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Income Inequality in Canada

Farm Versus Non-Farm Families

Canada

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FARM VERSUS NON-FARM FAMILIES

1985 to 1995

Agriculture and Agri-Food Canada
Strategic Policy Branch

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Abstract

The issue of income inequality cuts across many of the current economic and social pressure points in Canada. Income inequality may limit human resource development and the potential for economic growth. The impact of family income inequality and child poverty is of particular concern, given the importance of positive early childhood experiences. Income inequality is also a factor in growing political alienation and the disjunction in values between the Canadian "elite" and the general population.

This paper shows that, for farm families as a group, there was less income inequality in 1995 than in 1985 and a considerable narrowing of the income inequality gap between farm and non-farm families. In terms of polarization, it shows that the numbers of farm families in all the ranges—top, middle and bottom—of the income distribution remained the same. However, non-farm families in the middle range declined in the period under study. This finding is consistent with the findings of earlier Canadian studies on earnings inequality. Historical Gini coefficients (from 1971) also indicated a steady improvement (decline) in income inequality for farm families.

Executive Summary

There has been considerable interest in Canada and elsewhere regarding the issue of income/earnings inequality and polarization. Income inequality deals with shifts in the share of earnings and/or income while polarization measures deal with shifts in the proportions of workers within the distribution.

The issue of income/earnings inequality cuts across many of the current economic and social pressure points in Canada. Inequality may limit human resource development and the potential for economic growth. The impact of family income inequality and child poverty is of particular concern, given the importance of early childhood for adult outcomes. Income inequality is also a factor in growing political alienation and the disjunction in values between the Canadian "elite" and the general population.

The Human Development Network of the federal government's Policy Research Initiative focused on three aspects of income inequality: the decline of the middle class and the polarization of society into haves and have-nots; poverty, including child poverty, extreme poverty, aboriginal poverty, and the potential for development of an underclass; and horizontal inequality across income groups, based on race, gender, immigrant status, disability or region. This paper complements that research by taking a deeper look at the farm sector and examining income inequality as a potential issue for farm families.

Over the past economic cycle (1984 to 1993), there was almost no change in real average family disposable income—labour income, plus investment returns, plus overall government transfers, less income and payroll taxes. This lack of growth in income represents a sharp break from the significant increases in real income that occurred in the 1960s and 1970s. Within the same time frame, family disposable income inequality did not increase in Canada, although real labour earnings did fall dramatically among men with low skill levels and among younger workers (under age 35),

particularly men (Picot 1966, Zyblock 1996, Finnie 1997). This phenomenon has to some degree, been the result of globalization of the marketplace and the increased skill sets needed in a competitive economy.

It has been argued however, that Canada is clearly "kinder and gentler" in that both inequality and polarization are considerably lower, and incomes at the bottom of the spectrum are higher than in the United States. Between 1985 and 1995, both inequality and polarization of family disposable income fell in Canada, while both rose in the United States.

Disposable income inequality did increase over the same period in the United States and in a number of European countries. However, the stability of disposable income inequality masks a significant increase in inequality based on family labour income. In other words, income inequality would have increased over the economic cycle, if not for the fact that personal transfers from governments, in combination with the impact of the progressive income tax system, more than offset the negative impact of the market on family income inequality.

This paper shows that, for farm families as a group, there was less income inequality in 1995 than in 1985 and a considerable narrowing of the income inequality gap between farm and non-farm families. In terms of polarization, the Foster-Wolfson Polarization index, which captures the notion of a "disappearing middle class," shows that the numbers of farm families in all the ranges—top quarter, middle half and bottom quarter—of the income distribution remained the same. However, non-farm families in the middle range declined in the period 1985 to 1995. This finding is consistent with the findings of earlier Canadian studies on earnings inequality. Historical Gini coefficients (from 1971) also indicate a steady improvement (decline) in income inequality for farm families.

The average income of farm families in rural areas has generally been below that of urban families. However, this income gap has closed considerably to about a seven percent difference in recent years. While rural farm families in some regions of the country reported income above their rural non-farm neighbours, as in the Atlantic region in 1985, 1991 and 1993, Ontario and the Prairies in 1995, and those in Quebec and British Columbia have generally reported incomes below their rural non-farm counterparts.

The importance of the various sources of income for rural non-farm families mirrors more closely that for urban families. Rural non-farm families rely more on wages and salaries than do rural farm families. However, rural non-farm families rely a great deal more on government social transfers than do either farm or urban non-farm families. This dependency might be explained by the fact

that many rural non-farm residents are retired and drawing on Canada/Quebec Pension Plans and Old Age Security, two major components of government social transfer payments. Also, a relatively higher proportion of these families are unemployed and they normally have more children, implying a greater reliance on the federal Child Tax Credit.

Statistics Canada's Low Income Cut-Offs (LICOs) were used in the paper as indicators of economic well-being. This measure represents an estimate of the cost of acquiring the basic necessities, such as food, shelter and clothing for families and individuals, by urbanization category. While this statistic is often referred to as the poverty line, it has no officially recognized status nor does Statistics Canada promote its use as a poverty line.

Statistics Canada data indicate a significant downward trend (improvement) in the proportion of rural farm families with income under LICO. This decrease also indicates that rural farm families have done relatively better than rural and urban non-farm families and Canadian families in general in receiving income above LICO.

To understand the factors influencing the convergence of the income inequality gap between farm and non-farm families, this paper looks at income inequality by age, farm type and province. Six farm types (dairy, cattle, hogs, poultry and eggs, potatoes, and grains and oilseeds) are considered. The data indicate that farm family income inequality changed little over the period 1991 to 1995. Families associated with two types (cattle and hogs) had indices of inequality consistently and significantly below the average for all farm families. An explanation for the differences between farm types may be based on differences in the structure of farming in each sub-sector and the extent to which families with different farm types rely more or less on non-farm income. However, establishing firm linkages is beyond the scope of this paper and should be a matter for future research.

When farm family income inequality is considered by region, the data show that farm families in British Columbia and Alberta consistently had the highest levels of income inequality in the period 1991 to 1995 with their year-to-year inequality indices considerably above the national average based on farm family income. Comparisons of indices for the other provinces are ambiguous in the sense that there is no clear pattern in the rankings.

The differences noted in farm family income inequality by province might be partially explained by the concentration of various farm types in those provinces, as well as by the access to off-farm employment which, in many instances, depends on the extent of urbanization**.** However, almost all provinces produce the identified crops and livestock, although with varying degrees of

concentration. This diversification makes it difficult to discuss, in isolation, the significance of incomes from livestock and crop production as contributors to the varying degrees of provincial farm income inequality. While it is possible to infer that much of the provincial farm family income inequality has been driven by non-farm earnings and to a lesser extent, by the concentration of farm type, such inference is drawn on the basis of casual observation of the data. Provincial farm family income inequality could be influenced by other factors, such as age and gender. Accordingly, further research in this area may be required to deduce the factors influencing the levels of interprovincial farm income inequality.

In conclusion, the paper finds that while income inequality is a condition which affects both farm and non-farm families, farm families in general made considerable strides in narrowing the gap between themselves and their non-farm counterparts to the point where it is hardly discernible. There are some regional and gender differences underlying the differential impact of income inequality but the reasons for these are not easy to identify and isolate. More research is needed to determine the linkage between farm income inequality and factors such as non-farm income, farm type and structure, and wealth which have been identified as influencing the magnitude of the income inequality gap between farm and non-farm families nationally and in the regions. In addition, research that uses up to date data since 1995 is required to determine the impact that recent developments in world commodity markets have had on the economic well-being of farm and non-farm families and income inequality.

Section 1: Introduction

There has been a good deal of interest in Canada and elsewhere in the issue of income/earnings inequality and the polarization of income for Canadians as a whole. In general, studies of income/earnings inequality are concerned with whether the conditions of workers anywhere in the distribution have changed specifically with respect to their share of income/earnings. Studies dealing with polarization ask whether the share of workers distributed in the middle class has fallen over time.

Indeed, a number of studies show that income/earnings inequality increased in Canada through the 1980s. However, little is currently known about income inequality of families associated with the farm sector, relative to trends in the general population, or relative to other sectors. Researchers need to address several questions. For example, how does the typical farm family[1] compare to the average Canadian family, or to the average non-farm family? Are there gender or age-based issues of income inequality in the farm sector? What is the significance of farm and off-farm income? In researching the answers, one has to consider both income from employment and income from all other sources, including government transfers.

The issue of income inequality cuts across many of the current economic and social pressure points in Canada. Inequality may limit human resource development and the potential for economic growth.[2] The impact of family income inequality and poverty on children is of particular concern, given the relationship between early childhood opportunities and success in adulthood. Income inequality is also a factor in growing political alienation and the difference in values between Canadian "elite" and the general population.

The Policy Research Committee of Human Resources Development Canada focused on three aspects of income inequality:

- the decline of the middle class and the polarization of society into haves and have-nots;
- poverty, including child poverty, extreme poverty, aboriginal poverty, and the potential for development of an underclass;

1. The Glossary of Terms provides a definition/description of the types of families discussed in this paper.
2. See Jenkins 1991.

- horizontal inequality across income groups, based on race, gender, immigrant status, disability or region.

In an effort to contribute to the discussion on income inequality in Canada, this paper focuses on families associated with the primary agricultural sector. The objective of this paper is to develop a comprehensive set of data, information and analysis on income inequality in the Canadian primary agricultural industry. The paper will therefore focus on comparing income and its distribution, for individuals and families associated with the agricultural sector and the population in general. This effort will focus on determining whether income inequality is a significant issue for families associated with the agricultural sector, and the factors influencing inequality, if it exists.

To provide a comprehensive report on this subject, the paper considers family income by region, urbanization category (i.e. urban, rural non-farm and rural farm), age, farm type, and province. After the introduction, Section 2 presents a literature review of recent studies on income inequality in both Canada and the United States. Section 3 discusses the data used in the paper and the methodology for measuring income inequality. Section 4 presents the level and sources of farm and non-farm family incomes by region and urbanization category over the period 1985 to 1995 as well as the extent to which these families report income from these sources. The paper also considers family incomes relative to Statistics Canada's Low Income Cut-Offs (LICOs), which are a measure of relative economic hardship. Section 5 presents data on the distribution of family income and statistical measures of income inequality and polarization. Section 6 looks at the distribution of family income by age, farm type and province in an effort to explain the reasons for income inequality in the agricultural sector. Section 7 discusses the policy implications of farm family income inequality and Section 8 summarizes the important elements of the paper.

Section 2: Literature Review

There is now a substantial body of literature on the distribution of income and earnings in both Canada and the United States. In general, three types of factors influencing the labour market explain past trends in income/earnings inequality: supply-side, demand-side and institutional factors. Supply-side and demand-side factors are usually considered in the context of the labour market for skilled, higher paid workers versus less skilled, lower paid workers. Institutional factors, on the other hand, relate to the role of certain organizations, such as labour unions, and their role in influencing wages and salaries.

Supply-side factors increase inequality if they cause the supply curves for skilled labour and unskilled labour to shift outward by different amounts, thus widening the gap in relative wages. Similarly, in economic terms, demand-side factors influence the position of the demand curve for skilled labour relative to non-skilled labour. Any shifts in this curve in turn determine the relative wages of skilled labour versus non-skilled labour. If the gap between these wages increases, then so does the earnings inequality. Also, changes in institutional arrangements in the labour market, such as the declining influence of unions, could lead to a gap in relative wages and hence earnings inequality.[3]

Based on the literature, it appears that increasing demand for skilled labour, represented by an outward shift in the demand curve, has been the dominant factor influencing income/earnings inequality particularly in the United States and to a lesser extent in Canada. In the United States, this shift has resulted in wage inequality, whereas in Canada, hours worked are affected (Picot 1997). Significant increases in earnings inequality in the United States over the past two decades are well-documented in the literature.

