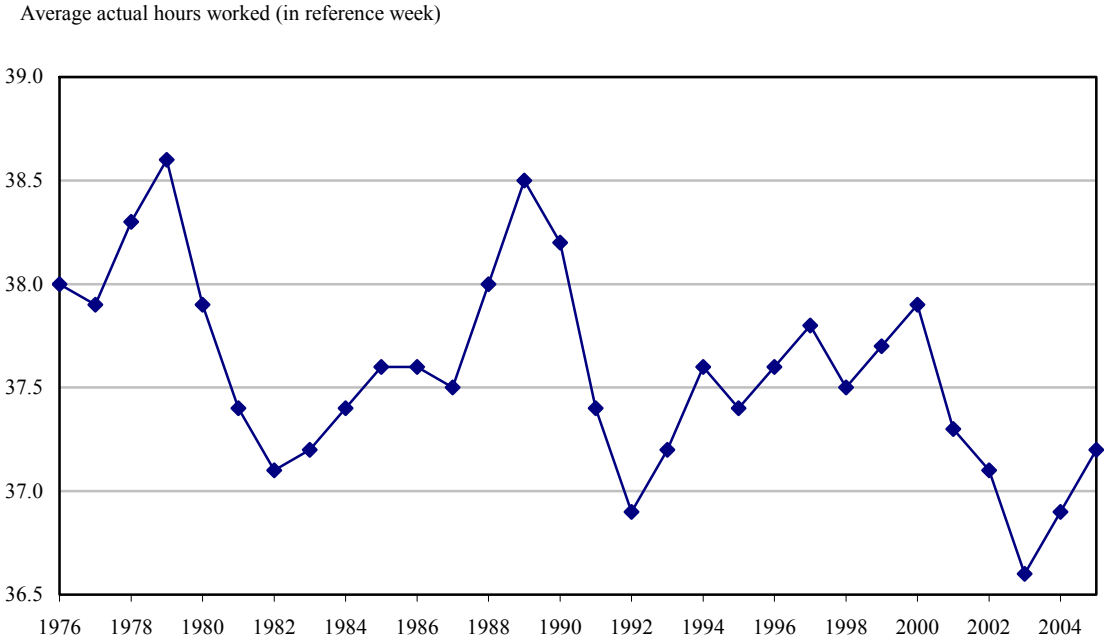
1. Gross domestic product.
Source: Statistics Canada, CANSIM, various series.

Figure 2-1 Labour market indices — Employment and unemployment rates



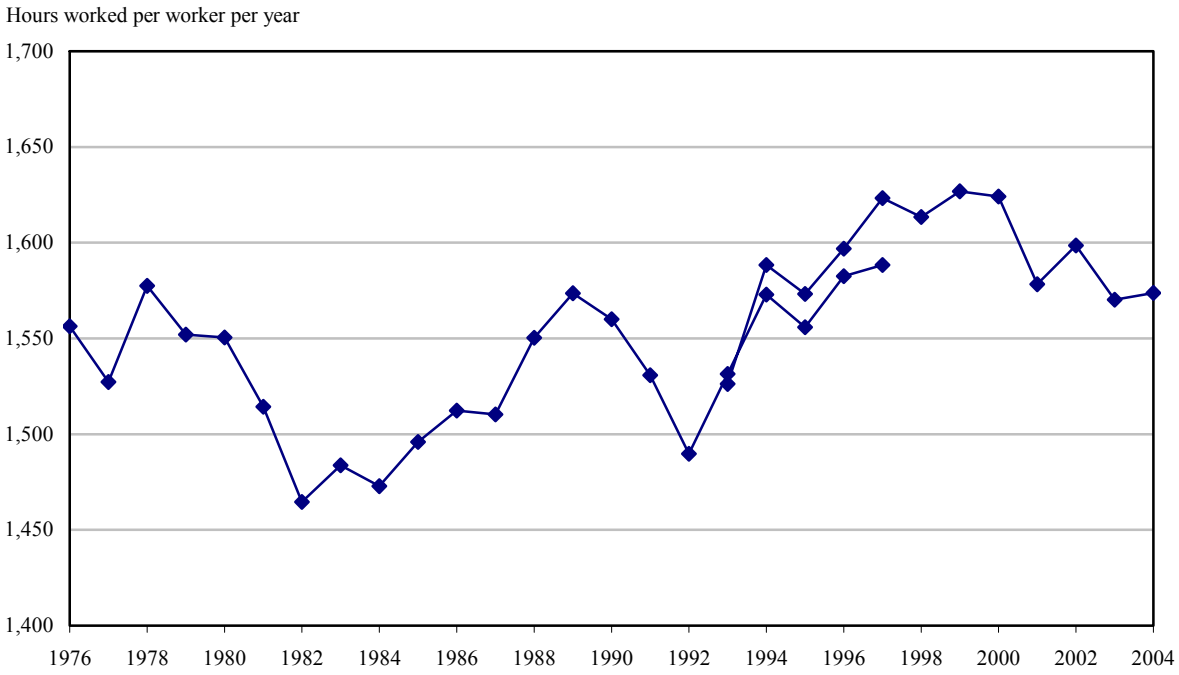
Source: Statistics Canada, Labour Force Survey.

Figure 2-2 Labour market indices — Average actual hours worked (in reference week)



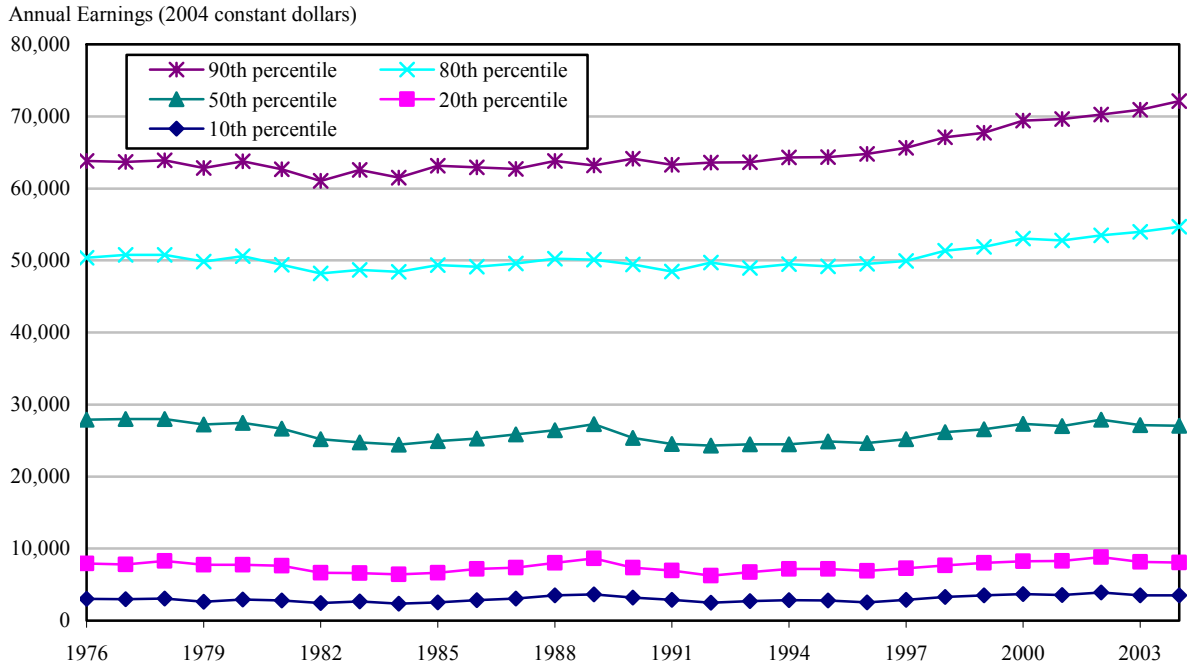
Source: Statistics Canada, Labour Force Survey.

Figure 2-3 Labour market indices — Hours worked per worker per year



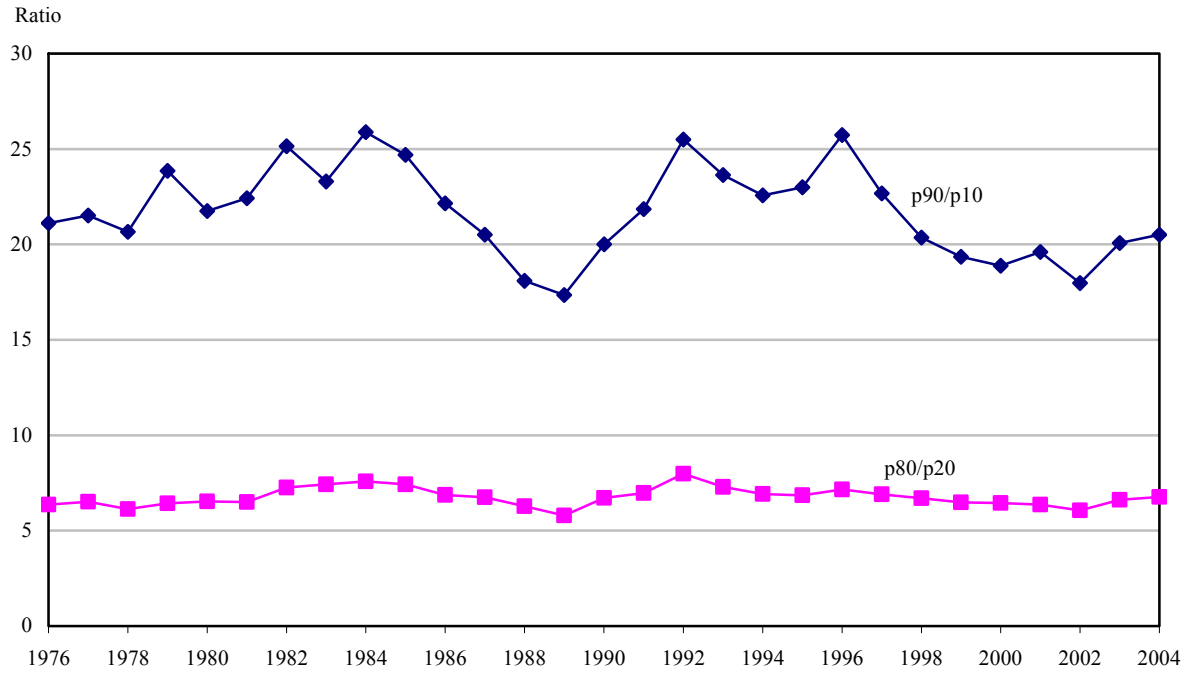
Sources: Statistics Canada, Labour Force Survey, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 3-1 Annual individual earnings distribution, 1976 to 2004



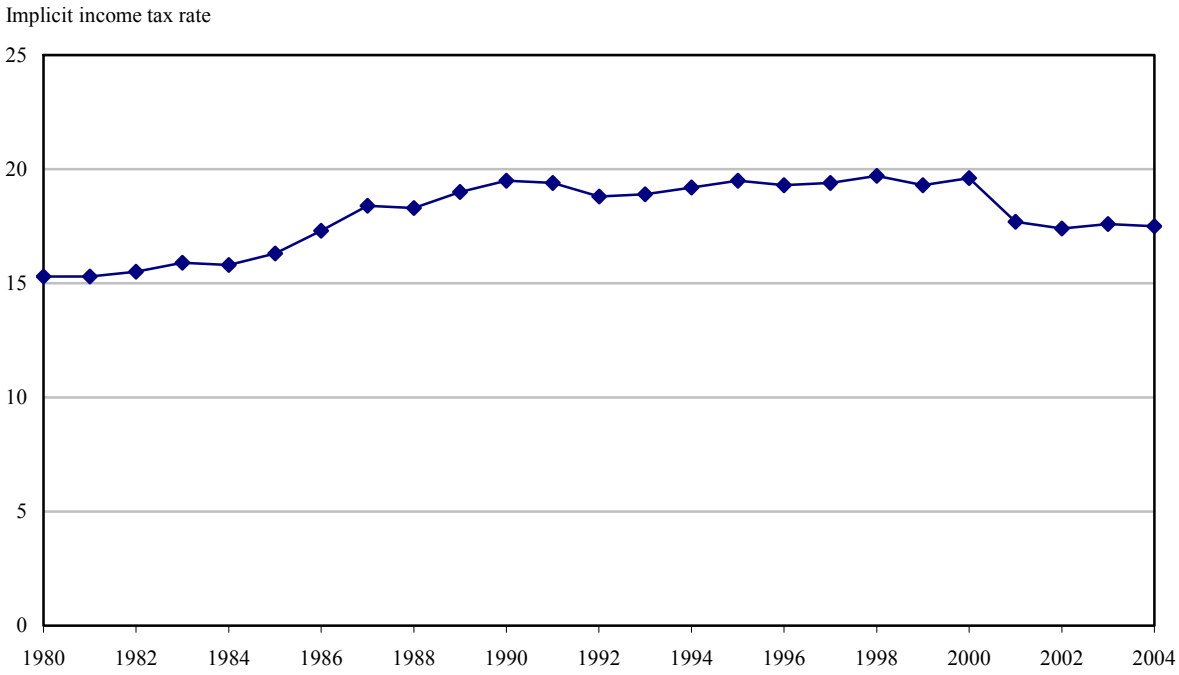
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 3-2 Annual individual earnings distribution ratios, 1976 to 2004