Levy and Murnane 1992 provide a thorough discussion of the literature surrounding this phenomenon, emphasizing the role played by increases in the relative demand for highly skilled workers and, in particular, the diminished opportunity for young, less-educated people to earn a middle-class income. Juhn, Murphy, and Pierce 1993 provide further evidence of these trends in a detailed discussion of wage inequality in the United States. On the basis of their data, they find that 40% of younger workers (those with one to ten years of

3. A fuller description of the labour model underlying this discussion is presented in the Economic Report of the President 1997 and in Finnie 1997.

experience) have had no increase in economic opportunity since the mid-sixties. In general, they find a significant increase in wage inequality between the highest and lowest paid workers in all categories defined by education, experience, occupation and industry.

In accounting for this increased inequality in wages, Juhn, Murphy, and Pierce 1993 attribute it largely to increased premiums on skill. This conclusion is clearly consistent with that of Levy and Murnane 1992 and is supported by similar evidence presented by Katz and Murphy 1992 and Murphy and Welch 1993. Beach and Slotsve 1994 and Riddell 1995 find similar evidence for the Canadian situation. However, the fundamental forces underlying these effects remain unclear.

Two popular hypotheses attempt to explain these forces. One hypothesis states that the changes in earnings inequality stem from skill-based technological change or from changes in the global economy that specifically increased international competition (Bound and Johnson 1992). Globalization drove down the earnings of workers in certain import-competing industries. This decrease in earnings generated a wider (inter-sectoral) distribution of earnings among workers of similar characteristics (e.g. age and education) and generally put downward pressure on the wages of types of workers concentrated in these sectors, in particular, low-skilled workers (Finnie 1997).

The other hypothesis states that technological change resulted in an increase in the earnings of higher skilled workers and led to declines for those lacking the requisite skills. According to Finnie 1997, this argument is often used to explain further the relative decline in the earnings of less educated workers and in some cases, of younger workers, because of the lack of experience-related skills necessary in a technology-oriented workplace.

Casual observation seems to support either or both of these hypotheses. Berman, Bound and Griliches 1994 present evidence from the United States Annual Survey of Manufacturing that favours the skill-based technological change explanation. The work of O'Neil 1995, which examines the effects of the returns to education on income dispersion at the international level, also supports this view.

The Economic Report of the President 1997 provides further evidence of the education premium in the United States. The report indicates that the returns to education grew tremendously during the 1980s and early 1990s. In 1980, the median male college graduate earned about one third more than the median high school graduate, but this wage premium grew to over two thirds (70%) by 1993. Since then the trend has slowed, and the ratio even declined in 1995.

In Canada, earnings inequality increased through the 1980s among full-time year round workers, both men and women (Riddell 1995). Earnings inequality, as measured by the Gini coefficient,[4] increased for full-time full-year female earners from 0.263 in 1981 to 0.280 in 1989 (Morissette, Myles and Picot 1993). A simultaneous increase in polarization among this female population appeared in the 1980s. Using the Foster-Wolfson Polarization index for female full-time full-year workers, Morissette, Myles and Picot 1993 reported an increase in earnings inequality, rising from 0.212 in 1981 to 0.224 in 1989.

4. Section 4 provides explanations of Gini coefficients and the Foster-Wolfson Polarization index.

During the recent past, earnings inequality among male workers increased and among women, declined. Supply-side factors were identified as contributing to this gender-based shift. The basis of this argument is that the steady increases in the number of hours and weeks worked by women caused their earnings to rise. Also playing a role is the movement of women into traditional male occupations (Riddell 1995; Morissette, Myles and Picot 1993).

Picot 1996 reported that for the entire working-age Canadian population, earnings inequality has not increased in any of the three periods studied (1975–94, 1981–89 or 1984–93). If anything, there was a slight decline in earnings inequality. However, Picot noted that the real earnings of men with low earnings and low skill levels fell dramatically, as did those of younger workers (under age 35), particularly men.

Earnings inequality among males was characterized by very serious and significant declines in real earnings of the lower paid, less skilled males, and similar declines among younger male workers (Picot 1996, 1997; Zyblock 1996; Zyblock and Tyrell 1997; Finnie 1997). Clearly, demand-side factors had a significant influence on the widening wage gap relative to the supply response in these categories. There was an increasing demand for highly skilled workers in general while the less skilled, especially younger males, found it difficult to find well-paying jobs.

Picot 1996 noted that the rise in earnings inequality among men was largely associated with rising inequality in both hours worked per week and weeks worked per year. Little of the increase was due to rising inequality or polarization in hourly wages. Similarly, the decline in earnings inequality among women, observed through both the 1980s and early 1990s, was due largely to increases in weeks worked among women with lower annual incomes.

Morissette, Myles and Picot 1993 report that earnings inequality and polarization occurred among males beginning in the latter part of the 1970s. They noted that the early 1970s was a period where individual male earnings inequality was relatively stable. However, average male earnings stagnated after 1977, and coupled with rising inequality, meant that the size of the male middle group was shrinking. With the advent of a recession in the early 1980s, males experienced significant increases in inequality. Most of this increase was driven by a widening distribution among full-time full-year males. Zyblock 1996 noted that the richest 30% of males had large absolute earnings gain (1984 to 1993) and relative earnings gains (1981 to 1989 and 1984 to 1993) at a time when overall average male earnings stagnated. The Economic Council of Canada 1991 and Beach and Slotsve 1994 support these findings.

There are problems with the technological and skill-based explanations of earnings inequality. For example, using the technology argument to explain the decline in earnings of younger workers seems misplaced when one considers that this group is likely the most technologically adept and, therefore, the most skilled. Hence, their earnings should be rising, not falling, as a result of technological change.

Perhaps the most promising explanations are based on cohort analyses that recognize the size of the supply of young workers that come to the market in each period (Foote 1996) and consider institutional and market factors. Demand pressures related to globalization, technological change, and other structural changes in the economy have most certainly affected different groups of workers to varying degrees. Nevertheless, institutional factors had some effect on less skilled and younger workers as well.

Several studies at Agriculture and Agri-Food Canada in the 1970s and early 1990s (Davey, Hassan and Lu 1974; Darcovich and Mouelhi 1976; Darcovich, Gellner and Leung 1979; Bourgoyne 1992) analysed farm family income inequality relative to that of rural and urban and non-farm families. These studies found that income inequality among farm families was greater than for non-farm families in both rural and urban areas throughout the early 1970s, but declined during the late 1980s. By province, income inequality among farm families in the Prairie provinces was generally higher than in other provinces. Age and education were also important factors influencing this income inequality.

In summary, income/earnings inequality has been a feature of both the American and Canadian social setting, with increasing demand for skilled labour being a major factor in the United States. However, both supply-side and institutional factors seem to have contributed to this inequality in both countries. In Canada, young male workers in general appear to be affected the most, while women and older males in general experienced some improvement in their income position.

Despite the comprehensive analyses of the trends in Canadian earnings inequality and polarization to date, Canadian studies have not focused enough attention on earnings inequality or, more generally, income inequality between workers in specific sectors of the economy. Studies that discuss income inequality in the agricultural sector during the 1970s and 1980s need to be updated. Accordingly, this paper attempts to determine the extent of inequality among families in the farm, rural non-farm and urban non-farm sectors for a more recent period (1985 to 1995) and some of the factors influencing this inequality.

Section 3: Data Sources and Methodology

3.1 Data sources

Survey of Consumer Finances

To study income inequality in farm families relative to the non-farm families, we considered the level and distribution of farm family income and compared them to non-farm families. The data used in most of this analysis are derived from the annual Survey of Consumer Finances for the years 1985, 1991, 1993 and 1995. Statistics Canada conducts this survey in conjunction with the Labour Force Survey in April every year. The survey asks respondents to report all sources of income received during the preceding year, according to individual income tax returns. Income from wages and salaries, net self-employment income, investment and pension income and government social transfer payments are included in the survey. There are questions on age, education level, region and size of area of residence (i.e. urban or rural).

For our purposes, farm families are defined as those families in which at least one individual reports some (positive or negative) net farm income (after depreciation). This information allows us to compare farm versus non-farm income in rural and urban areas as well as to determine the importance of the various income sources for farm and non-farm families. Combined with LICOs and statistical measures of income inequality, we have an indication of how farm families' economic well-being has changed over time relative to the general population.

The major weakness of the data source is that neither the survey frame nor the questionnaire contents are directly targeted at farm families. Furthermore, farm families represent only a small share (two percent) of the overall sample, even though two percent reflects their overall share in the general population. The advantages of the survey are that Statistics Canada uses the same methodology to estimate the family incomes of farm and non-farm families, and the data are available on an annual basis from 1971.

Whole Farm Database

To explain the changes in income inequality across different farm types in the farm sector, we analyze data from an alternate source—Statistics Canada's Whole Farm Database. The database is also produced annually based on individual tax returns, but the series is available for all provinces only as of 1990. The major difference between this data source and the Survey of Consumer Finances is that the Whole Farm Database includes only operators of unincorporated farms with gross farm revenues over $10,000, and incorporated farms with revenues over $25,000. The Survey of Consumer Finances includes any individual reporting some net farm income. Another difference is that net farm income data is after depreciation on the Survey of Consumer Finances, but before depreciation on the Whole Farm Database.

3.2 Methodology

To determine how farm family income is distributed and whether this distribution changed over time, we considered several measures of inequality. In addition to average levels and sources of income, we also studied the distribution of the incomes of farm and non-farm families. Families are defined as economic families (husband-wife and lone parent families, not including unattached individuals).[5] The analysis considers Lorenz curves as well as Gini coefficients and other measures of inequality, such as the coefficient of variation, the exponential logarithm, the Theil-Entropy index, the Theil-Bernoulli index and the Foster-Wolfson Polarization index.

Distribution by deciles

An analysis of income inequality begins with a discussion of how income is distributed over the population. One method is to divide the population into tenths (deciles). (Quintiles or percentiles are also possible.) Decile data are compiled by ranking families according to their total family incomes in ascending order, from lowest to highest. The array is then divided into ten equal parts or deciles. The bottom or lowest decile represents the group of families (lowest 10%) with the lowest income, the second decile (10% of families) has the second lowest income and so on. It is then possible to examine the share of income received by any decile group to provide one indicator of the equality of income. Obviously, if each decile of families receives 10% of the income, then the income would be equally distributed. Historically, the bottom decile of families has received less than 10% of total family income, while the top decile has received more than 10%, indicating some inequality of income.

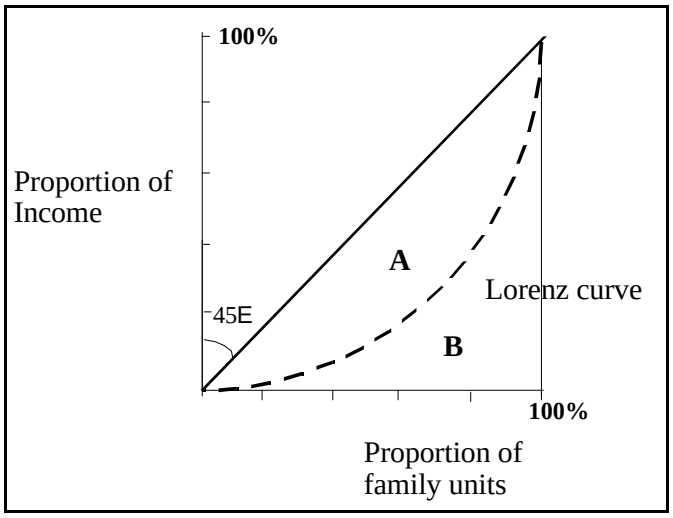
Lorenz curve

The Lorenz curve is a graphical representation of the income distribution. Using the decile data described above, the curve is obtained by plotting the cumulative proportion of family units on the horizontal axis against the cumulative proportion of income received by those family units on the vertical axis (Figure 1). The area between the Lorenz curve and the 45 degree line is the Lorenz area (area A). If income were evenly distributed, the Lorenz curve would coincide with the diagonal 45 degree line and there would be no income inequality. Alternatively, in the case of absolute inequality where one family unit received all

5. Economic families are defined as a group of individuals sharing a common dwelling unit related by blood, marriage (common-law) or adoption including married children. Our definition does not include unattached individuals, but just husband-wife families and lone parent families.

the income, the curve would coincide with the horizontal axis. Therefore, the inequality of income is indicated by the degree to which the curve departs from the diagonal line: the further the curve is from the diagonal line, the more unequal the income distribution.

Figure 1: Lorenz curve



Gini coefficient

The Gini coefficient is the most well-known measure of income inequality in the economic literature. The Gini coefficient measures the area between the Lorenz curve and the 45 degree line (area A) as a proportion of the area below the 45 degree line (area B). This ratio has a value ranging from zero to one. A zero value indicates no income inequality, and the Lorenz curve would coincide with the 45 degree line. A value of one indicates complete income inequality which would occur if the top income decile received all the income, and the Lorenz curve would coincide with the x-axis and the right vertical line. Historically, the Gini coefficient has hovered between 0.3 and 0.4 for farm families in Canada.

Coefficient of variation

The coefficient of variation is another measure of income inequality. It measures the standard deviation of the (income) distribution as a percentage of its mean. As with the Gini coefficient, the greater the value of the coefficient, the greater the degree of inequality. Since this measure tends to be sensitive (the sign will change) if transfers occur at the top of the income spectrum, Wolfson 1997 considers it top sensitive.

Exponential logarithm, the Theil-Entropy index and the Theil-Bernoulli index (mean log deviation)

Three other statistical measures used to measure income inequality are cited in the literature, particularly Wolfson 1997: the exponential logarithm, the Theil-Entropy index and the Theil-Bernoulli index (mean log deviation). These measures assume slightly different income distributions in an effort to control peculiarities in the data, and are bottom sensitive, i.e. sign will change if transfers occur at the bottom of the income distribution. Wolfson 1997 offers a further description of these measures, as does the Appendix.

Foster-Wolfson Polarization index

The Foster-Wolfson Polarization index was developed to measure the share of the population in various parts of the distribution, i.e. around the median, or in the top or bottom tails. It has most recently been reported in the literature relating to a declining middle class. It is analogous to the Gini coefficient, because of its relationship to underlying Lorenz curves. If everyone has the same distribution of earnings, then the Foster-Wolfson Polarization index is equal to zero. However, a perfectly polarized population will be divided into equal halves, each having one of two possible values of earnings: the minimum or the maximum. In this case, the Foster-Wolfson Polarization index will be equal to one. Hence, this index simultaneously captures the idea of the variance from the median and bi-modality of the distribution (Wolfson 1997).

Section 4: Level and Sources of Farm and Non-Farm Family Incomes

In any discussion of income inequality, it is important to consider, first of all, how income has changed over time, particularly relative to other sectors. Data from Statistics Canada's Survey of Consumer Finances show how average family income for rural farm families, rural non-farm families and urban non-farm families varied between 1985 and 1995 in Canada[6] (Table 1). In 1995, Statistics Canada sampled 24,461 families: 1,221 were farm families and 23,240 were non-farm families. Another breakdown is that 921 were rural farm families, 5,362 were rural non-farm and 17,878 were urban non-farm families. Between 1985 and 1995, the estimated number of families increased from 7.0 million to 8.3 million with the number of rural farm families declining and that of rural non-farm and urban non-farm families increasing.

Average family income for all Canadian families was $55,267 in 1995 compared to $53,538 in 1985 (1995 constant dollars). This amount represents an increase of just over three percent. While relatively large gains were made between 1985 and 1991, family income declined in 1993 before rising again in 1995 in real terms. After the economic expansion of the late 1980s, a recession in 1990 and 1991 resulted in a drop in real family income.

Over the period 1985 to 1995, the average income of rural farm families increased substantially (12%), while that of rural non-farm families and urban non-farm families increased more moderately (4.4% and 2.7% respectively). However, the income of urban non-farm families exceeded that of rural farm and rural non-farm families in all years under consideration, while the income of rural farm families exceeded that of rural non-farm families in all years except 1993. It is not clear what was responsible for the difference in income gains. Much of what happened over this period can probably be explained by the opportunity of rural farm families, especially those with small-scale operations, to earn off-farm income (see Section 5.2: Scaler and other measures of income inequality). In addition, the generally lower level of wages earned by families in rural areas (Vera-Toscano 1999) and developments in agricultural markets help to explain what took place.

6. See Glossary of Terms.

Table 1: Family income by urbanization[a] category, Canada, 1985 to 1995 (in 1995 constant $)

		1985	1991	1993	1995	% change (1985 to 1995)
Total farm families	Number of families	320,847	283,207	252,809	301,766	7.0
	Average income ($)	50,502	50,194	50,560	54,013	
Rural farm families	Number of families	235,373	218,101	193,157	204,272	12.0
	Average income ($)	46,013	46,800	46,336	50,514	
Total non-farm families	Number of families	6,723,082	7,364,473	7,713,789	7,951,768	3.0
	Average income ($)	53,682	56,016	54,545	55,315	
Rural non-farm families	Number of families	1,040,398	1,215,574	1,239,367	1,176,954	4.4
	Average income ($)	44,283	46,109	47,699	46,247	
Urban non-farm families	Number of families	5,682,684	6,148,899	6,474,422	6,774,814	2.7
	Average income ($)	55,403	57,975	55,855	56,891	
Total all families	Number of families	7,043,929	7,647,680	7,966,598	8,253,534	3.2
	Average income ($)	53,538	55,800	54,418	55,267	

a. Due to the small sample size, the urban farm family, as a single category, is omitted in all the tables.
Source: Statistics Canada, Survey of Consumer Finances.

4.1. Family income by region

The number of families by region and urbanization category are presented in Table 2. As can be seen in Table 2, most rural farm families are found in the Prairies, followed by Ontario and Quebec. Over the period 1985 to 1995, the number of rural farm families decreased in all regions, particularly the Atlantic provinces. Rural non-farm families make up a large proportion of families in the Atlantic provinces, but there are many found in Ontario and Quebec as well. The number of these families has actually increased over the period 1985 to 1995 in all regions but the Prairies. Finally, Ontario and Quebec have the largest number of urban non-farm families. Over the period under consideration, the urban non-farm population increased in all regions.

Table 2: Number of families by urbanization category and region, 1985, 1991, 1993 and 1995

		Atlantic	Quebec	Ontario	Prairies	B.C.
Rural farm families	1985	11,882	38,386	55,905	118,717	10,483
	1991	6,822	25,583	53,225	121,075	11,396
	1993	7,928	24,023	48,004	105,930	7,272
	1995	6,412	26,950	53,642	107,111	10,157
Rural non-farm families	1985	234,382	266,408	261,562	175,882	102,164
	1991	261,713	332,775	333,688	163,196	124,202
	1993	268,166	310,576	335,807	182,431	142,387
	1995	266,589	314,889	298,162	153,115	144,199
Urban non-farm families	1985	359,393	1,545,602	2,198,191	871,590	707,908
	1991	384,749	1,626,018	2,434,024	934,535	769,573
	1993	395,081	1,704,520	2,572,599	974,590	827,632
	1995	420,225	1,707,716	2,727,898	1,039,833	879,142
All families	1985	607,302	1,864,259	2,549,003	1,194,189	829,176
	1991	655,001	1,995,151	2,844,091	1,241,521	911,916
	1993	673,579	2,048,317	2,975,378	1,284,178	985,146
	1995	696,536	2,065,148	3,111,679	1,338,699	1,041,472

Source: Survey of Consumer Finances, Custom Tabulations.

Family income estimates by region and urbanization category for farm and non-farm families are presented in Table 3. A combination of factors explain regional differences in average family income. The factors include the extent of urbanization and industrialization, employment opportunities, and for farm families, the average farm size and the type of agricultural production. Families in the Atlantic provinces reported the lowest average family income, followed by Quebec and the Prairie provinces. Relative to the average Canadian farm family, those in Ontario and British Columbia consistently reported income in excess of the national average in all years except 1985, when British Columbia farm family income was marginally lower. In the other regions, income remained stagnant or fell.

Inter-regional comparisons of average family income by urbanization category show differences between rural and urban families (Table 3). In the Atlantic provinces, the average income of rural farm families consistently ranked above rural non-farm families in all years except 1995. However, it remained below urban non-farm families for all years under consideration. In Quebec, the average income of rural farm families was lower than that of rural non-farm families in all years except 1993, and below urban non-farm family income for all years under consideration. In Ontario, rural farm families had higher average income than similar families in other regions for all years. Compared to non-farm families, however, Ontario rural farm families had lower family income than both rural and urban non-farm families in all years.

Table 3: Average family incomes by urbanization category, for various regions in Canada, 1985, 1991, 1993 and 1995

		Atlantic	Quebec	Ontario	Prairies	B.C.
Rural farm families	1985	$47,455	$40,580	$49,250	$46,662	$39,651
	1991	$43,487	$39,568	$52,981	$45,361	$51,442
	1993	$46,470	$44,309	$51,050	$44,831	$43,678
	1995	$40,344	$39,904	$61,907	$49,872	$51,794
Rural non-farm families	1985	$38,730	$40,825	$51,811	$46,201	$43,468
	1991	$40,739	$42,887	$51,650	$48,811	$47,617
	1993	$40,748	$43,608	$55,305	$48,028	$51,349
	1995	$40,756	$41,425	$52,542	$46,373	$53,775
Urban non-farm families	1985	$49,341	$51,039	$59,565	$55,574	$54,875
	1991	$49,965	$52,547	$63,159	$55,863	$59,619
	1993	$50,295	$49,118	$60,427	$55,935	$58,076
	1995	$47,987	$51,670	$61,782	$53,907	$59,637
All families	1985	$45,213	$49,369	$58,623	$53,534	$53,378
	1991	$46,238	$50,762	$61,689	$53,932	$57,873
	1993	$46,400	$48,224	$59,772	$54,021	$57,122
	1995	$45,211	$49,877	$60,923	$53,001	$58,698

Constant dollars (1995=100).
Source: Survey of Consumer Finances, Custom Tabulations.

In the Prairie provinces, the average income of rural farm families was lower than that of rural non-farm families in 1991 and 1993 but higher in 1985 and 1995. Relative to urban families, rural farm families, like those in other regions, had incomes that were always lower than urban non-farm families. Families in British Columbia reported similar relative income trends, with rural farm families reporting lower average family income than urban non-farm and rural non-farm families in all years considered, except 1991.From the foregoing discussion, we can draw two conclusions. First, the average income of rural farm families has generally been below that of urban families. However, this income gap has closed considerably to about a seven percent difference in recent years. Second, from a regional standpoint, rural farm families in some regions of the country reported income above rural non-farm families, as in the Atlantic provinces in 1985, 1991 and 1993 and Ontario in 1991 and 1995. However, those in Quebec and British Columbia have generally reported incomes below rural non-farm families.

The regions in which rural farm families experienced greater income gains relative to rural non-farm families between 1985 and 1995, are those areas where there were opportunities for rural farm families to earn off-farm income and where specific farm types were concentrated. Grain and oilseed farms in Ontario and the Prairie provinces, and potato farms in the Atlantic provinces registered significant income gains after 1992, according to recent data from the Whole Farm Database (see Section 6.2: Income inequality by farm type and Section 6.3: Income inequality by province). Cattle, dairy, hog, and poultry and egg farms made less significant gains between 1992 and 1995. These farm types, concentrated in Quebec and British Columbia may not have experienced as large relative gains in income as rural non-farm families over the period. A more in-depth discussion of the distribution of farm family income by farm type follows and may provide insight into explaining these regional differences in farm family income.

4.2. Sources of farm and non-farm family income

After identifying a certain degree of income disparity between Canadian farm families and others in the wider population, the paper highlights the sources of income of the different family types to ascertain if these sources have led to the disparities.

Recent literature on the allocation of farm family labour between farm and off-farm employment suggests that risk-neutral farmers will divide their labour supply between farm and off-farm employment opportunities to equalize marginal returns (Mishra and Goodwin 1997). If expected marginal returns are greater in one occupation, more labour will be devoted to that occupation. However, if producers are risk-averse and perceive the variance of wages (or earnings) to be greater in one occupation than another, they will allocate less time to the job with more risk and accept lower wages in the less risky alternative. Changes in the riskiness of employment alternatives thus affect the allocation of labour. In Canada, off-farm wages and salaries are an important component of farm family income and this varies by region and farm type.