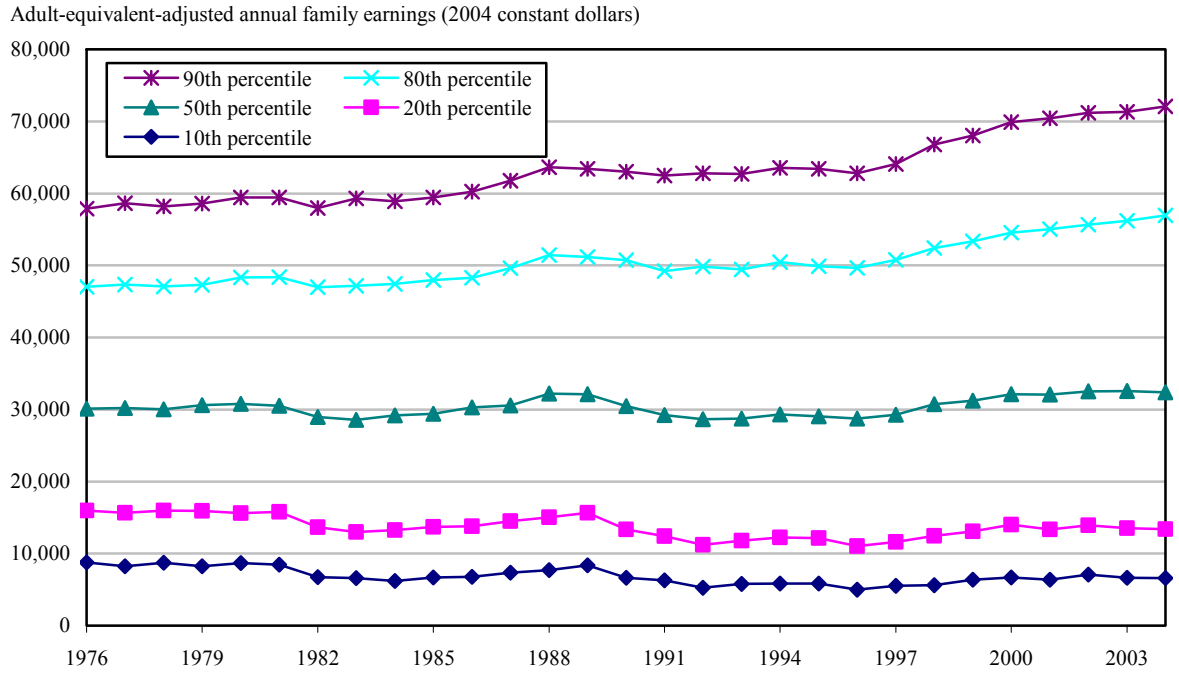
Note: p = percentile.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 4 Implicit income tax rate, all families, 1976 to 2004



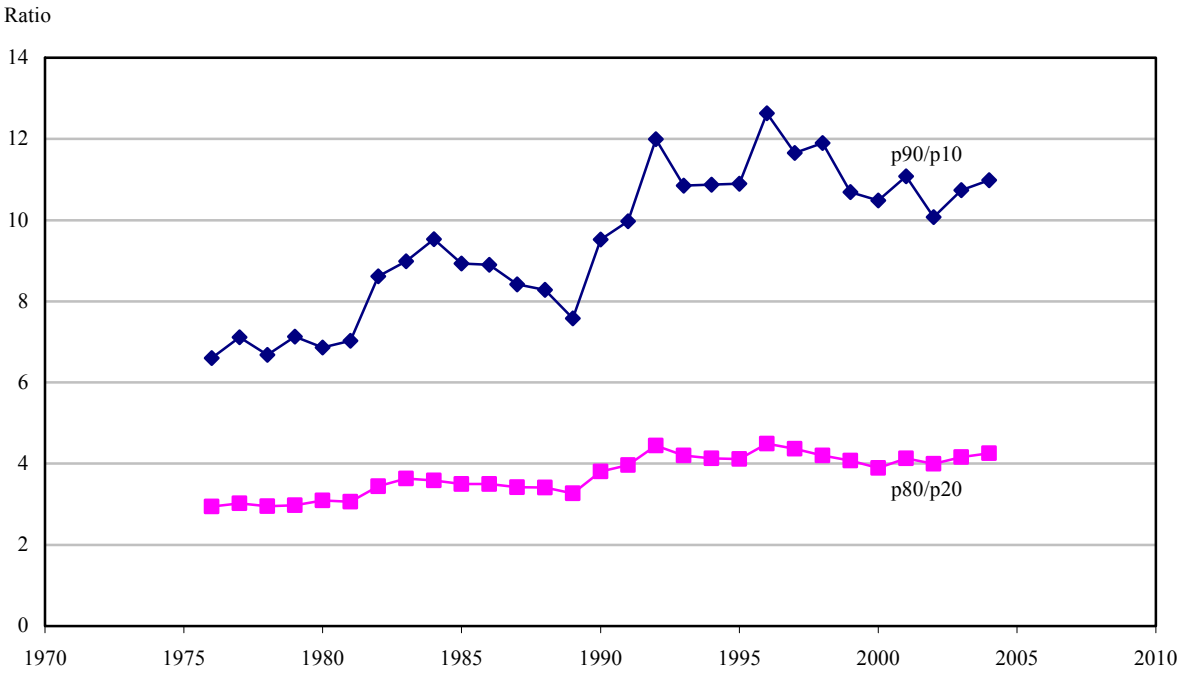
Source: Statistics Canada, CANSIM Table 202-0501.

Figure 5-1 Annual family earnings distribution, 1976 to 2004



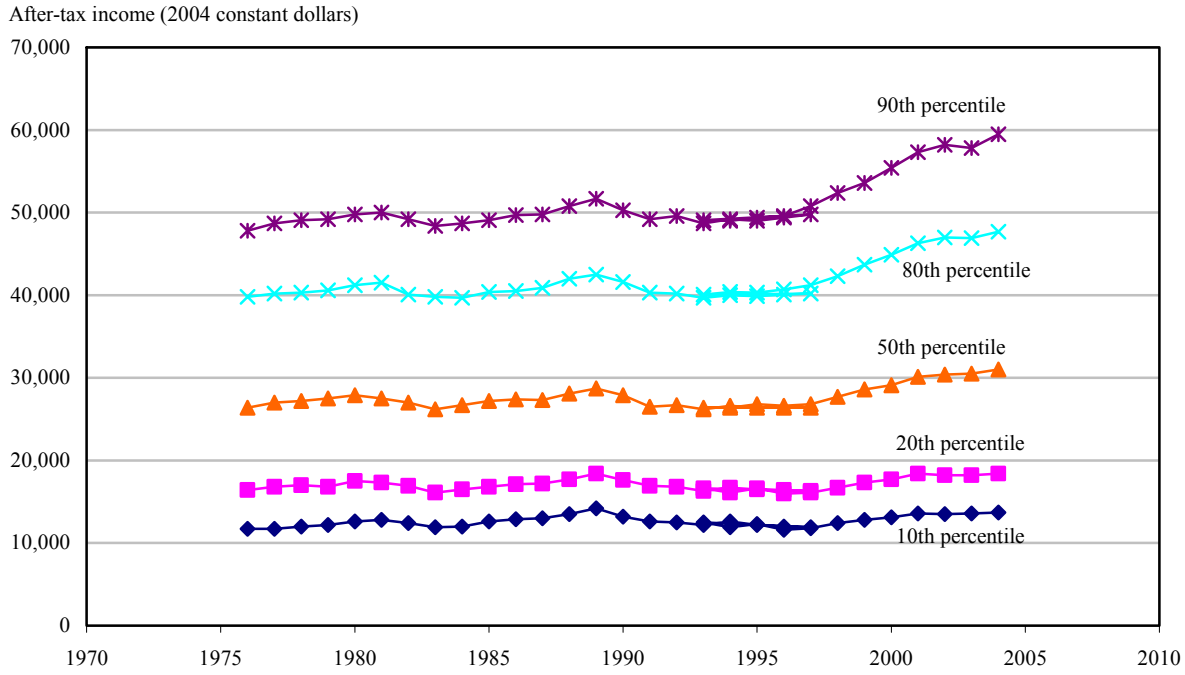
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 5-2 Annual family earnings distribution ratios, 1976 to 2004



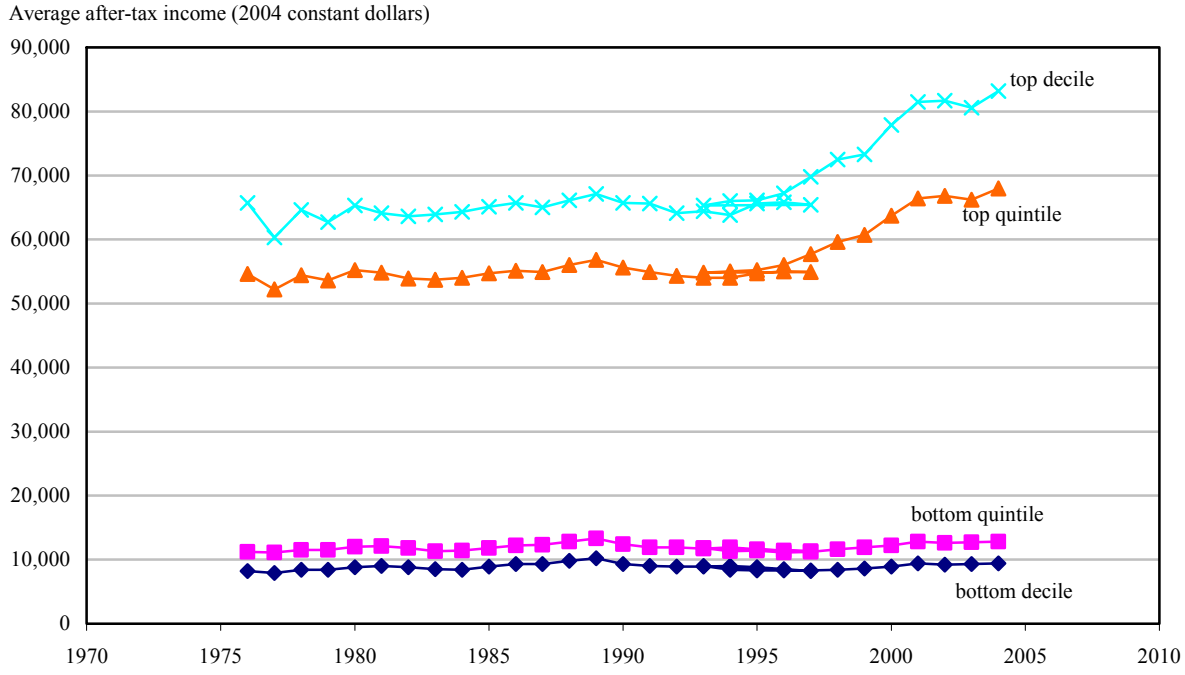
Note: p = percentile.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 6-1 Family after-tax income by percentile, 1976 to 2004



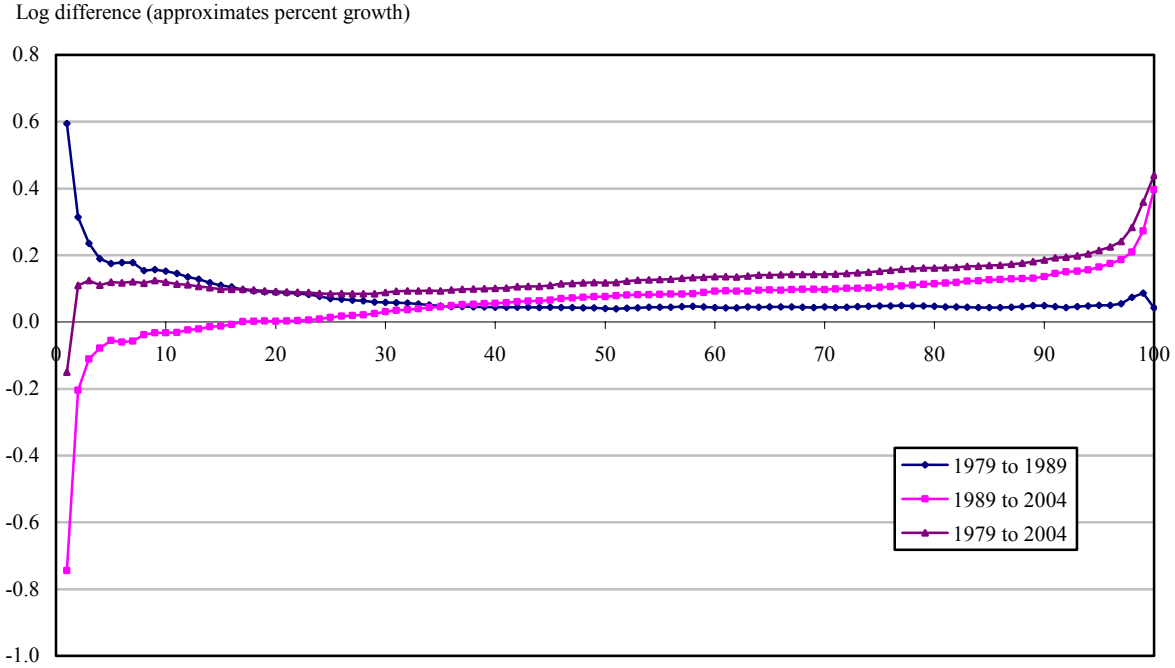
Note: Income figures are on an adult-equivalent-adjusted basis.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 6-2 Average after-tax income in the top and bottom quintiles and deciles, 1976 to 2004