The relationship between the importance of off-farm income and gross revenue or farm size is also significant. Porteous 1974 observed that there is an inverse relationship between net farm income and off-farm income at lower levels of gross income. This observation is consistent with historical data (1974 to 1994) which show that off-farm income represents a higher share of total family income for families on small farms (revenues under $50,000) and medium-sized farms (revenues between $50,000 and $100,000) and less important for large "commercial" farms (revenues of $100,000 and over) (Agriculture and Agri-Food Canada 1997). For example in 1994, farm families with gross revenues under $100,000 received over 50% of their income from off-farm sources. On the other hand, only a small percentage of large farm operators worked off the farm. Bollman 1974 suggested that off-farm work does not significantly enhance the viability of large farms, since three months of off-farm work are needed to compensate for even a relatively small decrease in farm output prices.

Compared to all Canadian families, rural farm families relied more on net self-employment income (from farming in particular) and investment, and less on wages and salaries and other income sources (Table 4). Income from government social transfer payments were as important for farm families as for all Canadian families in constant dollar terms. In 1995, out of a total average income of $51,514 for rural farm families, about $20,000 (40%) came from wages and salaries, over $15,000 (30%) came from farming and just over $6,000 (10%) came from government social transfer payments.

Table 4: Sources of family income, 1985 and 1995

	Rural farm[a]		Rural non-farm		Urban non-farm		All families	
	1985	1995	1985	1995	1985	1995	1985	1995
Farm income[b]	14,059	15,374	0	0	0	0	661	494
Off-farm employment income	1,771	2,861	2,628	2,962	2,457	3,283	2,472	3,246
Wages and salaries	19,455	20,430	30,713	31,064	42,420	41,623	39,799	39,474
Investment income	5,168	4,245	2,219	1,455	3,286	2,201	3,229	3,229
Government social transfers[c]	4,544	6,189	7,327	8,366	5,219	6,393	5,489	6,665
Other off-farm income	1,016	2,415	1,396	2,400	2,020	3,390	1,887	3,237
Total family income	46,013	51,514	44,238	46,247	55,403	56,891	53,537	55,267

a. Urban farm-family data excluded due to small sample size.
b. Government farm support (i.e. Crop Insurance, GRIP, rebates for farm inputs and all commodity subsidies) are included in the farm income figure. Capital grants are excluded.
c. Government social transfers include income from CPP/QPP, Old Age Security, Guaranteed Income Supplement, Child Tax Benefits, Workers' Compensation, Employment Insurance, social transfers, and GST credit.

Source: Statistics Canada, Survey of Consumer Finances.

Therefore, income from off-farm sources represents almost two thirds of total family income. It is important to keep in mind that these numbers mask differences for families on small versus large commercial farms, where off-farm income is more or less important depending on the amount of labour allocated to farm production. Finally, the one percent increase in real average income of the rural farm family between 1985 and 1995 occurred as a result of slightly higher wages and salaries, net non-farm self-employment income and other income, substantially higher government social transfer income, but despite lower investment income over the period.

By comparison, the importance of the various sources of income for rural non-farm families mirrors more closely that for urban non-farm families. Non-farm families, by definition, rely more on wages and salaries and investment income than do farm families in rural areas. However, rural non-farm families rely a great deal more on government social transfers than do either rural farm or urban non-farm families. This difference might be explained by the fact that many rural non-farm residents are retired and drawing on Canada/Quebec Pension Plans (CPP/QPP) and Old Age Security, two major components of government social transfer payments. Also, a relatively higher proportion of these families are unemployed and have more children than families in urban areas, implying a greater reliance on the federal Child Tax Credit (Statistics Canada 1996).

Apart from off-farm wages and salaries, Canadian families, in general, receive their income from a variety of other sources including self-employment income, investment income, and government social transfer payments. Generally, wages and salaries are the most significant component of total income for both farm and non-farm families while social transfer payments and investment income are important (Tables 4 and 5). In 1995, all families received 71% of total income from wages and salaries. Compared to 1985 however, all families received less income from wages and salaries in 1995 (71% versus 74% in 1985) and from investment income (four percent versus six percent) and more on government social transfer payments (12% versus 10%), as shown in Table 5.

Table 5: Importance of sources of family income, by urbanization category, 1985 and 1995

	Rural farm		Rural non-farm		Urban non-farm		All families	
	1985	1995	1985	1995	1985	1995	1985	1995
Farm income	31%	30%	0%	0%	0%	0%	1%	1%
Net non-farm self-employment income	3%	5%	6%	6%	4%	6%	5%	6%
Wages and salaries	42%	40%	69%	67%	77%	73%	74%	71%
Investment income	11%	8%	5%	3%	6%	4%	6%	4%
Government social transfers	10%	12%	17%	18%	9%	11%	10%	12%
Other income	2%	5%	3%	5%	4%	6%	4%	6%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: Statistics Canada, Survey of Consumer Finances.

4.3. Percentage of families reporting

The percentage of families reporting various sources of income in 1985 and 1995 is shown in Table 6. This information differs from Table 5 in that Table 6 reflects the number of respondents out of the total sample of farm families who reported income from the various sources. Together with the source data previously presented, this percentage helps provide an indication of the importance of various income sources.

In 1995, all rural farm families reported net farm income, since this is how farm families are defined. Fifteen percent reported income from (net) non-farm self-employment sources, 68% earned wages and salaries, 68% received some investment income, 90% reported government social transfer payments, and 22% reported other off-farm income. Compared to 1985, fewer rural farm families reported income from wages and salaries and investment income, but significantly more reported government social transfer income and other off-farm income. Similarly, fewer rural non-farm and urban non-farm families reported wages and salary income and investment income in 1995 than in 1985, but the same percent of rural non-farm families (90%) and urban non-farm families (84%) reported government social transfer income in 1995 as in 1985. Other income was reported by more urban and rural non-farm families in 1995 as well.

Table 6: Percentage of families reporting various sources of income, 1985 and 1995

	Rural farm		Rural non-farm		Urban non-farm		All families	
	1985	1995	1985	1995	1985	1995	1985	1995
Farm income	100%	100%	0%	0%	0%	0%	5%	4%
Net self-employment income	—	15%	16%	19%	13%	15%	17%	19%
Wages and salaries	75%	68%	80%	76%	85%	81%	84%	80%
Investment income	70%	68%	45%	38%	53%	43%	52%	43%
Government social transfers	84%	90%	90%	90%	84%	84%	85%	85%
Other income	15%	22%	15%	21%	20%	25%	19%	24%

Note: (—) represents numbers too small to be estimated.

4.4. Families under the Low Income Cut-Off (LICO)

To provide an indication of relative economic well-being, Statistics Canada has published a series of LICOs for almost 30 years. This measure represents an estimate of a low income threshold below which it would be difficult to acquire the basic necessities, such as food, shelter and clothing. Statistics Canada determines that families who spend more than 54.7% (based on 1992 expenditure patterns) of their income on basic necessities are in financially straitened circumstances.[7] While this statistic is often referred to as the poverty line, it has no officially recognized status as such, nor does Statistics Canada promote its use as a poverty line. Rather it allows us to compare family income relative to the cost of (basic) living in a rural versus urban setting for farm versus non-farm families. In 1995, LICO for a family of four living in a rural area was estimated to be $21,944. By comparison, a family of four residing in a large urban centre (over 500,000), required at least $31,753 to cover the cost of basic necessities.

The percentage of families with income under LICO by urbanization category for 1985, 1991, 1993 and 1995 is shown in Table 7. From the total population of 8.3 million families, approximately 1.2 million families or 14.2% reported income under LICO in 1995. This proportion is only slightly lower than the situation in 1985 when 1.3 million families out of approximately 7.0 million or 14.4% reported income under LICO. However, in 1991 there was an improvement in that fewer families or 12.9% were under LICO. This percentage increased again in 1993 to 14.5% after the recession of the early 1990s.

Table 7: Percent of families under LICO, 1985, 1991, 1993 and 1995

	1985	1991	1993	1995
All farm families	16.0%	12.1%	11.4%	9.0%
Rural farm	16.7%	11.4%	12.1%	9.0%
All non-farm families	14.0%	13.0%	14.6%	14.4%
Rural non-Farm	12.1%	9.5%	9.4%	9.8%
Urban non-farm	14.7%	13.7%	15.6%	15.2%
All families	14.4%	12.9%	14.5%	14.2%

Source: Statistics Canada, Survey of Consumer Finances.

In terms of urbanization, there is a significant downward trend (improvement) in the proportion of rural farm families with income under LICO. This decrease, noted in Table 7, also indicates that rural farm families have done better than rural and urban non-farm families and Canadian families in general in receiving income above LICO. In 1985, 16.7% of rural farm families reported income under LICO, compared with 12.1% of rural non-farm families and 14.7% of urban non-farm families. Over the period 1985 to 1995, these proportions changed considerably (9.0%, 9.8% and 15.2% respectively).

7. See Statistics Canada 1996, p. 50.

By 1991, a lower percentage of rural farm families (11.4%) had income under LICO than urban non-farm families (13.7%). While there was some deterioration between 1991 and 1993 in the financial situation of rural farm families (the percentage under LICO increased from 11.4% to 12.1%), it was worse for urban non-farm families, whose relative position increased from 13.7% to 15.6%. To worsen the economy, a recession in 1990 and 1991 caused unemployment rates to jump to 8.1% and 10.4% respectively, and real economic activity to fall 0.2% in 1990 and 1.8% in 1991. This recession affected the relative economic well-being of most Canadians.

Since 1985, the proportion of rural non-farm families with income under LICO has improved, falling from 12.1% in 1985 to 9.8% in 1995. However, urban non-farm families experienced a deterioration in their economic well-being with a greater share under LICO, 15.6% in 1993 and 15.2% in 1995 compared to 14.7% in 1985 and 13.7% in 1991 (Table 7).

In regional terms, between 1985 and 1995, the proportion of all families, farm and non-farm, under LICO remained the same in all locations, except Ontario and British Columbia (Table 8). All families in British Columbia experienced an improvement in economic well-being since the percentage of families below LICO fell from 17% to 13%. All families in Ontario, on the other hand, experienced a deterioration in economic well-being, since the percentage under LICO increased from 11% to 13%. However, relative to other provinces, Ontario had the lowest proportion of families with income under LICO, in both years.

In 1995, the proportion of all farm families in Canada under LICO was much smaller (9%) than the proportion of all non-farm families (14%). A similar situation prevailed in all regions, where in 1995, there was a lower share of all farm families than all non-farm families with income under LICO (except in British Columbia). Among all non-farm families, a greater proportion of urban non-farm families than rural non-farm families reported income under LICO in each of the five regions.

Table 8: Percent of families under LICO, by region, 1985 and 1995

	Atlantic		Quebec		Ontario		Prairies		B.C.		Canada	
	1985	1995	1985	1995	1985	1995	1985	1995	1985	1995	1985	1995
All farm families	12%	7%	18%	6%	16%	7%	17%	10%	16%	17%	16%	9%
Rural farm	13%	11%	18%	6%	16%	6%	18%	11%	11%	4%	17%	9%
All non-farm families	17%	16%	17%	17%	11%	13%	14%	15%	17%	13%	14%	14%
Rural non-farm	16%	14%	14%	10%	7%	6%	12%	10%	12%	9%	12%	10%
Urban non-farm	17%	17%	17%	18%	12%	13%	14%	15%	17%	13%	15%	15%
All families	16%	16%	17%	17%	11%	13%	14%	14%	17%	13%	14%	14%

Source: Statistics Canada, Survey of Consumer Finances.

The 1995 LICO statistics for farm and non-farm families represent in general some improvement over the 1985 numbers. However, it should be noted that the small sample size for farm families serves to temper the significance of the results. Nevertheless, for rural farm families in Canada, the improvement was striking in that only nine percent of those families were under LICO in 1995 compared to 17% in 1985. The proportion of urban non-farm families in Canada under LICO was the same in both 1985 and 1995. However, in 1995, the proportion of rural non-farm families in Canada under LICO was less (10%) than it was in 1985 (12%).