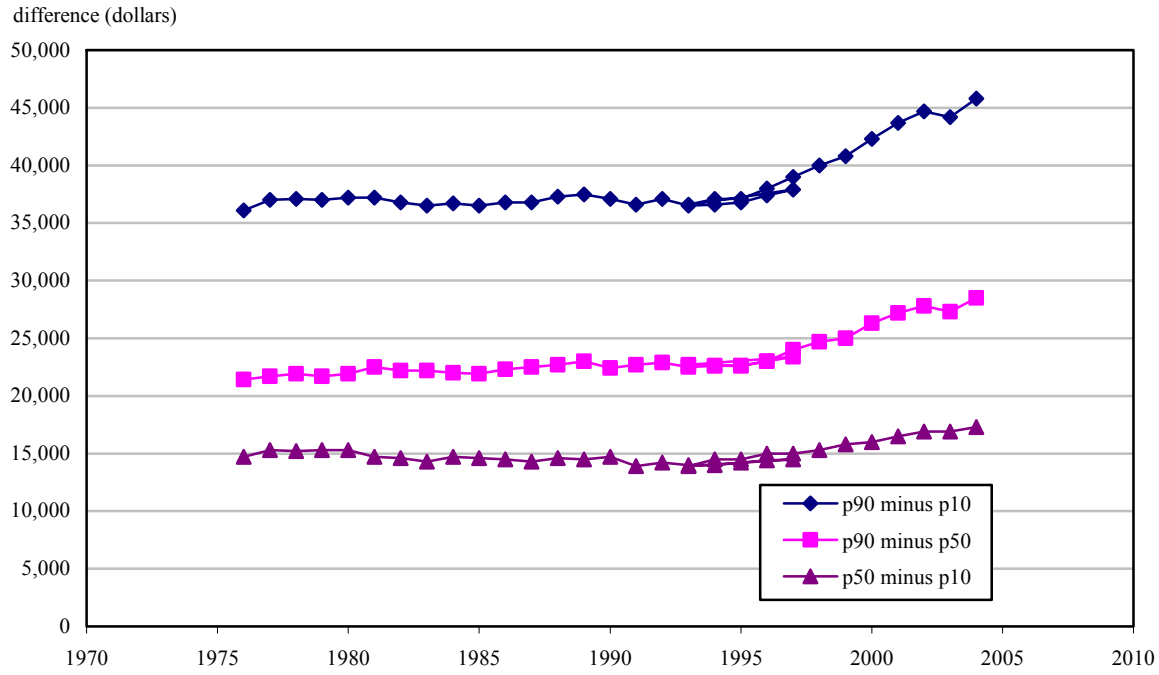
Note: Income figures are on an adult-equivalent-adjusted basis.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 7 Growth rate of average after-tax income by centile, selected periods, 1979 to 2004



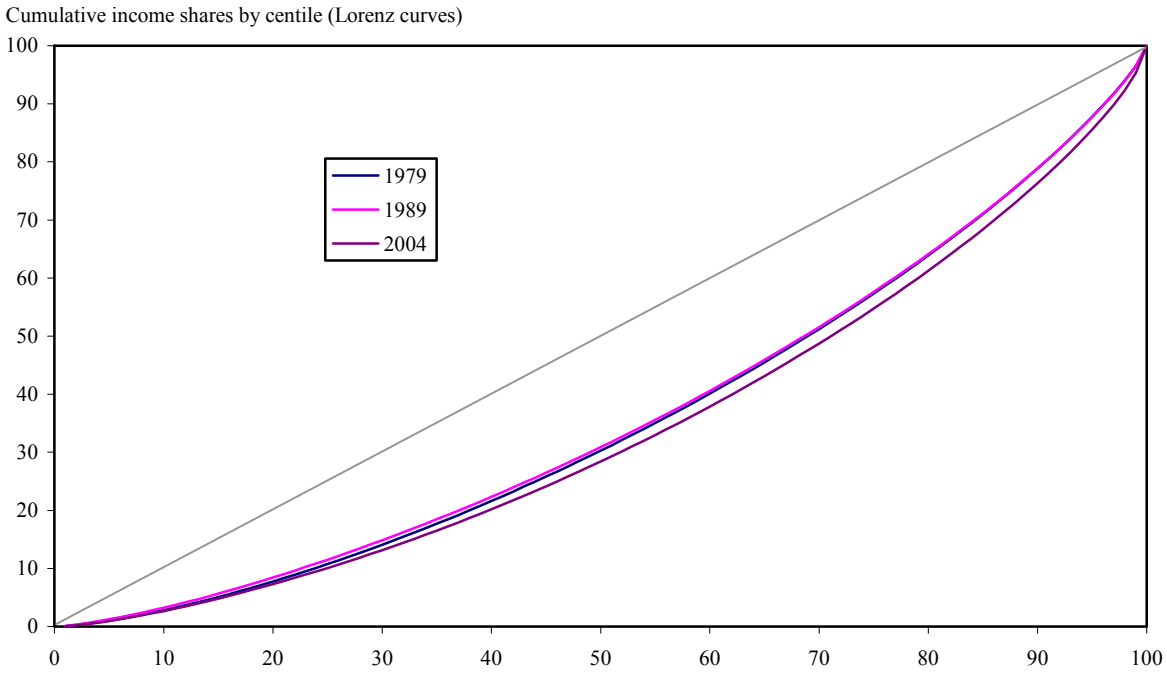
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 8 Absolute income differences in adult-equivalent-adjusted after-tax income, 1976 to 2004



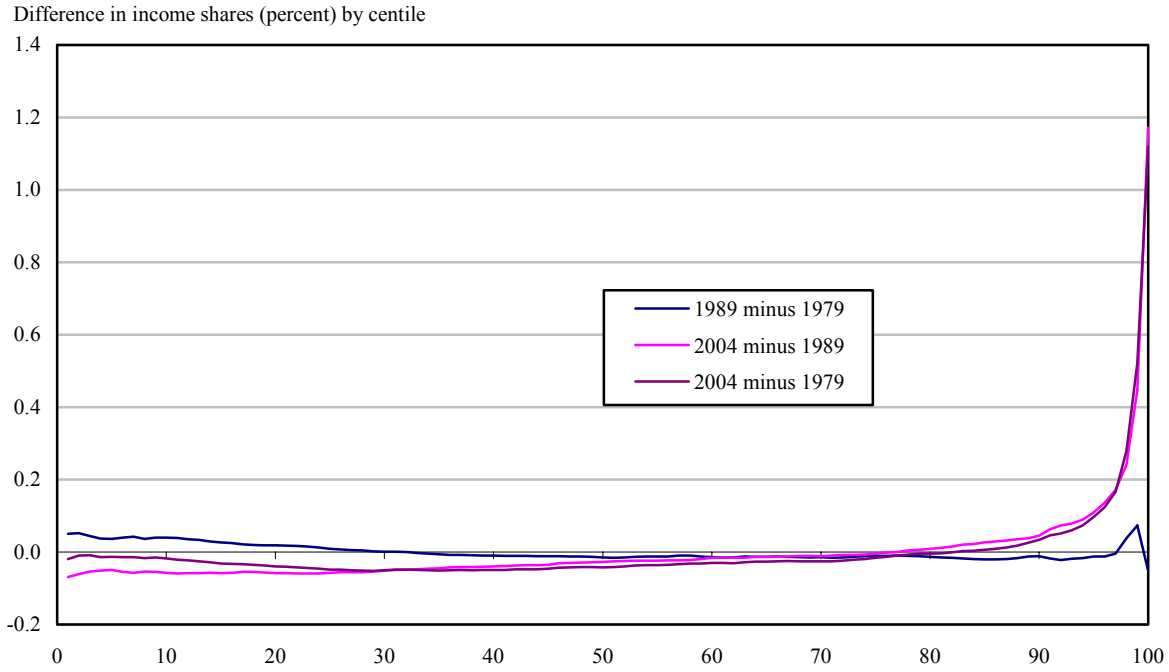
Notes: p = percentile. Income figures are on an adult-equivalent-adjusted basis.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 9-1 Family after-tax-income distribution, by cumulative income shares, 1979, 1989 and 2004



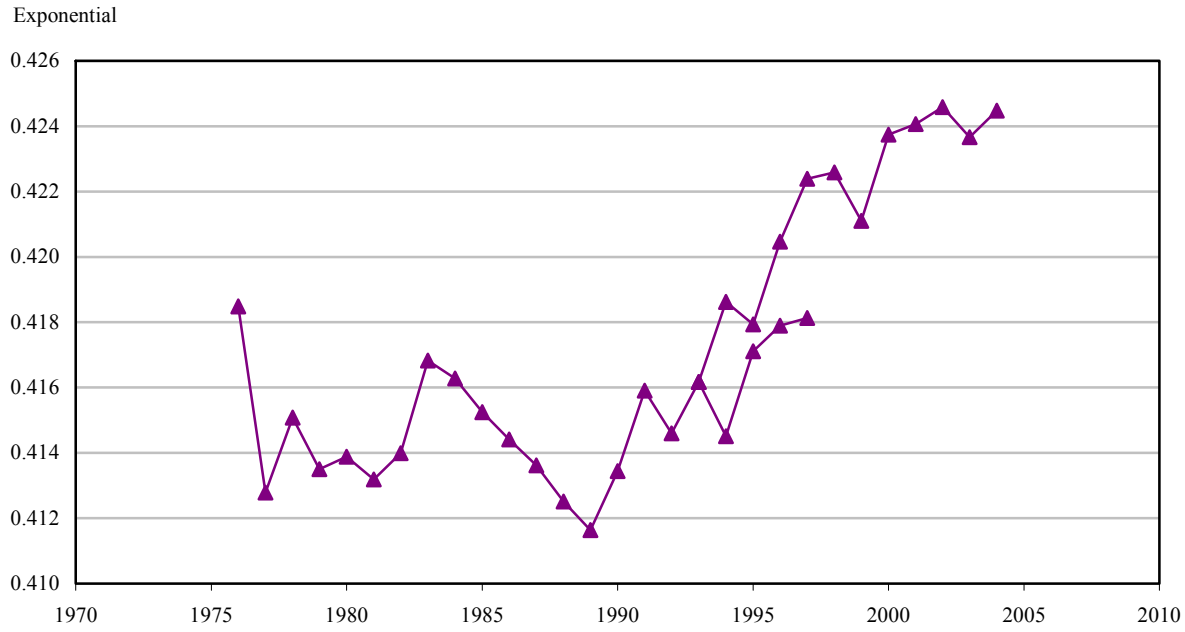
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 9-2 Family after-tax-income distribution, by difference in income share, 1979, 1989 and 2004



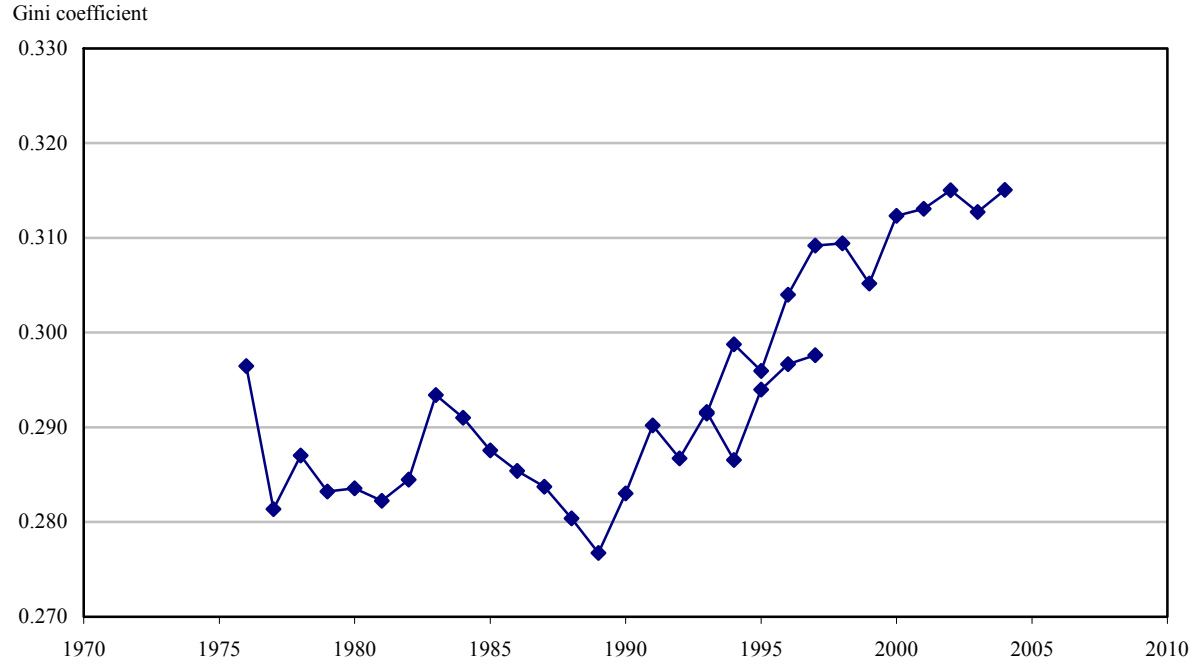
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 10-1 Family after-tax-income inequality indices — Exponential, 1976 to 2004



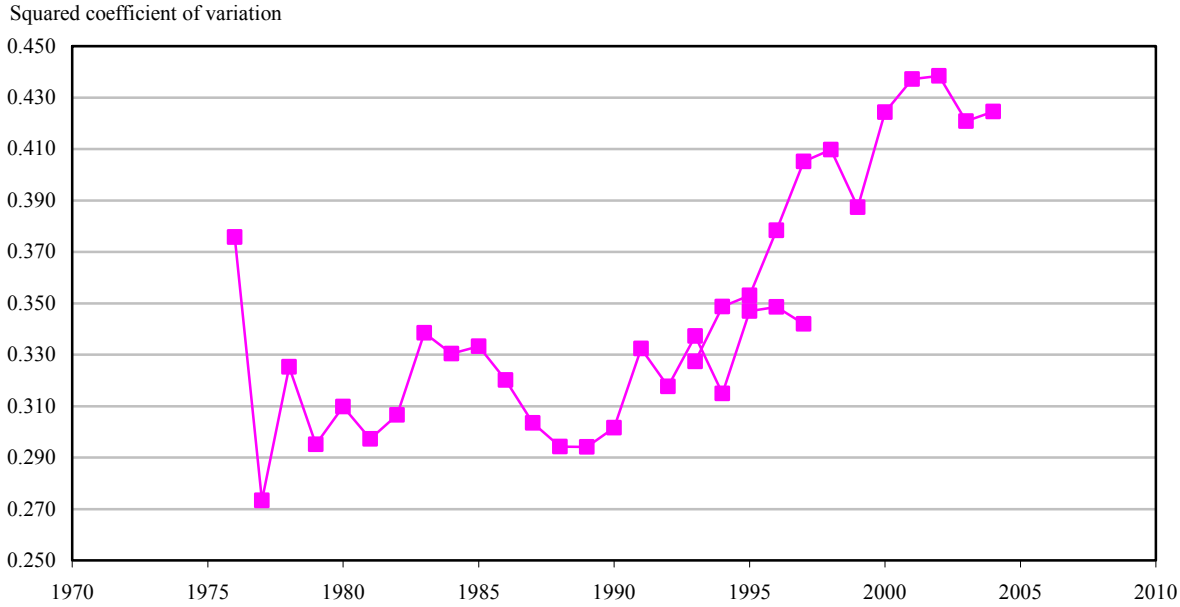
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 10-2 Family after-tax-income inequality indices — Gini coefficient, 1976 to 2004