In summary, LICOs which are an indicator of relative economic hardship for families, indicate that rural farm families made significant gains relative to rural and urban non-farm families over the period 1985 to 1995. A smaller percentage of Canadian farm families had income under the threshold of low income, as defined by Statistics Canada, in 1995 compared to 1985. On the other hand, rural non-farm families made less significant improvement over the period, and the economic hardship of urban non-farm families actually increased since a greater percentage of these families had income under LICO.

Section 5: Measurement of Income Inequality

In this section, we compare the distribution of farm and non-farm family income in 1985 and 1995, and present measures of income inequality. These measures include income decile data for farm and non-farm families, Lorenz curves (a pictoral representation of these data), and scalar measures of income inequality such as Gini coefficients and other statistical measures described in the methodology section and the glossary of terms section.

5.1. Decile distributions

The distribution of family income for farm versus non-farm families based on decile data is presented in Table 9.[8] We compare the percentage of total family income received by each decile or 10% of families to determine the equality or inequality of distribution of income. If income were distributed equitably, then each decile of families would receive 10% of the total. Any deviation from this share indicates inequality of income.

Between 1985 and 1995, the share of income received by farm and non-farm families in each decile became more comparable. For example, decile 1 (lowest 10%) of farm families received 1.3% of total family income in 1985 and 2.2% in 1995. These percents compare with 2.5% for non-farm families in both 1985 and 1995. Decile 5 of farm families, on the other hand, received 7.3% and 7.6% of total income in 1985 and 1995 respectively, less of a change than for decile 1. Again, these percents compare with the shares received by non-farm families of 8.1% and 8.0% in 1985 and 1995 (decile 5). Decile 10 of farm families (the highest 10%) received 28.3% and 25.8% of total family income in 1985 and 1995. This change indicates that while the income share declined over time, the families still received a share of income much larger than their share of the population. For non-farm families, decile 10 received 24.1% and 24.9% of total family income in 1985 and 1995. Therefore, income inequality for farm families declined 2.5% over the period 1985 to 1995, while that for non-farm families remained almost the same (an increase of 0.8%).

8. These farm family income data have been adjusted to account for differences in family size. The first adult is given a weight of 1.0 and all other adults and children, a weight of 0.4. These data differ from those in the previous section; they are lower dollar amounts than unadjusted data.

Table 9: Decile data by income level and family category for 1985 and 1995

	Farm families				Non-farm families			
	1985		1995		1985		1995	
	Mean income	Share	Mean income	Share	Mean income	Share	Mean income	Share
	($)	(%)	($)	(%)	($)	(%)	($)	(%)
Decile 1	3,408	1.3	6,544	2.2	7,319	2.5	7,630	2.5
Decile 2	9,896	3.7	12,876	4.3	12,916	4.4	13,201	4.3
Decile 3	13,148	4.9	15,947	5.3	16,592	5.6	17,028	5.5
Decile 4	16,049	6.0	18,993	6.3	20,271	6.9	20,826	6.7
Decile 5	19,526	7.3	22,851	7.6	23,916	8.1	24,725	8.0
Decile 6	23,089	8.7	27,247	9.1	27,733	9.4	28,832	9.3
Decile 7	27,956	10.5	31,731	10.4	32,186	10.9	33,456	10.8
Decile 8	34,137	12.8	38,363	12.8	37,635	12.8	39,235	12.6
Decile 9	44,215	16.5	48,923	16.4	39,835	15.4	48,110	15.5
Decile 10	75,451	28.3	80,005	25.8	70,973	24.1	77,298	24.9

The similarities in the pattern of income distribution for farm and non-farm families is best illustrated by deciles 1 to 6 in the distribution. For both 1985 and 1995, the lowest 60% of farm and non-farm families received less than 60% of the income while the highest 40% received more than 60% of the income. In fact, using this method, one can infer that the families in decile 6 and decile 7 demonstrate what may be considered to be an almost equitable basis of income distribution.

The Lorenz curves show how farm and non-farm family income was distributed in 1985 (Figure 2) and 1995 (Figure 3). The inequality of the income distribution is indicated by the degree to which the Lorenz curve departs from the diagonal line: the further the curve is from the diagonal line, the more unequally distributed is family income. In 1985, farm family income was distributed more unequally than that of non-farm families since the Lorenz curve for farm families was further from the diagonal line than that for non-farm families (Figure 2). This difference narrowed in 1995, when the two curves almost overlapped, as a result of an improvement in the distribution of farm family income (Figure 3).

Figure 2: Farm and non-farm family income, Lorenz curves, standardized family income data, 1985

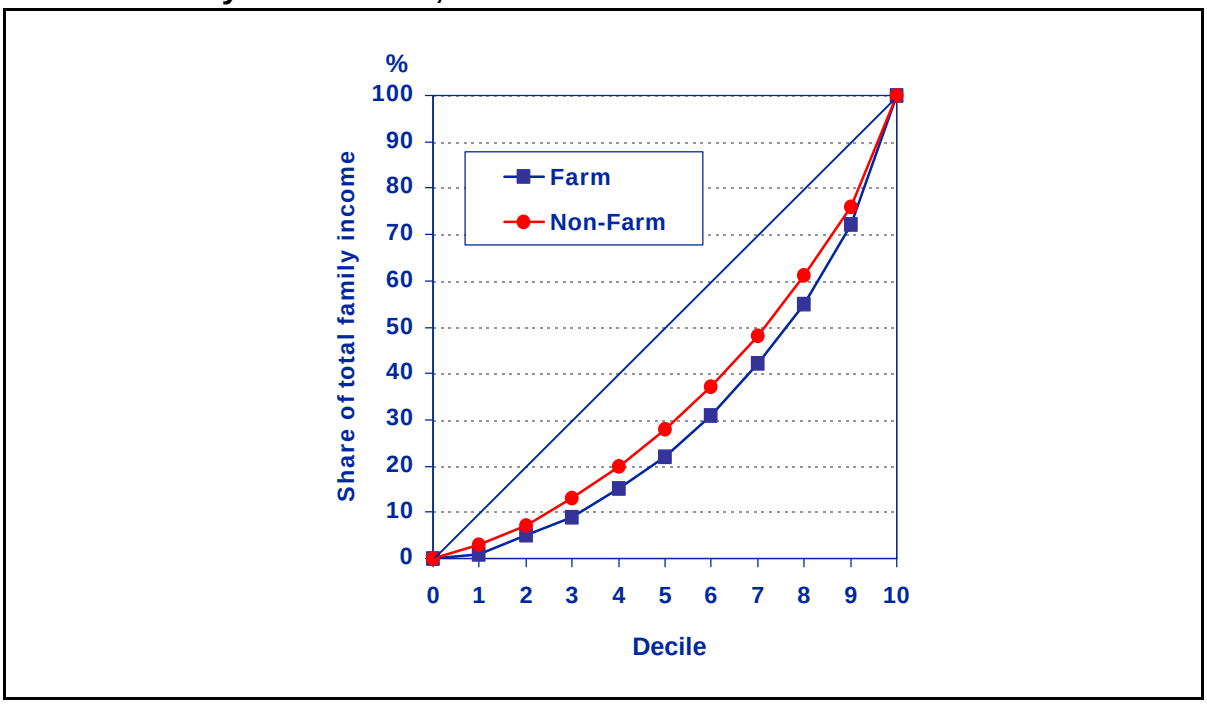
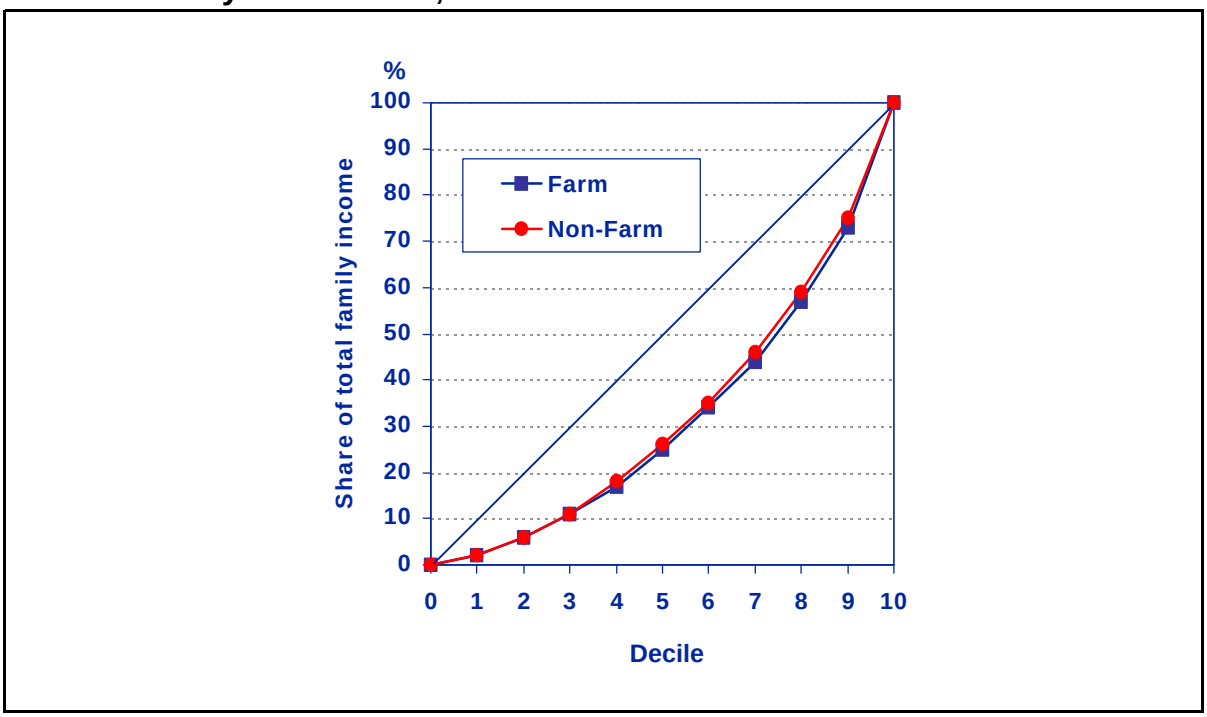


Figure 3: Farm and non-farm family income, Lorenz curves, standardized family income data, 1995



5.2. Scalar and other measures of income inequality

We present six measures of income inequality in an attempt to measure the degree of income inequality for farm and non-farm family income in 1985 and 1995 (Table 10). In terms of the Gini coefficient, the data show some degree of income inequality among all families, all scores being greater than zero. For farm families, their income distribution improved in that there was less income inequality in 1995 (0.34) than in 1985 (0.39). However, a comparison of income inequality for farm families relative to non-farm families shows that between 1985 and 1995, the gap between these two groups actually narrowed (0.34 farm, 0.33 non-farm in 1995).

The coefficient of variation, which measures the difference in relative income shares of the various decile groups for farm and non-farm income shows the same trend as the Gini coefficient over the period. There was less variation in income shares for farm families in 1995 than in 1985. In fact, the dispersion in farm and non-farm family income moved in opposite directions over the period. While there was a reduction in the coefficient of variation for farm family income distribution, the coefficient for non-farm family income actually increased (from 0.60 in 1985 to 0.62 in 1995) to the point where it was only marginally higher than farm income.

Table 10: Alternative measures of inequality

	Farm families		Non-farm families	
	1985	1995	1985	1995
Gini coefficient	0.39	0.34	0.32	0.33
Coefficient of variation	0.74	0.67	0.60	0.62
Theil-Entropy index	0.25	0.21	0.17	0.18
Theil-Bernoulli index	0.29	0.21	0.18	0.19
Exponential index	0.45	0.44	0.43	0.43
Foster-Wolfson Polarization index	0.37	0.36	0.30	0.31

All other measures of inequality indicate similar trends in income inequality between farm and non-farm incomes. The Theil-Entropy index, the Theil-Bernoulli index and the Exponential index all show an improvement in income distribution among farm families and a deterioration for non-farm families between 1985 and 1995. While these measures show a difference in the degree of inequality between farm and non-farm income, the gap is not significant and narrows over time.