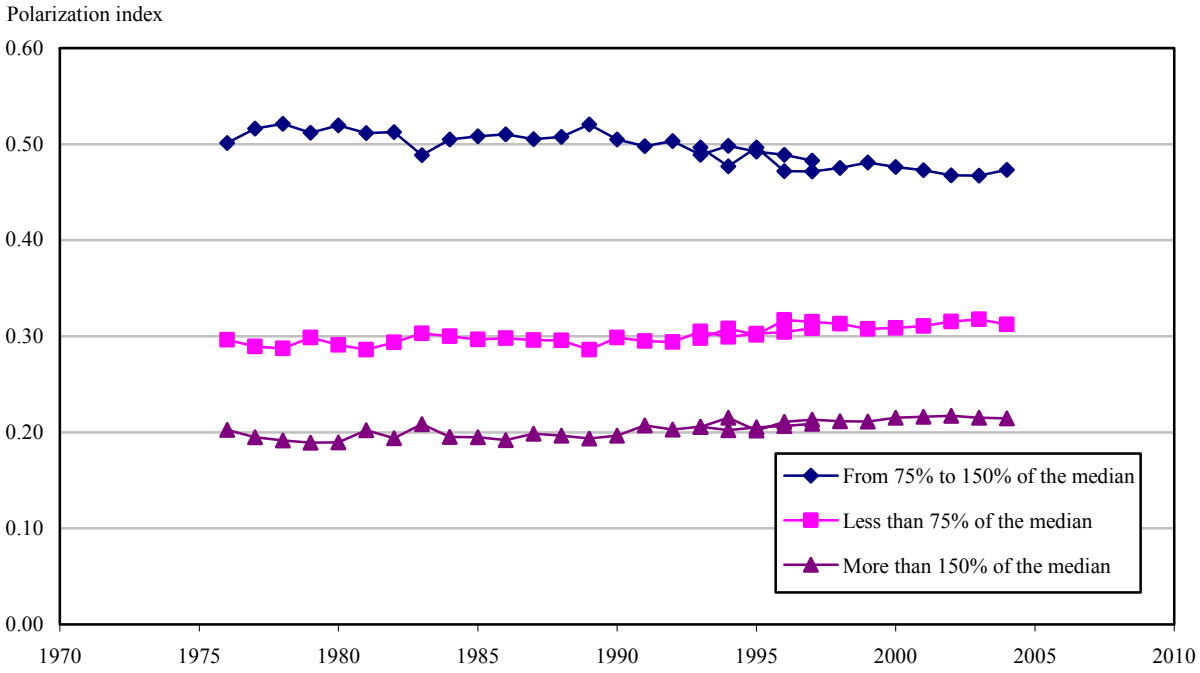
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 10-3 Family after-tax-income inequality indices — Squared coefficient of variation, 1976 to 2004



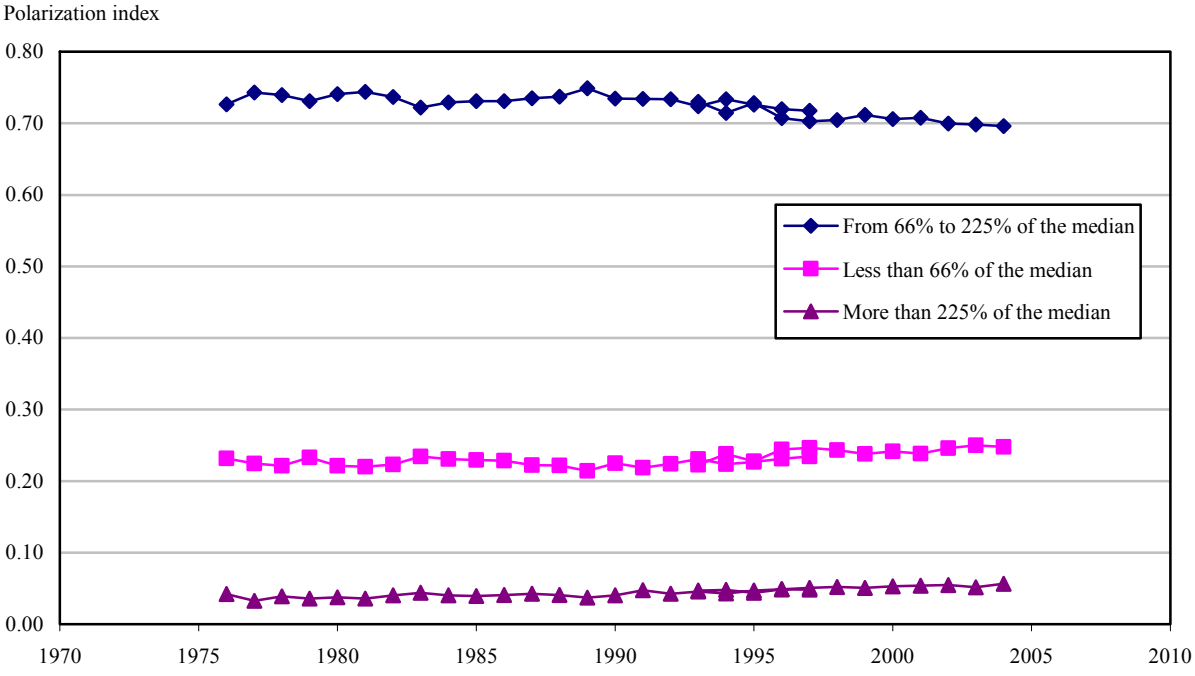
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 11-1 Polarization index for the population with adult-equivalent-adjusted after-tax income — Ranges at 75% and 150% of the median, 1976 to 2004



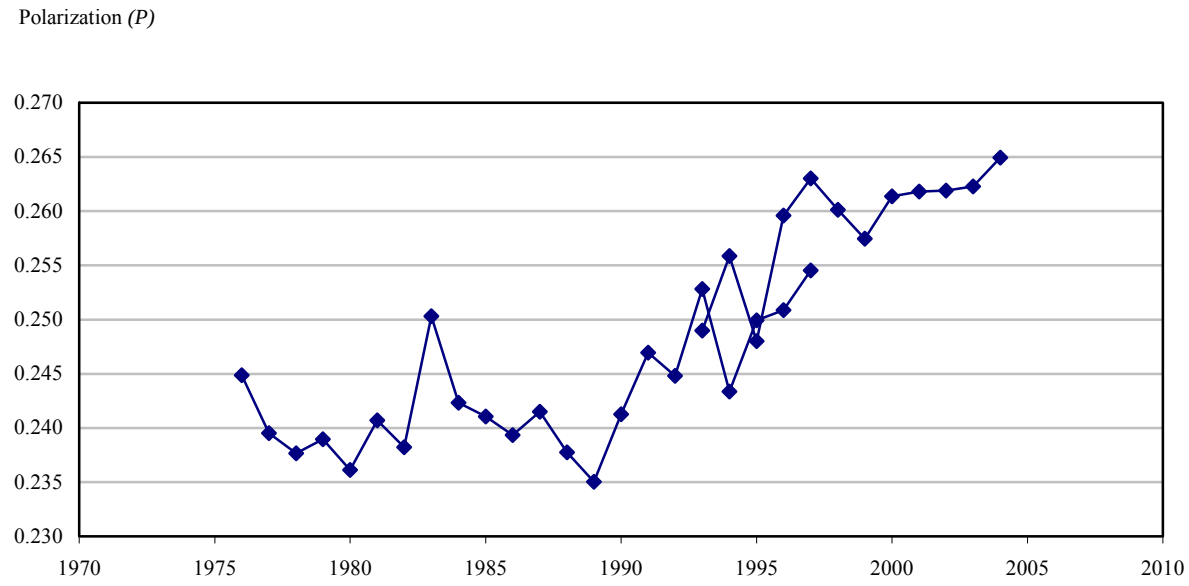
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 11-2 Polarization index for the population with adult-equivalent-adjusted after-tax income — Ranges at 66% and 225% of the median, 1976 to 2004



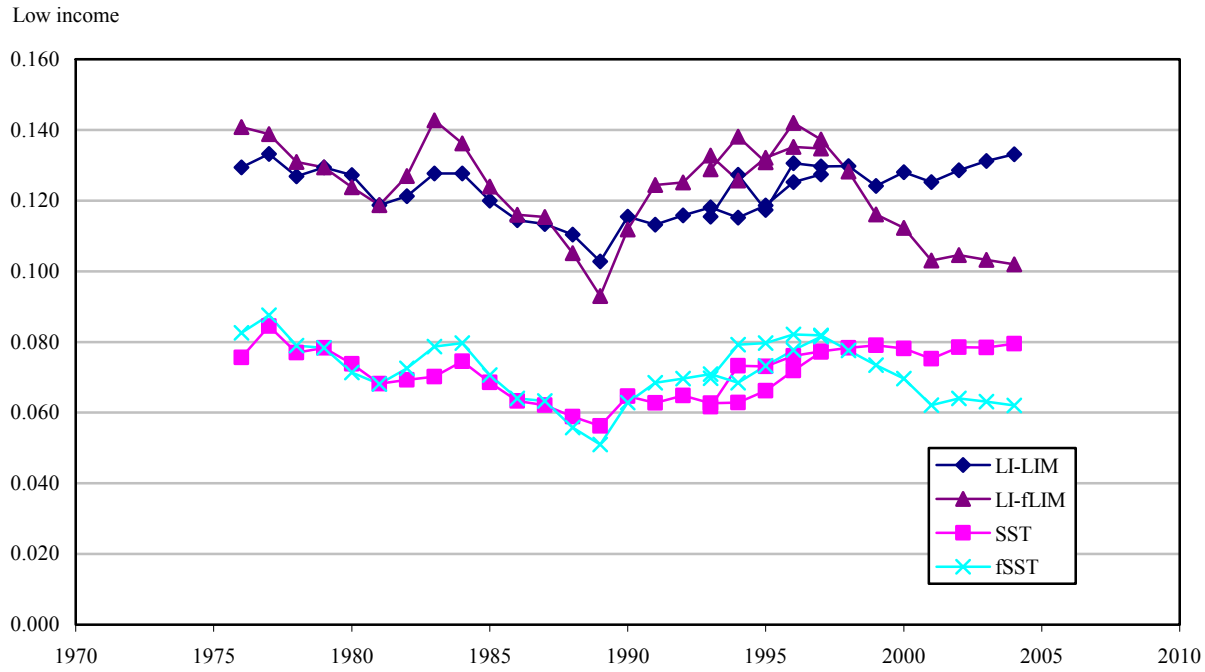
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 11-3 Wolfson's polarization index for the population with adult-equivalent-adjusted after-tax income, 1976 to 2004



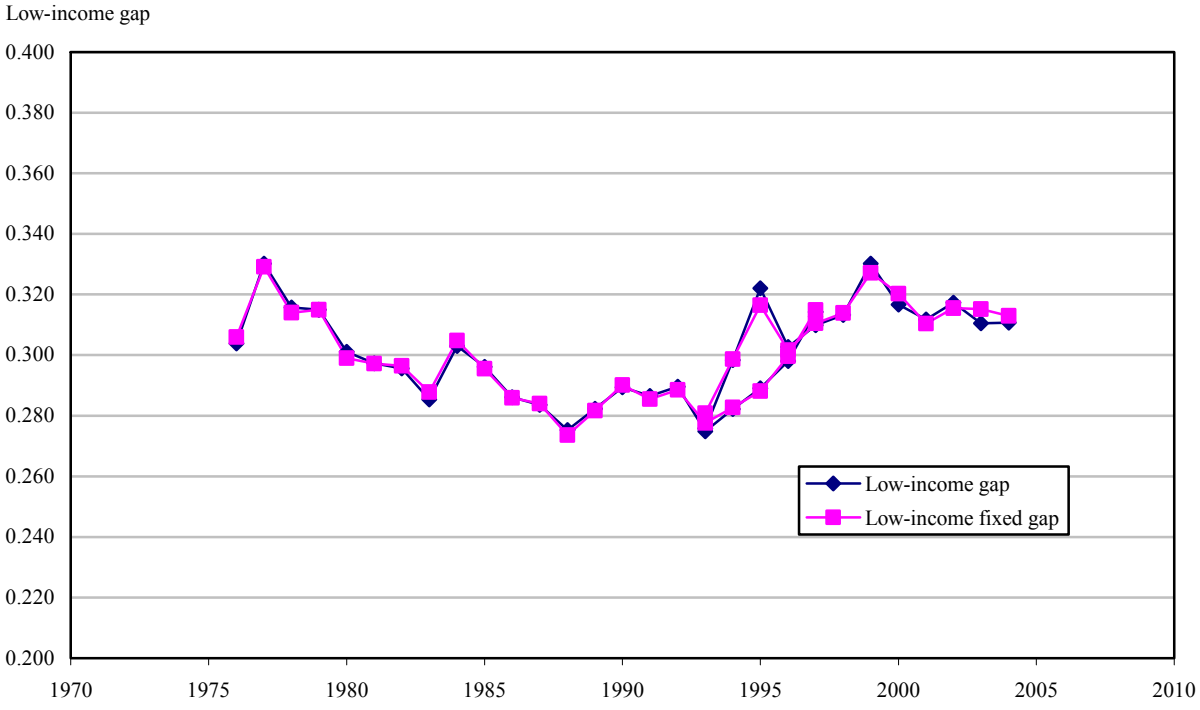
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 12-1 Incidence of low-income and low-income intensity, 1976 to 2004



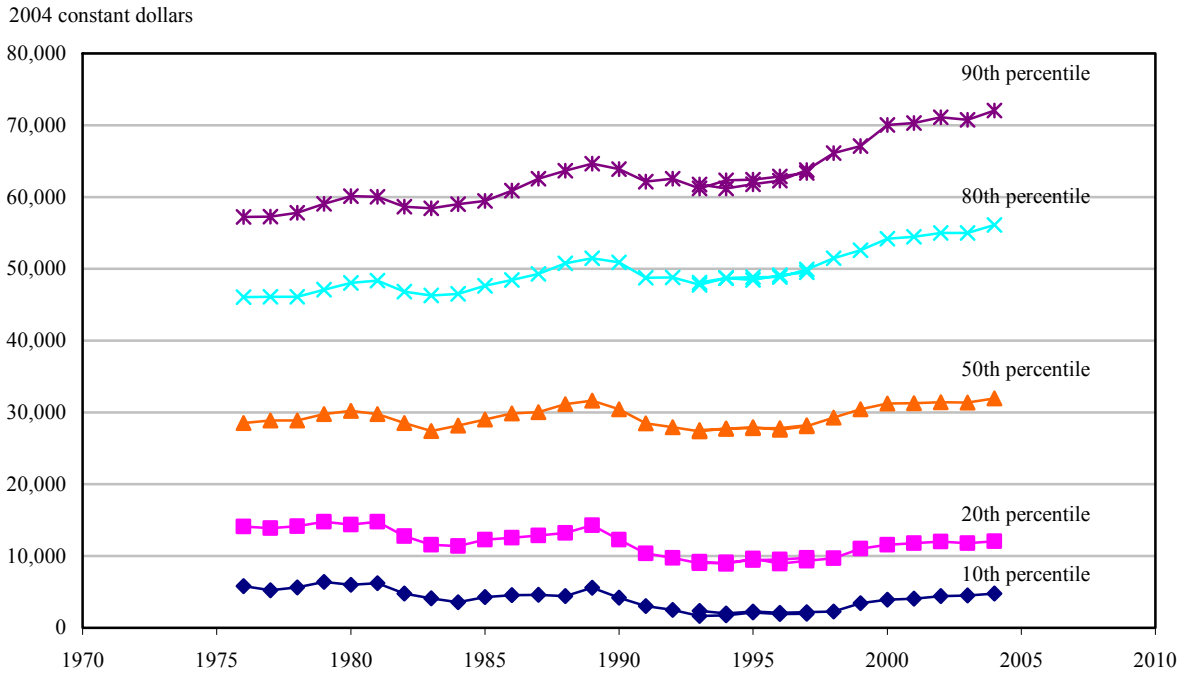
Notes: LI-LIM = Conventional low-income measure; LI-fLIM = Low-income measure cut-off, fixed to its 1979 value; SST = Sen-Shorrocks-Thon index,conventional cut-off; fSST = Sen-Shorrocks-Thon index, fixed cut-off.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 12-2 Low-income gap, 1976 to 2004



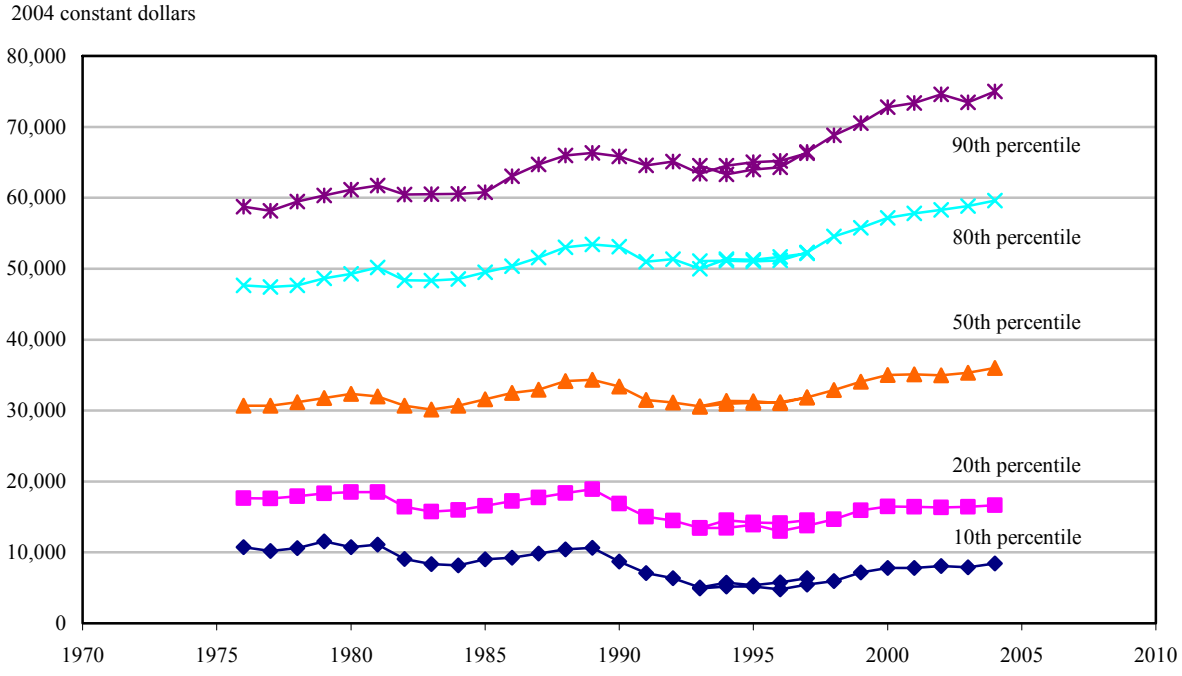
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 13-1 Family market income by percentile — All persons, 1976 to 2004



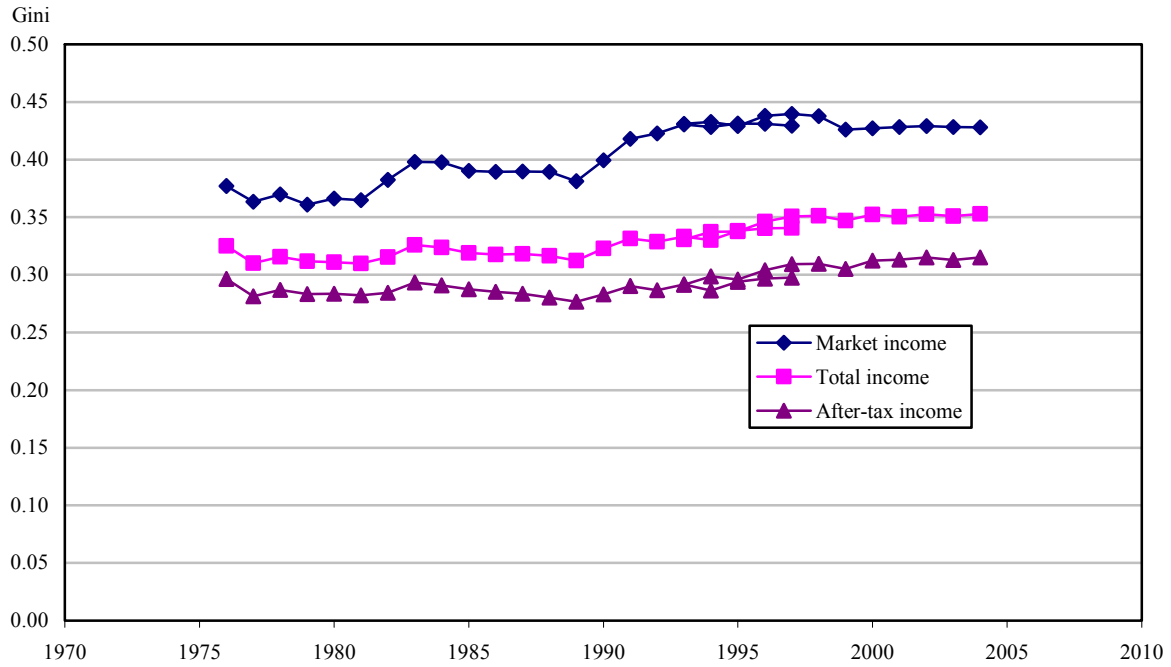
Note: Income figures are on an adult-equivalent-adjusted basis.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 13-2 Market income by percentile — Persons in prime-aged-headed families, 1976 to 2004



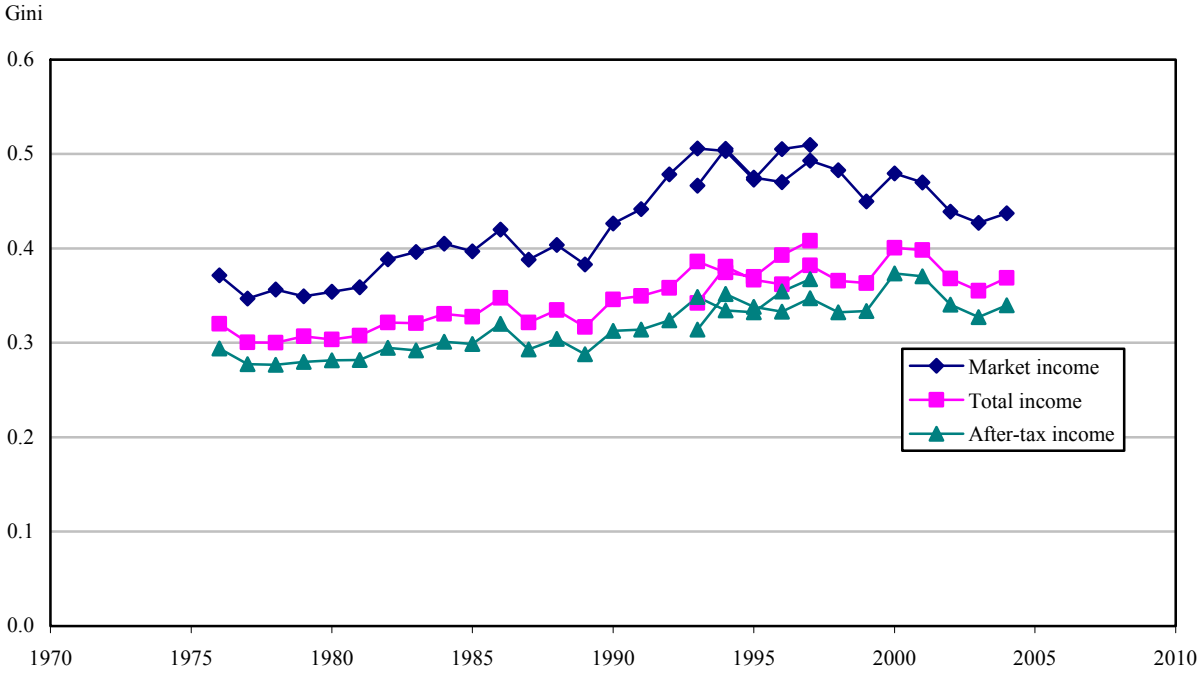
Note: Income figures are on an adult-equivalent-adjusted basis.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 14-1a Market, total, and after-tax income inequality (Gini coefficient) — All families, 1976 to 2004



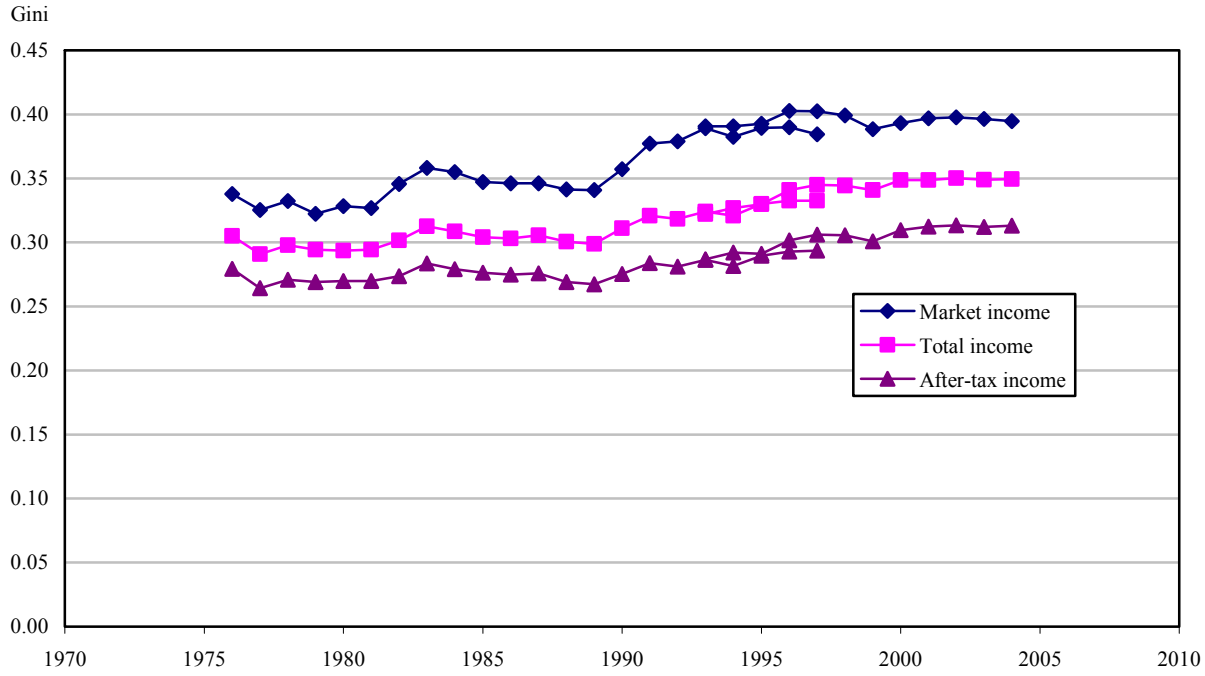
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 14-1b Market, total, and after-tax income inequality (Gini coefficient) — Young heads (aged 18 to 24), 1976 to 2004