The Foster-Wolfson Polarization index supports the same statistical findings. It shows that the number of farm families in all the ranges—top, middle and bottom—of the income scale remained the same. However, among non-farm families, those in the middle range declined in the period 1985 to 1995. This finding is consistent with that of earlier studies discussed in the literature review.

5.3. Historical Gini coefficients

The statistical analysis of inequality in the farm and non-farm sector presented in the previous sections considered the period 1985 to 1995. The results of previous studies are available and are useful to determine how income inequality for farm and non-farm families has changed over time. Results are presented in Table 11.

Table 11: Historical Gini coefficients

Year	Authors	Data source	Farm	Non-farm		All
				Urban	Rural	
1971	Davey, Hassan and Lu (1974)	SCF*	0.46	0.39	0.39	0.40
1973	Darcovich and Mouelhi (1976)	SCF	0.45	0.39	0.37	0.39
1975	Darcovich, Gellner and Leung (1979)	SCF	0.47			0.39
1989	Bourgoyne, D. (1992)	SCF	0.36	0.34	0.33	
1990	Bourgoyne, D. (1992)	SCF	0.40	0.35	0.33	

SCF is Survey of Consumer Finances. Numbers are rounded to two decimal places.

Table 11 shows the Gini coefficients for farm and non-farm families for five selected years. The lowest Gini coefficient (0.36) for farm family income distribution was recorded in 1989. The highest Gini coefficient (0.47) was calculated in 1975. While there may have been some differences in methodology or data definitions between the studies, generally these numbers indicate that income inequality improved over the period 1971 to 1989. Similarly, for non-farm families, the Gini coefficients for both urban and rural families have traditionally been lower than for farm families, ranging from a high of 0.39 in 1971 in both areas to a low of 0.35 and 0.33 in 1990 respectively. The most significant observation from the data, however, is that income inequality declined in the farm sector to the same level as the non-farm sector.

In summary, the income distribution of Canadian farm families improved over the period 1985 to 1995, as indicated by the decline over time in the measures of income inequality. Relative to non-farm families, farm family income distribution approached that of non-farm families, as shown by the narrowing of the gap in measures of income inequality for the two family types. Non-farm families, with some reduction in income inequality over this period, did not come close to the gains of farm families. To explain these developments, we will consider income inequality by age, farm type, and province.

Section 6: Distribution of Income Inequality

To explain some of the changes in income distribution and inequality in the farm sector over the period 1985 to 1995, three factors will be considered: age, farm type, and province.

6.1. Income inequality by age

In much of the recent work on earnings inequality in Canada and the United States, the effects of age and gender were important factors for explaining changes in overall earnings inequality over time and between countries. Finnie 1997, Zyblock 1996 and Zyblock and Tyrell 1997 specifically considered the changes in earnings inequality of males and females of different age groups over time. All found that over the period of the 1980s and into the 1990s, male earnings inequality, particularly young males, increased and that of females decreased over time. Similar results are found in the United States where male earnings are more unevenly distributed and female earnings are more evenly distributed.

Explanations for these changes are based on structural change in the labour force whereby more highly skilled workers are required due to rapid technological innovation and globalization. This change has hurt young male workers. At the same time growth in the service sector and increased labour force participation of women due to their increasing hours, education levels and movement into formerly male-dominated fields, have resulted in increased earnings equality for female workers. Once overall earnings inequality is considered however, the increases in male earnings inequality are almost entirely offset by the relatively stable female earnings inequality such that overall earnings inequality increased only slightly over the period.

The impact of age on earnings inequality can be explained by the life cycle. Young entry-level workers, lacking work experience and/or skills have more unequally distributed earnings. Similarly, older workers preparing for retirement, or already retired, also have unequally distributed earnings. The literature reviewed shows that this was the case for earnings inequality in Canada during the 1980s and early 1990s.

However, earnings are only one factor. Studies that looked at family income inequality found other factors related to family formation and sources of family income to be important. Family income includes the money income sources of all family members, and in some cases, is substantially more than earnings (wages and salaries from employment). Studies into

family income inequality such as Zyblock and Tyrell (1997) conclude that the increase in the incidence of lone (single) parent families, placed upward pressure on income inequality, while the trend away from younger families led to downward pressure.

To determine whether age has an impact on income inequality, specifically family income inequality in the farm sector, it is important to consider farm family income inequality by age of household head. In the Survey of Consumer Finances, the male partner in husband-wife families is assumed to be the head of the household, regardless of who is actually responsible for operating the farm. Due to the small sample of farm families available from the survey, the sample can be divided into only three age groups, based on the age of the household head: 40 years of age and under, 41 to 54 years of age, and 55 and older (Tables 12 and 13). There are approximately 350–500 families in the sample of each age group. We consider income inequality for both farm and non-farm families to show the impact of age. Data by gender are not available from the Survey of Consumer Finances and therefore will not be discussed.

The percentage share of income received by each decile (10%) of families, ranked from lowest to highest, is shown in Table 12. A comparison between farm and non-farm families shows that income was less equally distributed among farm families than non-farm families in 1985. This distribution is demonstrated by the larger difference in shares between the lowest and the highest deciles for all ages (1–28% for farm families versus 3–24% for non-farm families). By age group, family income for the youngest farm families (less than 41 years of age) was less equally distributed as there was a larger gap between the lowest and highest income deciles (1–28% for farm families versus 2–23% for non-farm families). This distribution was true for farm families in the other two age groups, as reflected in the shares of income.

Table 12: Income distribution by age of household head for farm and non-farm families, 1985 and 1995

(%)	1985								1995							
	Less than 41 years of age		From 41 to 54 years of age		55 years of age and older		All ages		Less than 41 years of age		From 41 to 54 years of age		55 years of age and older		All ages	
	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm
Decile 1	1	2	1	3	2	3	1	3	2	2	2	3	2	3	2	2
Decile 2	4	4	4	5	4	5	4	4	4	4	4	4	4	4	4	4
Decile 3	5	6	5	6	5	5	5	6	5	6	5	6	5	5	5	5
Decile 4	6	7	6	7	6	6	6	7	6	7	6	7	6	7	6	7
Decile 5	7	8	7	8	7	7	7	8	7	8	8	8	8	8	8	8
Decile 6	9	10	9	10	9	9	9	9	9	9	9	9	9	9	9	9
Decile 7	10	11	11	11	10	10	11	11	10	11	11	11	10	11	10	11
Decile 8	13	13	13	13	12	12	13	13	12	13	13	13	12	12	13	13
Decile 9	17	16	17	15	16	15	17	15	16	16	16	15	16	15	16	16
Decile 10	28	23	26	23	28	26	28	24	27	25	26	25	26	26	26	25
CANADA	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Statistics Canada, Survey of Consumer Finances, Custom Tabulations.

Table 12 also shows that there was an improvement in farm income distribution and inequality relative to non-farm families over the period, 1985 to 1995. The shares of income received by each decile were almost identical for all farm and non-farm families in 1995. The lowest 10% of farm families (decile 1) received two percent of total family income, as did the lowest 10% of non-farm families. Similarly, the highest 10% of farm families (decile 10) received 26% of total family income, and 25% for non-farm families. This narrowing of the gap in shares received by lowest and highest deciles for farm families (from 1–28% in 1985 to 2–26% in 1995), implies an improvement in equality. By comparison, the gap in non-farm families' shares stayed more or less the same over the period, implying little change in the inequality of income.

Table 13 shows the income inequality statistics by age group. In 1985, average income for farm families (all ages) ($26,692) was considerably below that of non-farm families ($29,494). By 1995, while a gap still existed, it had narrowed considerably ($30,215 for farm, $31,035 for non-farm). However, when family income is considered by the age of the household head, this was not the case for all age groups. Most notably, in 1985, farm households where the household head was 55 years of age and older, reported family income that actually exceeded that of non-farm families ($21,689 for farm, $20,912 for non-farm). On the other hand, farm households headed by individuals less than 41 years of age reported income substantially lower ($16,692) than that for non-farm families ($19,869). Similarly, for households headed by individuals from 41 to 54 years of age, there was a larger gap between farm and non-farm family income ($19,065 versus $23,814 respectively).

Table 13: Income inequality measures for farm and non-farm families, 1985 and 1995

	Less than 41 years of age		From 41 to 54 years of age		55 years of age and older		All ages	
	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm
1985								
Average income ($)	16,692	19,869	19,065	23,814	21,689	20,912	26,692	29,494
Median income ($)	13,203	17,731	15,406	21,412	16,999	16,999	21,541	25,803
Sample size	621	11,197	532	6,134	654	7,113	1,807	24,444
Estimated no. of families (000's)	107	3,023	103	1,774	112	1,926	321	6,723
Gini coefficient	0.40	0.32	0.38	0.30	0.37	0.34	0.39	0.32
Coefficient of variation	0.75	0.58	0.70	0.55	0.72	0.65	0.74	0.60
Theil-Entropy index	0.26	0.16	0.24	0.15	0.23	0.19	0.25	0.17
Theil-Bernoulli index	0.33	0.18	0.28	0.16	0.24	0.19	0.29	0.18
Exponential index	0.45	0.42	0.45	0.42	0.44	0.43	0.45	0.43
Foster-Wolfson Polarization index	0.38	0.29	0.39	0.27	0.35	0.33	0.37	0.30

Source: Statistics Canada, Survey of Consumer Finances, Custom Tabulations.

Table 13: Income inequality measures for farm and non-farm families, 1985 and 1995 (Continued)

	Less than 41 years of age		From 41 to 54 years of age		55 years of age and older		All ages	
	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm
1995								
Average income ($)	32,603	30,068	28,744	32,001	29,727	31,167	30,215	31,035
Median income ($)	26,045	26,224	23,691	27,649	24,899	26,345	24,840	26,753
Sample size	345	8,046	376	7,120	499	8,074	1,220	23,240
Estimated no. of families (000's)	84	2,857	97	2,504	120	2,590	301	7,952
Gini coefficient	0.35	0.33	0.36	0.33	0.34	0.33	0.34	0.33
Coefficient of variation	0.68	0.62	0.68	0.61	0.66	0.63	0.67	0.62
Theil-Entropy index	0.20	0.18	0.21	0.17	0.19	0.18	0.21	0.18
Theil-Bernoulli index	0.21	0.18	0.24	0.19	0.20	0.19	0.21	0.19
Exponential index	0.44	0.43	0.44	0.43	0.43	0.43	0.44	0.43
Foster-Wolfson Polarization index	0.34	0.31	0.36	0.30	0.31	0.31	0.36	0.31

Source: Statistics Canada, Survey of Consumer Finances, Custom Tabulations.

By 1995, income by age group shows that the youngest farm families (less than 41 years of age) now had income that was above that of non-farm families ($32,603 versus $30,068), while family income for the other two age groups was lower than that for non-farm families ($28,744 versus $32,001 for individuals from 41 to 54 years of age and $29,727 versus $31,167 for those 55 years of age and older) (Table 13). Perhaps the events in the labour market affecting earnings for young male wage earners in particular had less effect on young males heading farm households over the period 1985 to 1995, leading to the gap. However, improvements in government social transfer policy that benefited the elderly over this period, had less impact on farm households than non-farm households. Farm households were perhaps more affected by lower interest rates which reduced their debt obligations in 1995.

The income inequality statistics in Table 13 indicate that for all age groups considered, income was less equally distributed for farm families than for non-farm families in 1985. For example, the Gini coefficient for the youngest farm household income (less than 41 years of age) was 0.40 compared to 0.32 for non-farm households. Similarly, for middle-aged farm households (from 41 to 54 years of age), the Gini coefficients were 0.38 for farm and 0.30 for non-farm families. For elderly households (55 years of age and older), the Gini coefficients were 0.37 for farm and 0.34 for non-farm families in 1985.