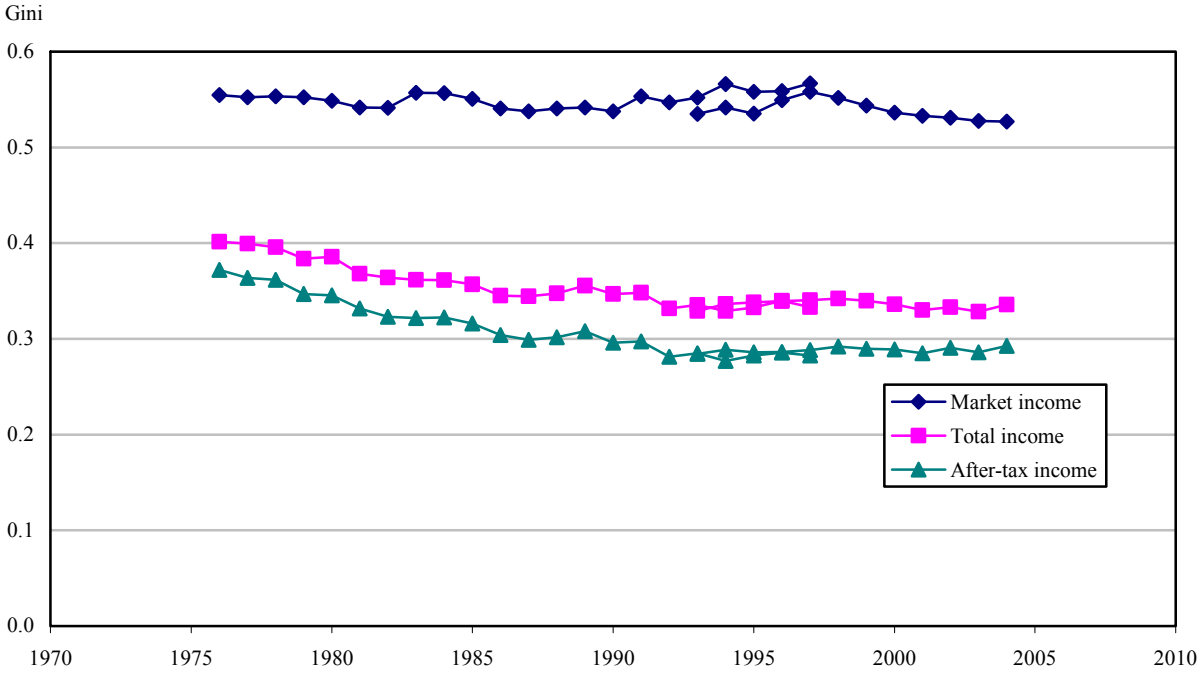
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 14-1c Market, total, and after-tax income inequality (Gini coefficient) — Prime-aged heads (aged 25 to 59), 1976 to 2004



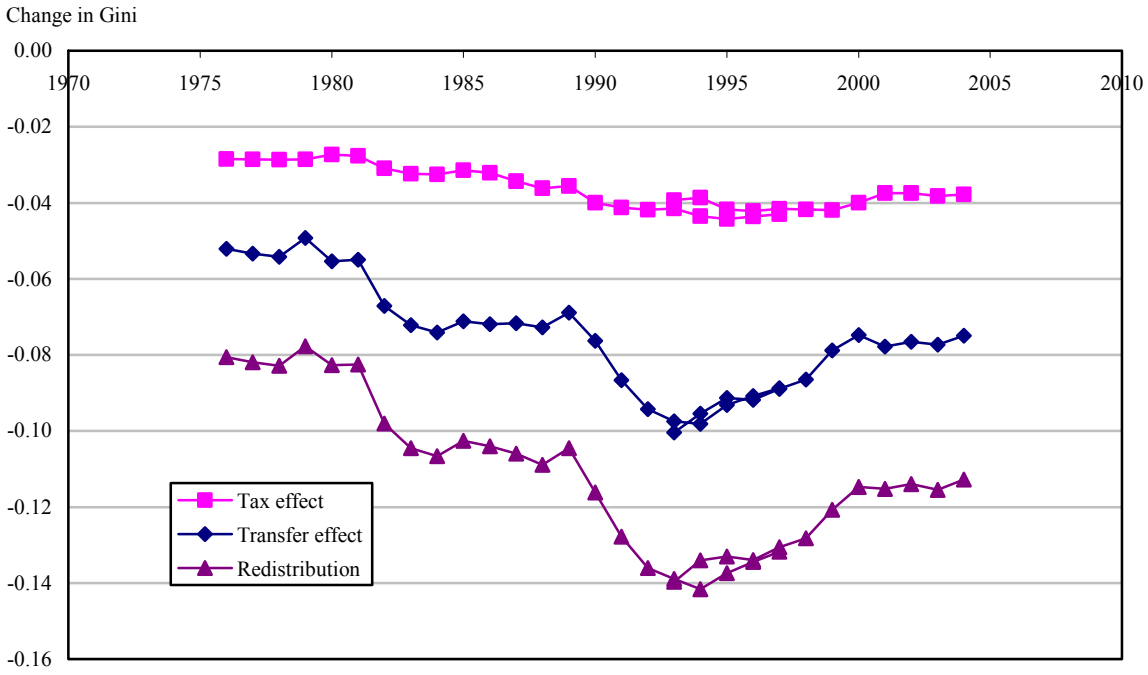
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 14-1d Market, total, and after-tax income inequality (Gini coefficient) — Older heads (aged 60 or more), 1976 to 2004



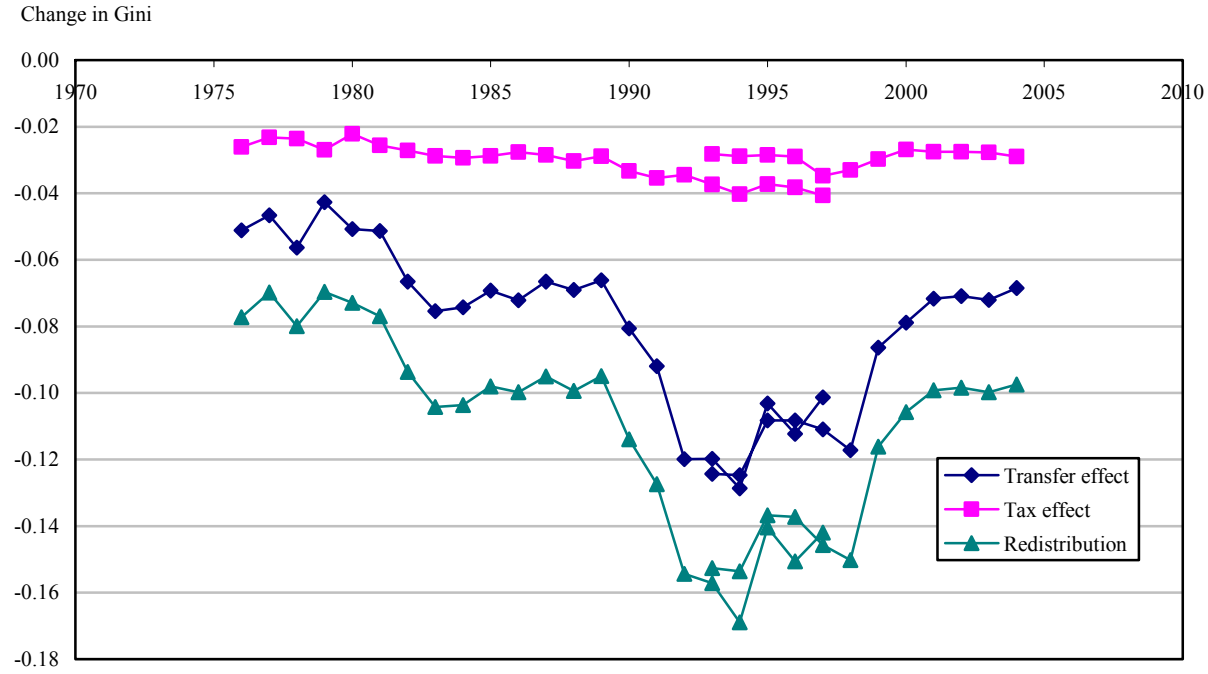
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 14-2a Direct effect of transfers and taxes on inequality (change in Gini coefficient) — All families, 1976 to 2004



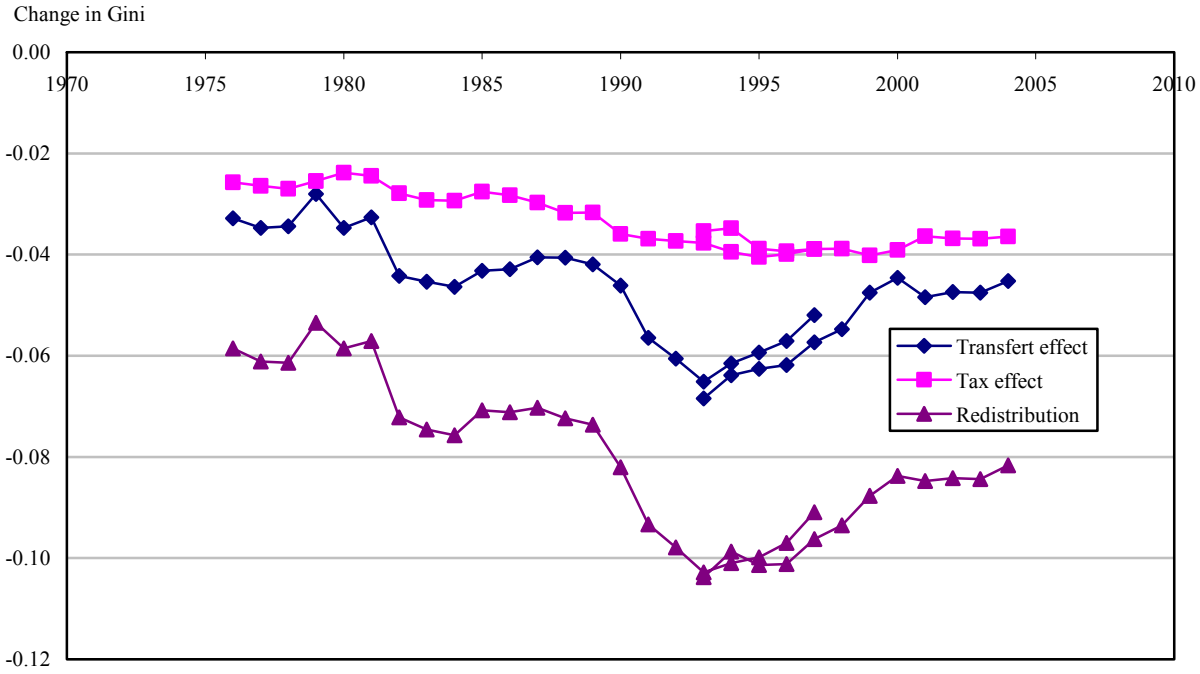
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 14-2b Direct effect of transfers and taxes on inequality (change in Gini coefficient) — Young heads (aged 18 to 24), 1976 to 2004



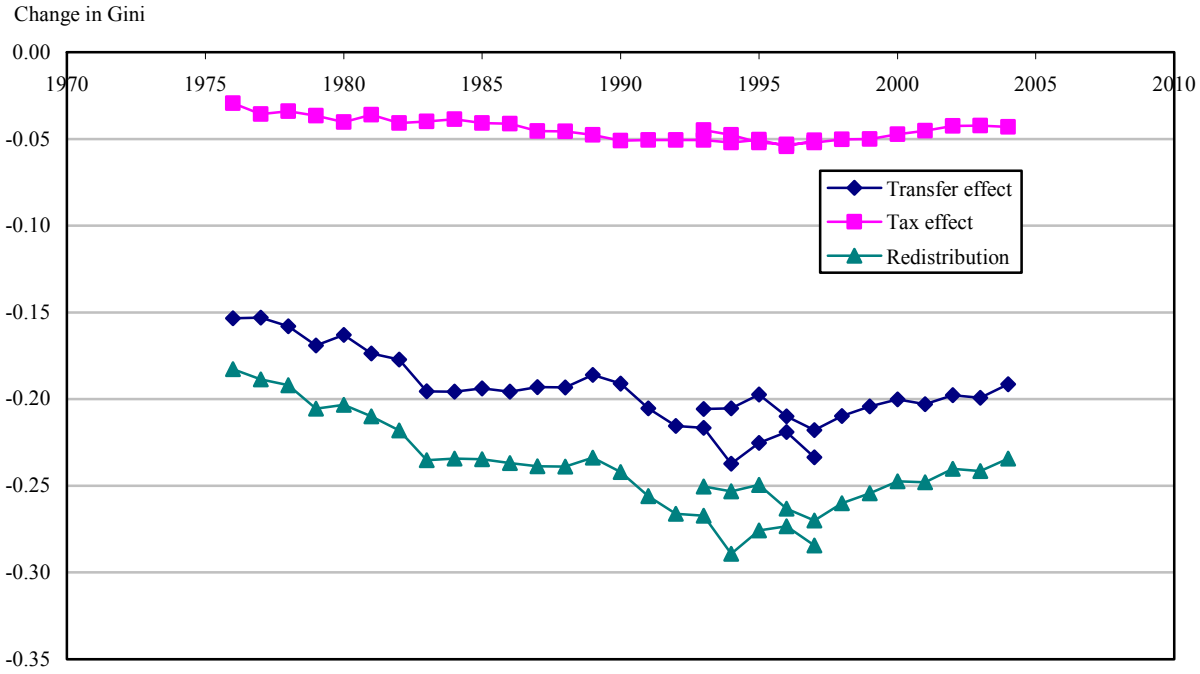
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 14-2c Direct effect of transfers and taxes on inequality (change in Gini coefficient) — Prime-aged heads (aged 25 to 59), 1976 to 2004



Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Figure 14-2d Direct effect of transfers and taxes on inequality (change in Gini coefficient) — Older heads (aged 60 or more), 1976 to 2004



Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Table 1 Inequality, polarization and low-income indices of income levels, direct effects, and redistribution, 1979, 1989 and 2004