The measures of income inequality presented for all farm and non-farm families, also indicate that farm families' income became more equally distributed while that of non-farm families stayed the same or deteriorated. Gini coefficients for all farm family income fell from 0.39 to 0.34 between 1985 and 1995, while those for all non-farm family income increased

from 0.32 to 0.33. Other measures of inequality such as the coefficient of variation, the Exponential index and the Foster-Wolfson Polarization index all fell over the period for farm families and increased or stayed the same for non-farm families.

Other income inequality measures indicate similar results: coefficients of variation show greater income inequality for farm families than for non-farm families since those for farm families are higher for all age groups. For elderly families, however, the difference in income inequality measures between farm and non-farm families is less than for the other age groups. The Foster-Wolfson Polarization index also indicates that farm family income was slightly more polarized than non-farm family income, with less difference between elderly farm and non-farm families.

By age of household head, all farm households experienced an improvement in income distribution and inequality with the youngest families (less than 41 years of age) making the greatest improvement and those headed by individuals 55 years of age and older making significant gains as well. The gap between income shares for the youngest farm households fell from 1985 (1–28%) to 1995 (2–27%). Gini coefficients for this age group fell from 0.40 in 1985 to 0.35 in 1995. Similarly, this measure of income inequality fell from 0.37 to 0.34 for households headed by older individuals (55 years of age and older). Those families headed by individuals considered babyboomers (from 41 to 54 years of age) experienced less of an improvement in income inequality (as measured by Gini's falling from 0.38 in 1985 to 0.36 in 1995). The other measures of inequality confirm these trends for the various age groups.

By comparison, however, the income distribution and inequality of all non-farm families headed by individuals less than 41 years of age deteriorated slightly between 1985 and 1995 as measured by the Gini coefficient, from 0.32 to 0.33, and the gap in shares between lowest and highest deciles broadened slightly. For non-farm households headed by babyboomers (from 41 to 54 years of age), Gini coefficients increased more, from 0.30 to 0.33 over the period indicating a deterioration in income distribution. Only older non-farm households experienced an improvement in income inequality, albeit slight (from 0.34 to 0.33).

6.2. Income inequality by farm type

This part examines income inequality for families associated with six farm types (dairy, cattle, hogs, poultry and eggs, potatoes, and grains and oilseeds) based on their importance to Canadian agricultural production. In the period 1991 to 1994, almost 40% of Canadian farm families were involved in the production of grains and oilseeds, about 30% in cattle, between 13% and 14% in dairy, about four percent in hogs, and about one percent both in poultry and eggs and in potatoes.

Table 14 presents average farm family income and measures of inequality by farm type over a five-year period, 1991 to 1995. Unlike the family income data presented earlier, these data are derived from Statistics Canada's Whole Farm Database project. There are major differences in methodology and definitions of data from the two data sources. Data from the Survey of Consumer Finances include all farm families with an individual reporting some net farm income. Data from the Whole Farm Database include only farm families with gross farm revenues of $10,000 and over for unincorporated farms, and $25,000 for incorporated operations.

Also, the net farm income reported from the Survey of Consumer Finances is after depreciation, whereas the farm income data presented here from the Whole Farm Database is before depreciation is deducted. Depreciation may not be a major factor for families on small farms as it becomes a smaller share of family total income, but as farms get larger, depreciation becomes a more important factor associated with larger capital assets. Income distribution by decile will therefore be significantly different since family income after depreciation of farm assets will be lower for families in the higher income classes. Nevertheless, looking at income distribution by farm type provides us with some explanation for farm family income inequality over the period 1991 to 1995.

Table 14: Average farm family income by farm type and Gini coefficient, 1991 to 1995

Farm family type	1991	1992	1993	1994	1995
All farm types					
Average income ($)	26,206	26,601	27,659	28,762	30,500
Gini coefficient	0.401	0.379	0.386	0.385	0.397
Dairy					
Average income ($)	25,354	25,912	26,010	27,102	28,625
Gini coefficient	0.339	0.340	0.345	0.328	0.335
Cattle					
Average income ($)	24,141	24,846	25,858	25,583	26,321
Gini coefficient	0.458	0.413	0.439	0.443	0.460
Hogs					
Average income ($)	19,877	21,743	21,829	20,276	21,895
Gini coefficient	0.422	0.393	0.389	0.434	0.432
Poultry and eggs					
Average income ($)	32,949	30,356	31,704	31,434	29,735
Gini coefficient	0.372	0.372	0.369	0.374	0.377
Potatoes					
Average income ($)	27,441	27,745	29,569	35,392	32,264
Gini coefficient	0.434	0.405	0.398	0.385	0.367
Grains and oilseeds					
Average income ($)	28,096	28,587	30,362	32,876	34,810
Gini coefficient	0.369	0.344	0.344	0.341	0.352

Source: Statistics Canada, Whole Farm Database.

Of the six farm types, families associated with three of them (poultry and eggs, potatoes, and grains and oilseeds) consistently had average incomes above the average for all farm types, except in 1995 when the average income of poultry and egg producers was slightly lower. Average family income for dairy, cattle and hog farms was lower than the average. However, throughout the period, the highest levels of income inequality occurred for cattle and hog farms, where the index of inequality was consistently above the average for all farm families. This case was the opposite for dairy and grain and oilseed farms where income inequality was lowest. Although poultry and egg farms had the highest average income per family, income inequality associated with them was modest compared to the overall average farm situation. Potato farms had a relatively high level of income inequality in 1991 to 1993 but dropped considerably in 1994 and 1995.

Ahearn, Perry and El-Osta (1993), looking at the income situation of farmers in the United States, found that households associated with smaller farms had lower Gini coefficients than other size groups. This lower income inequality, they stipulate, results from smaller farms generally yielding a more narrow range of income possibilities. Also, farm income inequality was the major source of income inequality among farm households. As farm size increased, the Gini coefficient increases. This situation may well be the case in Canada but it is beyond the scope of this paper to estimate Gini co-efficients by farm size.

Farm family income inequality over the period 1991 to 1995 changed little. Families associated with two farm types (cattle and hogs) had indices of inequality consistently and significantly above the average for all farm types. An explanation of the differences between farm types may be based on differences in the structure of farming and the extent to which families with different farm types rely more or less on off-farm income. However, this analysis is beyond the scope of this paper, and might be considered for further research.

6.3. Income inequality by province

It would be useful to ascertain the level and degree of farm income inequality at the provincial level in the period 1991 to 1995. Areas of interest would be whether the pattern has changed over time, is the pattern of farm income inequality consistent with what has been happening in the province as a whole, and from interprovincial comparisons, to what degree does inequality affect one province vis-à-vis another.

Table 15 shows that farm family income inequality varied considerably among provinces in the 1991 to 1995 period. In British Columbia, Manitoba and Nova Scotia, farm family income inequality increased every year in the period 1993 to 1995. Alberta also experienced a rise in inequality, although the same pattern persisted in both 1993 and 1994. The gap in farm family income inequality in Ontario closed in the period 1991 to 1994 but it widened a bit in 1995. Prince Edward Island and Saskatchewan experienced considerable fluctuation in inequality with the gap closing in Saskatchewan in the 1991 to 1993 period then opening in the 1994 to 1995 period while it fell in Prince Edward Island in 1992, rose in 1993, fell in 1994 and rose again in 1995. Like Prince Edward Island, New Brunswick and Quebec exhibited an almost similar pattern.

Of the nine provinces, farming families in British Columbia and Alberta consistently had the highest levels of income inequality in the period 1991 to 1995 with their year-to-year Gini coefficients considerably above the national average based on farm family income. Comparisons of Gini coefficients for the other provinces are ambiguous in the sense that there is no

clear pattern in the rankings. For example, in each year, Manitoba ranked from third to seventh with its Gini coefficient below the national level. Ontario's farm family income inequality index ranked relatively high (fourth to seventh) among the provinces but its level of income inequality was below the national average every year, except 1992 when it was marginally above.

Saskatchewan had the lowest level of farm family income inequality in 1993, and the third lowest in 1992, 1994 and 1995 and in each year under study its Gini coefficient was lower than the national level. Similarly, Quebec had the lowest level of farm family income inequality in 1991, 1994 and 1995; in 1992 and 1993 it ranked fourth and second respectively. For the Atlantic provinces (Nova Scotia, Prince Edward Island and New Brunswick) the income inequality index showed considerable variability but these provinces did not have the highest level of income inequality, which is quite opposite to the findings of Finnie (1998).

Table 15: Gini coefficients by province, for farm[a] families, 1991 to 1995

Provinces[b]	1991	1992	1993	1994	1995
Prince Edward Island	.386	.372	.394	.343	.383
Nova Scotia	.368	.321	.361	.387	.389
New Brunswick	.402	.345	.415	.382	.351
Quebec	.346	.353	.357	.340	.333
Ontario	.397	.383	.373	.372	.389
Manitoba	.373	.363	.368	.376	.394
Saskatchewan	.378	.347	.343	.348	.352
Alberta	.435	.386	.428	.428	.441
British Columbia	.464	.437	.451	.460	.469
CANADA	.401	.379	.386	.385	.397

a. Farm refers to the Gini coefficients based on farm family income.
b. Newfoundland is excluded from the table because of the small sample size for farm families.
Source: Whole Farm Database.

What is clear from the data is that, in all provinces, farm family income inequality persists. It is highest in Alberta and British Columbia where the Gini coefficients are considerably above the national level, both farm and non-farm. Of the other provinces, New Brunswick had a higher level of farm family income inequality than other provinces in 1991 and 1993, Ontario exceeded the national level in 1992, Prince Edward Island did so in 1993 and Nova Scotia in 1994. For the provinces as a whole, Finnie's data show that earnings inequality was lower than farm family income inequality in 1991 but higher in subsequent years.

The differences noted in farm family income inequality by province could, perhaps, be partially explained by the concentration of various farm types in those provinces as well as access to off-farm employment which, in many instances, depends on the extent of urbanization. For example, livestock production is concentrated in all provinces and is important to all farmers in terms of their revenue mix. Dairy is concentrated in Quebec and Ontario,

potatoes in Prince Edward Island, Manitoba and New Brunswick, grains and oilseeds in the Prairie provinces and Ontario, and poultry and eggs principally in Ontario and Quebec. Essentially, almost all provinces produced the identified crops and livestock, although with varying degrees of concentration. It is difficult to discuss in isolation, the significance of incomes from livestock and crop production as contributors to the varying degrees of provincial farm income inequality.

While income inequality in the livestock sector might have contributed to a relatively high level of farm income inequality in Alberta and, to a lesser extent in British Columbia, it should be noted that off-farm earnings were a more important source of income for families in British Columbia (over 80%), Alberta (over 70%), Ontario (over 70%) and Newfoundland (over 70%). Off-farm earnings were less important for farm families in Quebec, Prince Edward Island and Manitoba. While it is possible to infer that much of the provincial farm family income inequality has been driven by off-farm earnings and, to a lesser extent, by the concentration of farm type, it is quite obvious that such inference is drawn on the basis of casual observation of the data. Provincial farm family income inequality could be influenced by other factors, such as age and gender. Accordingly, further research in this area is required to deduce the factors influencing the levels of interprovincial farm income inequality.

Section 7: Policy Implications

It is reasonable to assume that government assistance and support to agriculture specifically in the form of program expenditure and transfers have played a role in narrowing the income inequality gap between farm and non-farm families.

Government policy toward agriculture has undergone numerous changes over the years. However, federal support to agriculture was significant during the 1980s but has declined a great deal since 1991. In 1986 alone, federal support totalled $2.5 billion through direct program payments to agricultural producers, in the form of income support and stabilization, crop insurance, ad hoc programs and cost reductions, financing assistance, and storage and freight. By 1995, this amount had fallen to $1.1 billion. These program expenditures are included as part of farm income and therefore the falling level of support has undoubtedly had an impact on farm families in general.

The federal government managed to bring a greater level of discipline to the agricultural marketplace through its international responsibilities at the World Trade Organization. However, the international environment points to reductions in farm support. In some instances these reductions could imply difficult circumstances for farm families whose holdings are relatively small and who are dependent on income from farming as their principal source. On the other hand, as producers are forced to respond to market forces, there may be greater efficiencies resulting in improving incomes.

Tax policy is another area of importance. As an instrument of policy change, tax policy could be used to affect the income of farm families in either a positive or negative way through its direct impact on farm revenues. Reductions in taxes normally lead to higher farm revenues while increases normally have the opposite effect, everything else being equal.

The program that contributes perhaps the most in reducing farm income inequality is government social transfers, for example Canda/Quebec Pension Plans (CPP/QPP) and Old Age Security. Approximately 90% of farm families received some form of social transfer in 1995, thereby underlying the dependence on this form of support. Any policy change in government social transfers should take into consideration the impact that the change might have on farm families.

Over 68% of rural farm families earn off-farm wages and salaries. Off-farm work represents an important source of revenue for capital deepening and reduces vulnerability of farm families to wide swings in farm prices and net farm income. It is also an important means by which returns to education and therefore total employment income can be increased. In the long run, greater access to education and training programs should reduce inequality by equipping both on-farm and off-farm workers with the capacity and skills to earn a better wage.

Section 8: Summary

Based on the income inequality literature, income/earnings inequality has been a feature of both the American and Canadian social setting with increasing demand for skilled labour being a major factor in the American experience. Both supply-side and institutional factors have contributed to earnings and income inequality in both countries. In Canada, young male workers have been affected the most, while women and older males in general have experienced some improvement in their income position.

This paper found that income inequality prevails among farm and non-farm families. However, while farm families traditionally experienced greater income inequality than non-farm families, this gap narrowed considerably over the 1985 to 1995 period. This narrowing occurred largely because the well-being of farm families improved over the period at the same time that non-farm families did not. Income polarization is not an important issue for these groups, although it increased marginally for non-farm families. From an historical perspective, farm family income inequality, as indicated by the Gini coefficient, decreased dramatically since 1971, falling from a high of over 0.46 in 1971 to a low of 0.34 in 1995. More recent data reflecting more recent developments in world commodity markets and farm income may tell a different story. But the discussion here centers on the 1985 to 1995 period only.

This paper shows that, for farm families as a group, there was less income inequality in 1995 than in 1985 and a considerable narrowing of the income inequality gap between farm and non-farm families. In terms of polarization, the Foster-Wolfson Polarization index, which captures the notion of a "disappearing middle class," shows that the numbers of farm families in all the ranges—top, middle and bottom—of the income distribution have remained the same. However, the number of non-farm families in the middle range declined in the period under study. This finding is consistent with the findings of earlier Canadian studies on earnings inequality. Historical Gini coefficients going back to 1971 also indicated a steady improvement (decline) in income inequality for farm families overtime.

The average income of rural farm families has generally been below that of urban families. However, this income gap has closed considerably to about a seven percent difference. From a regional standpoint, while rural farm families in some regions of the country have reported income above their rural non-farm neighbours, as in the Atlantic provinces in 1985 to 1991 and 1993, and Ontario and the Prairie provinces in 1995, those in Quebec and British Columbia have generally reported incomes below that of their rural non-farm counterparts.

Certain farm types were found to have much higher levels of income inequality than others—particularly for cattle, hog and potato farms and less so for dairy and grain and oilseed farms. This difference is perhaps explained by the structure of these farms and the ability of farmers and their families to earn off-farm employment income. However, more research is needed to identify the linkages between farm family inequality and other variables.

From a regional standpoint, farm family income inequality was highest in British Columbia and Alberta and lowest in Quebec and Manitoba. Much of the difference in income inequality can be explained by the concentration of specific farm types in each province, for example more cattle farms in Alberta. Here again, further research is required to identify the linkages.

While age and gender issues are important considerations driving earnings inequality in the general population, they are less significant in the agricultural sector. By age of household head, all farm households experienced an improvement in income distribution and inequality with the youngest age groups (less than 41 years of age) making the greatest improvement followed by those headed by individuals 55 years of age and older. The gap in income shares received by the lowest and highest deciles for the youngest farm households fell from 1–28% in 1985 to 2–27% in 1995. Gini coefficients also fell for this age group and for households headed by individuals 55 and over between 1985 and 1995. Families headed by babyboomers (from 41 to 54 years of age) had less improvement in income inequality (as measured by the Gini coefficient falling from 0.38 to 0.36). Other measures of inequality confirm these trends for the various age groups.

In conclusion, the paper finds that while income inequality is a condition which affects both farm and non-farm families, farm families in general made considerable strides in narrowing the gap between themselves and their non-farm counterparts to the point where it is hardly discernible. There are some regional and gender differences underlying the differential impact of income inequality but the reasons for these are not easy to identify and to isolate. More research is needed to determine the linkage between farm income inequality and factors (such as off-farm income, farm type and structure, and wealth) which have been identified as influencing the magnitude of the income inequality gap between Canadian farm and non-farm families nationally and in the regions.

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Glossary of Terms

Earnings/income inequality: In general, studies of earnings/income inequality are concerned with whether the condition of workers as measured by the share of income or earnings they receive, at the bottom or top of the income or earnings distribution, has changed.

Economic families: A group of individuals that share a common dwelling and who are related by blood, marriage (including common-law) or adoption. They include husband-wife families and lone parent families, including married sons or daughters, but not unattached individuals. Economic families are used for the concept of a spending unit unlike the census family which reflects a family in a more restrictive sense.

Farm families: Economic families who reported some (positive or negative) net farm income in the year are considered.

Farm type: A Statistics Canada classification whereby 51% or more of the farm's market receipts (revenue from the sale of agricultural products) are derived from sales of a particular commodity. For example, a dairy farm is a farm type based on the sale of dairy products.

Head of family: In husband-wife families, the husband is considered the head. In lone parent families, the parent with unmarried children is the head, or with married children, the member who is mainly responsible for the maintenance of the family. In lone parent families where relationships are other than husband-wife or parent child, the eldest in the family is considered the head.

Lone parent families: Families headed by a single parent with children related by blood, marriage or adoption.

Low income cut-offs (LICOs): Calculated by Statistics Canada and are based on average family expenditure on food, shelter and clothing expressed as a percentage of pre-tax income. Base-year LICOs are set where families spend 20% more of their income than the Canadian average on these basic necessities. LICOs are then adjusted each year by the Consumer Price Index. Based on 1992 expenditure patterns, LICOs were set at 54.7% of income. They are differentiated by size of area of residence (rural, urban) and by family size. For example in 1995, LICO was $31,753 for a family of four in urban areas of 500,000 and over.

Net farm income: From the Survey of Consumer Finances, the gross operating revenues (including most direct agricultural program payments) minus gross operating expenses after depreciation, as reported by those individuals operating their own or a rented farm on their own or in partnership. Income in kind is excluded.

Polarization: The determination of whether the number of workers in various parts of the distribution has changed. Increasing polarization would be associated with a rise in the proportions of workers at the bottom and top of the distribution, and a decline in the proportion of workers in the middle.

Rural areas: In the Survey of Consumer Finances where income is collected by size of residence, those areas where the population is under 1,000 in towns or villages and/or population density is under 400 persons per square kilometre based on 1996 Census geographic boundaries and 1991 Census population counts in 1995.

Rural families: Economic families residing in areas where the population is under 1,000 in towns or villages and/or population density is under 400 persons per square kilometre.

Total income: Includes income from seven sources:

- *Net farm income*—as defined above.
- *Wages and salaries*—gross wages and salaries before deductions for such items as income taxes, employment insurance and pension plans. Income in kind is excluded.
- *Net income from self-employment*—gross income minus expenses received from self-employment either on own or in partnership in an unincorporated business, including income from roomers or boarders. For farm families, net farm income is excluded from self-employment income, unless otherwise specified.
- *Investment income*—bond interest, dividends, mortgage interest, net rents, estate income, bank interest and other investment income including interest on Net Income Stabilization Account (NISA) balances.
- *Government social transfer payments*—all social welfare payments from the federal, provincial and municipal governments such as Old Age Security, Guaranteed Income Supplement, Spouse's Allowance, pensions under the Canada/Quebec Pension Plan (CPP/QPP), Employment Insurance benefits, Workers' Compensation, training allowances, veterans' benefits, social assistance, pensions to the blind and disabled, refundable tax credits, Goods and Services tax credits and child tax benefits.
- *Pensions*—retirement pensions, annuities and superannuation.
- *Miscellaneous income*—scholarships, alimony and other items not specified and not included in the above categories.

Urban families: Economic families residing in towns or cities where the population is over 1,000 or in areas where the population density is over 400 persons per square kilometre.

Appendix: Measures of Inequality

There are many ways to measure inequality. This appendix discusses the measures used in this paper and some of their characteristics. The paper focuses only on measures consistent with Lorenz inequality. Each of the measures is sensitive to somewhat different shifts in the shape to the earnings distribution.

The Gini coefficient and other inequality measures allow the analysis of whether "the rich are getting richer or the poor getting poorer." These measures are inappropriate for establishing whether there are more rich or more poor or whether the middle class is declining or expanding. To answer questions of the latter sort requires polarization measures that describe changes in the distribution of individuals across fixed relative earnings levels.

Middle sensitive measure of inequality

Gini coefficient

$$GINI = \Sigma_i W_i (y_i / \mu)$$

and

$$W_i = p_i \left[\sum_{i=1}^{j} (2p_j - p_i - 1) \right]$$

where W_i = a weight associated with the proportion of the population in the ith group

p_i = the proportion of the population in the ith income group

y_i = the average income in that group

μ = the overall mean income

The Gini coefficient is derived from the Lorenz curve and is defined as the area between the Lorenz curve and the diagonal line divided by the area of the whole triangle. The Gini coefficient therefore has a value between 0 and 1, where a value of 0 means that all individuals in

the population have the same earnings. This value is consistent with the Lorenz curve lying along the 45 degree line. A Gini coefficient with a value of 1 means that one individual holds all the income and the Lorenz curve lies along the horizontal axis.

The major criticism of the Gini coefficient is that it assumes equal importance to equal absolute differences in income, even if one of the differences is between two low income groups and the other between two high incomes. Zyblock (1996) determined that "... for a change in the Gini coefficient to be considered statistically significant and attributable to factors other than sampling variability, its absolute value must be greater than or equal to 0.008."(p. 20)

Top sensitive measure of inequality

Coefficient of variation

$$CV = \left[\Sigma p_i (y_i - \mu)^2\right]^5 / \mu$$

The coefficient of variation gives the standard deviation as a percentage of the mean. The measure is independent of the variate scale. It is useful when one wants to know whether one distribution is relatively more variable than another. The greater the value of the coefficient, the greater the degree of inequality. The coefficient of variation and the Gini coefficient tend to indicate a similar ordering of the degree of inequality of income distribution, but in absolute terms these two measures are not comparable. The main weakness of the coefficient of variation is that it is affected by the value of the mean.

Bottom sensitive measures of inequality

Theil-Entropy index

$$TE = \sum (y_i/\mu) 1n(y_i/\mu)$$

Theil-Bernoulli index

$$TB = -\sum p_i 1n(y_i/\mu)$$

Exponential index

$$EXP = \sum p_i \exp(-y_i/\mu)$$

where $1n$ = natural logarithm

p_i = the proportion of the population in the i^{th} income group

y_i = the average income in that group

μ = the overall mean income

It is possible for top sensitive measures of inequality to move in the opposite direction to bottom sensitive measures of inequality.

Polarization measures

Foster-Wolfson Polarization index

$$FWP = 2 \bullet [2 \bullet (0.50 - SHARE50 - GINI)] \bullet (median/mean)$$

where SHARE50 = the share of individual earnings of the bottom 50% of the distribution

If everyone has the same earnings, the Foster-Wolfson Polarization index will equal 0 and alternatively, a perfectly polarized population divided into equal halves. Each half has one of two possible values of earnings, the minimum or maximum, and the index will equal 1. The index measures the dispersion of the median and bi-modality of the distribution. For a change in the Foster-Wolfson Polarization index to be statistically significant at the five percent level, its absolute value must be greater than or equal to 0.015 (Zyblock 1996).