				Polarization			Low income (LI-LIM) [4]			Low income (LI-fLIM) [5]		
	Gini	EXP[1]	Squared CV[2]	PS[3] from 75% to 150% of median	PS from 66% to 225% of median	*P*	Incidence	Gap	Intensity	Incidence	Gap	Intensity
Income levels												
Market income												
1979	0.361	0.442	0.480	0.433	0.654	0.302	0.184	0.581	0.200	0.184	0.581	0.200
1989	0.381	0.449	0.535	0.408	0.632	0.326	0.200	0.589	0.220	0.193	0.595	0.214
2004	0.428	0.468	0.745	0.350	0.568	0.383	0.248	0.567	0.258	0.226	0.570	0.238
Total income												
1979	0.312	0.423	0.371	0.471	0.693	0.266	0.121	0.326	0.076	0.121	0.326	0.076
1989	0.312	0.423	0.384	0.468	0.693	0.268	0.094	0.291	0.053	0.086	0.290	0.049
2004	0.353	0.438	0.556	0.419	0.645	0.304	0.124	0.318	0.076	0.097	0.318	0.060
After-tax income												
1979	0.283	0.414	0.295	0.512	0.731	0.239	0.129	0.315	0.078	0.129	0.315	0.078
1989	0.277	0.412	0.294	0.521	0.749	0.235	0.103	0.282	0.056	0.093	0.282	0.051
2004	0.315	0.424	0.425	0.473	0.696	0.265	0.133	0.311	0.080	0.102	0.313	0.062
Direct effects												
Transfers												
1979	-0.049	-0.019	-0.109	0.038	0.038	-0.037	-0.062	-0.255	-0.124	-0.062	-0.255	-0.124
1989	-0.069	-0.026	-0.151	0.061	0.062	-0.058	-0.106	-0.297	-0.166	-0.107	-0.305	-0.166
2004	-0.075	-0.030	-0.188	0.070	0.077	-0.079	-0.124	-0.249	-0.181	-0.129	-0.251	-0.178
Taxes												
1979	-0.029	-0.009	-0.076	0.041	0.038	-0.027	0.008	-0.011	0.002	0.008	-0.011	0.002
1989	-0.036	-0.011	-0.090	0.052	0.055	-0.033	0.008	-0.009	0.003	0.007	-0.008	0.002
2004	-0.038	-0.013	-0.132	0.054	0.051	-0.039	0.009	-0.007	0.003	0.005	-0.005	0.002
Redistribution												
1979	-0.078	-0.028	-0.185	0.079	0.077	-0.063	-0.055	-0.266	-0.122	-0.055	-0.266	-0.122
1989	-0.104	-0.038	-0.241	0.113	0.117	-0.091	-0.098	-0.306	-0.164	-0.100	-0.313	-0.163
2004	-0.113	-0.044	-0.320	0.123	0.128	-0.118	-0.115	-0.257	-0.178	-0.124	-0.257	-0.176

1. Exponential.
2. Coefficient of variation.
3. Population share.
4. Conventional low-income cut-off.
5. Fixed low-income cut-off.

Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

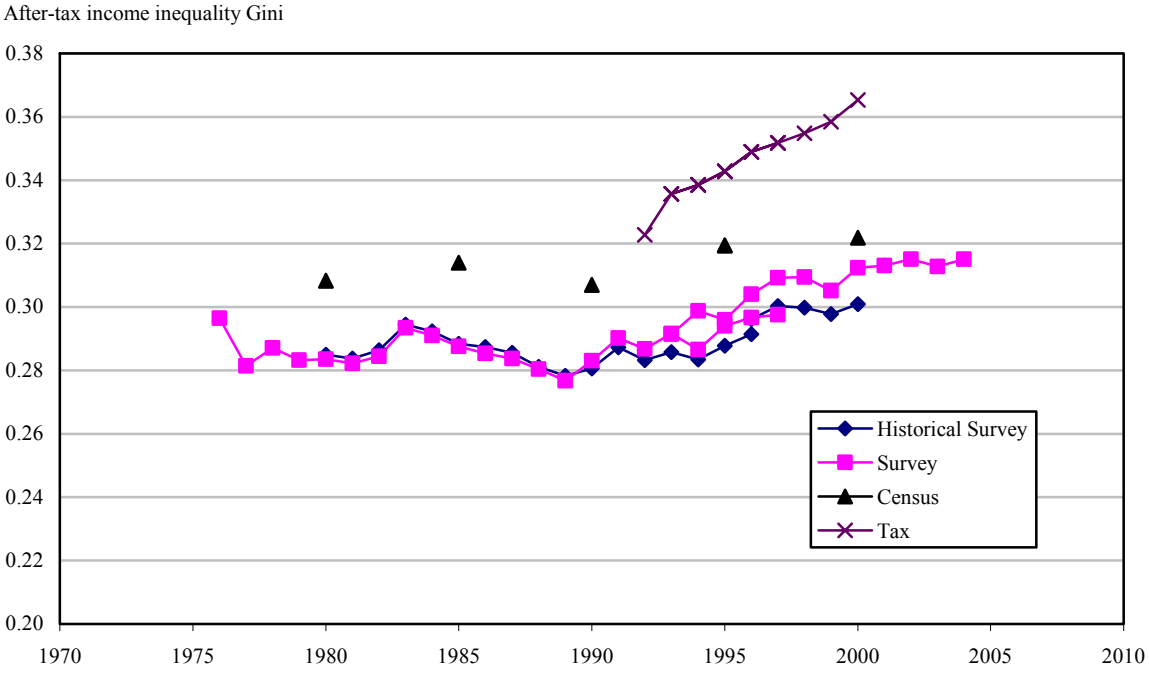
Table 2 Gini coefficients, holding age, market-income distribution and redistribution constant, 1979, 1989 and 2004

Year	Market income	Total income	After-tax income	Total redistribution
	Actual			
1979	0.361	0.312	0.283	-0.078
1989	0.381	0.312	0.277	-0.104
2004	0.428	0.353	0.315	-0.113
	Age constant at 1989 values			
1979	0.367	0.314	0.285	-0.082
1989	0.381	0.312	0.276	-0.105
2004	0.425	0.354	0.317	-0.108
	Age and market income distribution at 1989 values			
1979	0.384	0.333	0.302	-0.082
1989	0.381	0.312	0.276	-0.105
2004	0.384	0.313	0.280	-0.104
	Age and redistribution rates constant at 1989 values			
1979	0.367	0.288	0.251	-0.116
1989	0.381	0.308	0.268	-0.113
2004	0.426	0.351	0.310	-0.116

Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

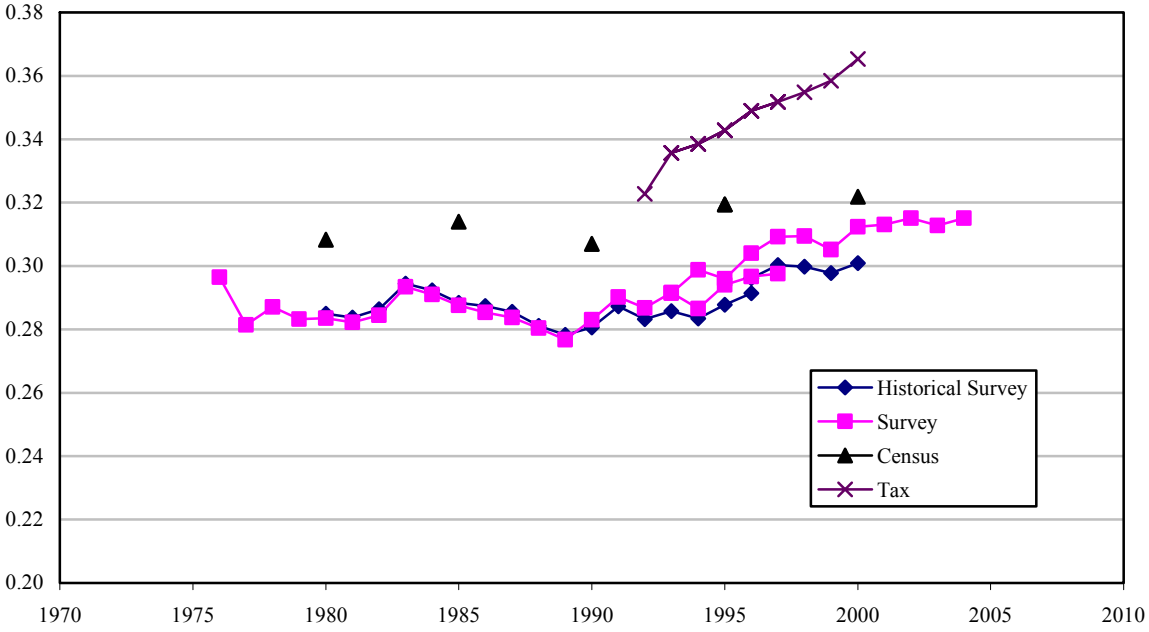
Appendix

Figure A.1-1 After-tax income inequality Gini, various sources, 1976 to 2004



Sources: Statistics Canada, Survey of Consumer Finances, Survey of Labour and Income Dynamics, Census of Canada, and Annual Estimates for Census Families and Individuals (T1 Family File).

Figure A.1-2 Tax and transfer redistribution (Gini), various sources, 1976 to 2004



Sources: Statistics Canada, Survey of Consumer Finances, Survey of Labour and Income Dynamics, Census of Canada, and Annual Estimates for Census Families and Individuals (T1 Family File).

Table A.1 After-tax income by percentile, average after-tax income in the top and bottom quintiles and deciles, 1976 to 2004

	Percentile					Average income in…			
	p10	p20	p50	p80	p90	Bottom decile	Bottom quintile	Top quintile	Top decile
SCF[1]	2004 constant dollars								
1976	11,700	16,400	26,400	39,800	47,800	8,200	11,200	54,600	65,700
1977	11,700	16,800	27,000	40,200	48,700	7,900	11,100	52,200	60,300
1978	12,000	17,000	27,200	40,300	49,100	8,400	11,500	54,400	64,600
1979	12,200	16,800	27,500	40,600	49,200	8,400	11,500	53,600	62,700
1980	12,600	17,500	27,900	41,200	49,800	8,800	12,000	55,200	65,300
1981	12,800	17,300	27,500	41,500	50,000	9,000	12,100	54,800	64,100
1982	12,400	16,900	27,000	40,100	49,200	8,800	11,800	53,900	63,600
1983	11,900	16,100	26,200	39,800	48,400	8,500	11,300	53,700	63,900
1984	12,000	16,500	26,700	39,700	48,700	8,400	11,400	54,000	64,300
1985	12,600	16,800	27,200	40,400	49,100	8,900	11,800	54,700	65,100
1986	12,900	17,100	27,400	40,500	49,700	9,300	12,200	55,100	65,700
1987	13,000	17,200	27,300	40,900	49,800	9,300	12,300	54,900	65,000
1988	13,500	17,700	28,100	42,000	50,800	9,800	12,800	56,000	66,100
1989	14,200	18,400	28,700	42,500	51,700	10,200	13,300	56,800	67,100
1990	13,200	17,600	27,900	41,600	50,300	9,300	12,400	55,600	65,700
1991	12,600	16,900	26,500	40,300	49,200	9,000	11,900	54,900	65,600
1992	12,500	16,800	26,700	40,200	49,600	8,900	11,900	54,300	64,100
1993	12,200	16,300	26,200	39,700	48,700	8,900	11,700	54,000	64,400
1994	12,600	16,700	26,600	40,000	49,200	9,000	11,900	54,000	63,800
1995	12,200	16,500	26,400	39,900	49,000	8,800	11,600	54,700	65,600
1996	12,000	16,400	26,400	40,100	49,400	8,500	11,400	55,000	65,800
1997	11,900	16,300	26,400	40,200	49,800	8,200	11,300	54,900	65,400
SLID[2]									
1993	12,500	16,600	26,400	40,100	49,100	9,000	11,800	54,800	65,300
1994	11,900	16,100	26,400	40,400	49,000	8,400	11,300	55,000	66,000
1995	12,300	16,600	26,800	40,300	49,400	8,300	11,400	55,200	66,100
1996	11,600	16,000	26,600	40,700	49,600	8,300	11,100	56,000	67,200
1997	11,800	16,100	26,800	41,200	50,800	8,300	11,200	57,700	69,800
1998	12,400	16,700	27,700	42,300	52,400	8,400	11,600	59,600	72,500
1999	12,800	17,300	28,600	43,700	53,600	8,600	11,900	60,700	73,300
2000	13,100	17,700	29,100	44,900	55,400	8,900	12,200	63,700	77,900
2001	13,600	18,400	30,100	46,300	57,300	9,400	12,800	66,400	81,500
2002	13,500	18,200	30,400	47,000	58,200	9,200	12,600	66,800	81,700
2003	13,600	18,200	30,500	46,900	57,800	9,300	12,700	66,200	80,600
2004	13,700	18,400	31,000	47,700	59,500	9,400	12,800	68,000	83,200

1. Survey of Consumer Finances.
2. Survey of Labour and Income Dynamics.
Note: Income figures are on an adult-equivalent-adjusted basis.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Table A.2 After-tax income inequality and polarization, various measures, 1976 to 2004

	Percentile ratio				Top decile/ bottom decile ratio	Top quintile/ bottom quintile ratio	Gini	EXP[1]	Squared CV[2]
	p90/p10	p80/p20	p90/p50	p50/p10					
SCF[3]									
1976	4.09	2.43	1.81	2.26	8.01	4.88	0.296	0.418	0.376
1977	4.16	2.39	1.80	2.31	7.63	4.70	0.281	0.413	0.273
1978	4.09	2.37	1.81	2.27	7.69	4.73	0.287	0.415	0.325
1979	4.03	2.42	1.79	2.25	7.46	4.66	0.283	0.414	0.295
1980	3.95	2.35	1.78	2.21	7.42	4.60	0.284	0.414	0.310
1981	3.91	2.40	1.82	2.15	7.12	4.53	0.282	0.413	0.297
1982	3.97	2.37	1.82	2.18	7.23	4.57	0.284	0.414	0.307
1983	4.07	2.47	1.85	2.20	7.52	4.75	0.293	0.417	0.338
1984	4.06	2.41	1.82	2.23	7.65	4.74	0.291	0.416	0.330
1985	3.90	2.40	1.81	2.16	7.31	4.64	0.288	0.415	0.333
1986	3.85	2.37	1.81	2.12	7.06	4.52	0.285	0.414	0.320
1987	3.83	2.38	1.82	2.10	6.99	4.46	0.284	0.414	0.304
1988	3.76	2.37	1.81	2.08	6.74	4.38	0.280	0.413	0.294
1989	3.64	2.31	1.80	2.02	6.58	4.27	0.277	0.412	0.294
1990	3.81	2.36	1.80	2.11	7.06	4.48	0.283	0.413	0.302
1991	3.90	2.38	1.86	2.10	7.29	4.61	0.290	0.416	0.332
1992	3.97	2.39	1.86	2.14	7.20	4.56	0.287	0.415	0.318
1993	3.99	2.44	1.86	2.15	7.24	4.62	0.292	0.416	0.337
1994	3.90	2.40	1.85	2.11	7.09	4.54	0.287	0.415	0.315
1995	4.02	2.42	1.86	2.16	7.45	4.72	0.294	0.417	0.347
1996	4.12	2.45	1.87	2.20	7.74	4.82	0.297	0.418	0.349
1997	4.18	2.47	1.89	2.22	7.98	4.86	0.298	0.418	0.342
SLID[4]									
1993	3.93	2.42	1.86	2.11	7.26	4.64	0.291	0.416	0.327
1994	4.12	2.51	1.86	2.22	7.86	4.87	0.299	0.419	0.349
1995	4.02	2.43	1.84	2.18	7.96	4.84	0.296	0.418	0.353
1996	4.28	2.54	1.86	2.29	8.10	5.05	0.304	0.420	0.378
1997	4.31	2.56	1.90	2.27	8.41	5.15	0.309	0.422	0.405
1998	4.23	2.53	1.89	2.23	8.63	5.14	0.309	0.423	0.410
1999	4.19	2.53	1.87	2.23	8.52	5.10	0.305	0.421	0.387
2000	4.23	2.54	1.90	2.22	8.75	5.22	0.312	0.424	0.424
2001	4.21	2.52	1.90	2.21	8.67	5.19	0.313	0.424	0.437
2002	4.31	2.58	1.91	2.25	8.88	5.30	0.315	0.425	0.438
2003	4.25	2.58	1.90	2.24	8.67	5.21	0.313	0.424	0.421
2004	4.34	2.59	1.92	2.26	8.85	5.31	0.315	0.424	0.425

Table A.2 After-tax income inequality and polarization, various measures, concluded

	Less than 75% of the median	From 75% to 150% of the median	More than 150% of the median	Less than 66% of the median	From 66% to 225% of the median	More than 225% of the median	Polarization (*P*)
SCF							
1976	0.296	0.501	0.203	0.232	0.727	0.042	0.245
1977	0.289	0.516	0.195	0.224	0.743	0.032	0.240
1978	0.287	0.521	0.192	0.221	0.740	0.039	0.238
1979	0.299	0.512	0.189	0.233	0.731	0.036	0.239
1980	0.291	0.519	0.189	0.221	0.741	0.038	0.236
1981	0.286	0.512	0.202	0.220	0.744	0.036	0.241
1982	0.294	0.512	0.194	0.223	0.737	0.040	0.238
1983	0.303	0.489	0.208	0.234	0.722	0.044	0.250
1984	0.300	0.505	0.195	0.231	0.729	0.040	0.242
1985	0.297	0.508	0.195	0.229	0.731	0.039	0.241
1986	0.298	0.510	0.192	0.228	0.731	0.041	0.239
1987	0.296	0.505	0.199	0.222	0.735	0.043	0.242
1988	0.296	0.508	0.197	0.222	0.737	0.041	0.238
1989	0.286	0.521	0.194	0.214	0.749	0.037	0.235
1990	0.299	0.505	0.197	0.225	0.735	0.040	0.241
1991	0.295	0.498	0.207	0.219	0.734	0.047	0.247
1992	0.294	0.503	0.203	0.224	0.734	0.042	0.245
1993	0.305	0.489	0.206	0.231	0.724	0.046	0.253
1994	0.299	0.498	0.202	0.223	0.734	0.043	0.243
1995	0.303	0.492	0.205	0.227	0.726	0.047	0.250
1996	0.304	0.489	0.207	0.231	0.720	0.049	0.251
1997	0.308	0.483	0.209	0.234	0.718	0.048	0.255
SLID							
1993	0.298	0.496	0.206	0.223	0.730	0.047	0.249
1994	0.308	0.477	0.215	0.238	0.714	0.048	0.256
1995	0.301	0.497	0.202	0.228	0.728	0.044	0.248
1996	0.317	0.472	0.211	0.244	0.707	0.049	0.260
1997	0.315	0.472	0.213	0.246	0.703	0.051	0.263
1998	0.313	0.475	0.212	0.243	0.705	0.052	0.260
1999	0.308	0.481	0.211	0.238	0.712	0.051	0.257
2000	0.309	0.476	0.215	0.241	0.706	0.053	0.261
2001	0.311	0.473	0.216	0.238	0.708	0.054	0.262
2002	0.315	0.468	0.217	0.246	0.700	0.054	0.262
2003	0.318	0.467	0.215	0.250	0.698	0.051	0.262
2004	0.312	0.473	0.214	0.248	0.696	0.056	0.265

1. Exponential
2. Coefficient of variation.
3. Survey of Consumer Finances.
4. Survey of Labour and Income Dynamics.

Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Table A.3 Impact of transfers and taxes on after-tax income inequality (Gini), 1976 to 2004

	Market income (a)	Total income (b)	After-tax income (c)	Direct effect of transfers (b) - (c)	Direct effect of taxes after transfers (c) - (b)	Total effect of transfers and taxes (c) - (a)
SCF[1]						
1976	0.377	0.325	0.296	-0.052	-0.028	-0.081
1977	0.363	0.310	0.281	-0.053	-0.029	-0.082
1978	0.370	0.316	0.287	-0.054	-0.029	-0.083
1979	0.361	0.312	0.283	-0.049	-0.029	-0.078
1980	0.366	0.311	0.284	-0.055	-0.027	-0.083
1981	0.365	0.310	0.282	-0.055	-0.028	-0.083
1982	0.383	0.315	0.284	-0.067	-0.031	-0.098
1983	0.398	0.326	0.293	-0.072	-0.032	-0.105
1984	0.398	0.324	0.291	-0.074	-0.033	-0.107
1985	0.390	0.319	0.288	-0.071	-0.031	-0.103
1986	0.389	0.317	0.285	-0.072	-0.032	-0.104
1987	0.390	0.318	0.284	-0.072	-0.034	-0.106
1988	0.389	0.317	0.280	-0.073	-0.036	-0.109
1989	0.381	0.312	0.277	-0.069	-0.036	-0.104
1990	0.399	0.323	0.283	-0.076	-0.040	-0.116
1991	0.418	0.331	0.290	-0.087	-0.041	-0.128
1992	0.423	0.329	0.287	-0.094	-0.042	-0.136
1993	0.431	0.333	0.292	-0.097	-0.041	-0.139
1994	0.428	0.330	0.287	-0.098	-0.044	-0.142
1995	0.431	0.338	0.294	-0.093	-0.044	-0.137
1996	0.431	0.340	0.297	-0.091	-0.044	-0.134
1997	0.429	0.341	0.298	-0.089	-0.043	-0.132
SLID[2]						
1993	0.431	0.331	0.291	-0.100	-0.039	-0.140
1994	0.433	0.337	0.299	-0.095	-0.039	-0.134
1995	0.429	0.338	0.296	-0.091	-0.042	-0.133
1996	0.438	0.346	0.304	-0.092	-0.042	-0.134
1997	0.440	0.351	0.309	-0.089	-0.042	-0.131
1998	0.438	0.351	0.309	-0.086	-0.042	-0.128
1999	0.426	0.347	0.305	-0.079	-0.042	-0.121
2000	0.427	0.352	0.312	-0.075	-0.040	-0.115
2001	0.428	0.350	0.313	-0.078	-0.037	-0.115
2002	0.429	0.352	0.315	-0.077	-0.037	-0.114
2003	0.428	0.351	0.313	-0.077	-0.038	-0.115
2004	0.428	0.353	0.315	-0.075	-0.038	-0.113

1. Survey of Consumer Finances.
2. Survey of Labour and Income Dynamics.
Sources: Statistics Canada, Survey of Consumer Finances and Survey of Labour and Income Dynamics.

Table A.4 Market and after-tax-income inequality using various data sources, 1976 to 2004

	Market income inequality (Gini)				After-tax income inequality (Gini)				Redistribution (Gini [after tax] minus Gini [market])			
	Historical Survey[1]	Survey[2]	Census[3]	Tax[4]	Historical Survey	Survey	Census	Tax	Historical Survey	Survey	Census	Tax
Year												
1976	...	0.3771	...	...	...	0.2965	...	...	...	-0.0806	...	...
1977	...	0.3633	...	...	...	0.2814	...	...	...	-0.0820	...	...
1978	...	0.3699	...	...	...	0.2870	...	...	...	-0.0829	...	...
1979	...	0.3610	...	...	...	0.2832	...	...	...	-0.0777	...	...
1980	0.3687	0.3662	0.3923	...	0.2849	0.2836	0.3083	...	-0.0838	-0.0827	-0.0840	...
1981	0.3684	0.3648	...	...	0.2837	0.2822	...	...	-0.0847	-0.0826	...	...
1982	0.3867	0.3825	...	...	0.2864	0.2845	...	...	-0.1003	-0.0980	...	...
1983	0.4015	0.3980	...	...	0.2944	0.2934	...	...	-0.1071	-0.1045	...	...
1984	0.4010	0.3977	...	...	0.2923	0.2910	...	...	-0.1087	-0.1067	...	...
1985	0.3936	0.3902	0.4157	...	0.2884	0.2875	0.3140	...	-0.1052	-0.1026	-0.1017	...
1986	0.3932	0.3894	...	...	0.2874	0.2854	...	...	-0.1058	-0.1040	...	...
1987	0.3921	0.3897	...	...	0.2856	0.2837	...	...	-0.1065	-0.1059	...	...
1988	0.3907	0.3893	...	...	0.2811	0.2804	...	...	-0.1096	-0.1089	...	...
1989	0.3849	0.3812	...	...	0.2783	0.2767	...	...	-0.1066	-0.1045	...	...
1990	0.3945	0.3992	0.4142	...	0.2806	0.2830	0.3070	...	-0.1139	-0.1162	-0.1072	...
1991	0.4123	0.4180	...	...	0.2873	0.2902	...	...	-0.1250	-0.1278	...	...
1992	0.4140	0.4228	...	0.4627	0.2832	0.2867	...	0.3228	-0.1308	-0.1361	...	-0.1399
1993	0.4213	0.4306	...	0.4770	0.2858	0.2916	...	0.3357	-0.1355	-0.1390	...	-0.1413
1994	0.4200	0.4282	...	0.4798	0.2834	0.2866	...	0.3385	-0.1366	-0.1416	...	-0.1413
1995	0.4204	0.4314	0.4458	0.4807	0.2878	0.2940	0.3194	0.3428	-0.1326	-0.1374	-0.1264	-0.1379
1996	0.4211	0.4311	...	0.4865	0.2914	0.2967	...	0.3490	-0.1297	-0.1344	...	-0.1375
1997	...	0.4294	...	0.4865	...	0.2976	...	0.3518	...	-0.1317	...	-0.1347
1993	...	0.4311	...	0.4770	...	0.2915	...	0.3357	...	-0.1397	...	-0.1413
1994	...	0.4328	...	0.4798	...	0.2988	...	0.3385	...	-0.1340	...	-0.1413
1995	...	0.4290	0.4458	0.4807	...	0.2959	0.3194	0.3428	...	-0.1330	-0.1264	-0.1379
1996	0.4263	0.4380	...	0.4865	0.2962	0.3040	...	0.3490	-0.1301	-0.1340	...	-0.1375
1997	0.4269	0.4397	...	0.4865	0.3003	0.3092	...	0.3518	-0.1266	-0.1305	...	-0.1347
1998	0.4247	0.4376	...	0.4893	0.2998	0.3094	...	0.3548	-0.1249	-0.1282	...	-0.1345
1999	0.4163	0.4259	...	0.4875	0.2978	0.3052	...	0.3585	-0.1185	-0.1207	...	-0.1290
2000	0.4140	0.4270	0.4387	0.4898	0.3009	0.3123	0.3219	0.3653	-0.1131	-0.1147	-0.1168	-0.1245
2001	...	0.4283	...	...	...	0.3131	...	...	...	-0.1152	...	...
2002	...	0.4290	...	...	...	0.3150	...	...	...	-0.1140	...	...
2003	...	0.4282	...	...	...	0.3127	...	...	...	-0.1155	...	...
2004	...	0.4279	...	...	...	0.3151	...	...	...	-0.1128	...	
Period												
1980 to 1990	0.0258	0.0330	0.0219	...	-0.0043	-0.0005	-0.0013	...	-0.0301	-0.0335	-0.0232	...
1990 to 2000	0.0195	0.0278	0.0245	...	0.0203	0.0293	0.0149	...	0.0008	0.0015	-0.0096	...
1993 to 2000	-0.0073	-0.0035	...	0.0128	0.0151	0.0207	...	0.0296	0.0224	0.0242	...	0.0168

... not applicable

1. Data are from the Survey of Consumer Finances and the Survey of Labour and Income Dynamics before the latest reweighting (in 2003). See Frenette, Green and Picot (2004), Table 1.
2. Data are from the Survey of Consumer Finances and the Survey of Labour and Income Dynamics after the latest reweighting (described in Lathe, 2005). Author's calculations.
3. Data are from the 1981-to-2001 Censuses of Canada. See Frenette, Green and Milligan (2006), Table 1.
4. Data are from the T1 Family File. See Frenette, Green and Picot (2004), Table 2.

Sources: Statistics Canada, Survey of Consumer Finances, Survey of Labour and Income Dynamics, Census of Canada, and Annual Estimates for Census Families and Individuals (T1 Family File).

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