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The Instability of Family Earnings and Family Income in Canada, 1986 to 1991 and 1996 to 2001

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Abstract

We investigate how family earnings instability has evolved between the late 1980s and the late 1990s and how family income instability varies across segments of the (family-level) earnings distribution. We uncover four key patterns. First, among the subset of families who were intact over the 1982-1991 and 1992-2001 periods, family earnings instability changed little between the late 1980s and the late 1990s. Second, the dispersion of families' permanent earnings became much more unequal during that period. Third, families who were in the bottom tertile of the (age-specific) earnings distribution in *1992-1995* had, during the *1996-2001* period, much more unstable market income than their counterparts in the top tertile. Fourth, among families with husbands aged under 45, the tax and transfer system has, during the 1996-2001 period, eliminated at least two-thirds (and up to all) of the differences in instability (measured in terms of *proportional* income gains/losses) in family market income that were observed during that period between families in the bottom tertile and those in the top tertile. This finding highlights the key stabilization role played by the tax and transfer system, a feature that has received relatively little attention during the 1990s when Employment Insurance (EI) (formerly known as Unemployment Insurance (UI)) and Social Assistance (SA) were reformed.

Keywords: Earnings Instability; Uncertainty; Government transfers; Spousal income.

I. Introduction

Family earnings instability may affect the well-being of individuals in several ways. Unless they are fully offset by government transfers and tax reductions, unexpected fluctuations in family earnings generate unexpected changes in family disposable income. If borrowing constraints are present, these changes in disposable income may move families away from their preferred consumption path (Browning and Lusardi, 1996: 1800) and thus, reduce their welfare (Dynarski and Gruber, 1997: 235). High earnings instability signals high earnings uncertainty, which may induce families to save for precautionary motives (Caballero, 1991; Guiso *et al*., 1992; Browning and Lusardi, 1996; Irvine and Wang, 1994 and 2001; Huggett, 2004), affect the decisions of their members regarding labour supply (Pistaferri, 2003), self-employment (Parker *et al.*, 2005), portfolio allocation, schooling, and occupational choices (Guiso *et al*., 2002) and modify their fertility behaviour (Wu, 1996; Fraser, 2001). If individuals are risk-averse, and given that social and private insurance mechanisms do not completely eliminate economic uncertainty, high uncertainty levels will decrease individuals' well-being (Osberg and Sharpe, 2002). Because it may increase the volatility of family income, high family earnings instability may create stress and anxiety for families' main earners, reduce their sense of control over their lives and potentially increase their vulnerability to health problems in the longer run.

Family earnings instability may also be quite different now than it used to be in the mid-1980s. This is so for numerous reasons. First, even though permament layoff rates have changed little between the 1985-1989 period and the 1995-1999 period, hiring rates of men and women aged 25 to 34 have dropped substantially (by 16% and 22%, respectively) between these two periods (Morissette, 2004). Hence, while young workers' chances of losing their job have not changed much between the late 1980s and the late 1990s, their chances of finding a new job in the event of a layoff—as proxied by hiring rates—have fallen markedly. All else equal, this should increase the duration of unemployment spells experienced by young displaced workers and increase earnings instability.

Second, hourly wages of newly hired men and women (those with two years of seniority or less) have fallen substantially relative to those of their counterparts with greater seniority between 1981 and 2004, even *within* age groups (Morissette and Johnson, 2005). For instance, hourly wages of newly hired men aged 35 to 44 fell 10% during that period, while those of their counterparts with more than two years of seniority remained unchanged. This decline in the relative wages of new employees implies that, controlling for the duration of unemployment spells experienced by displaced workers, earnings losses of displaced workers should be greater now than they were during the 1980s. This in turn should generate upward pressures on earnings instability.

Third, the incidence of temporary employment has risen substantially among newly hired employees between the late 1980s and the late 1990s. In 1989, 11% of newly hired private sector employees held a temporary job. By 1998, the corresponding proportion was, at 21%, almost twice as high (Morissette and Johnson, 2005). As a result, a growing fraction of today's new employees have no credible guarantees of employment continuity, a pattern that should also contribute to increasing earnings instability.

Conversely, other factors may have tended to reduce family earnings instability. First, the proportion of two-parent families (with children) with two earners rose from 48% in 1980 to 63% in 2000 (Statistics Canada, 2000). As a result, for a growing fraction of families, the risk of job loss is now spread across two earners rather than being concentrated on a single earner. Second, permanent quit rates fell substantially between the late 1980s and the late 1990s. In 1999, permanent quit rates averaged 7.3%, much less than the rate of 9.2% observed in 1989 (Morissette, 2004). As a result, job stability *rose* in Canada during the 1989-1999 period (Heisz, 2005: Figure 1).

Despite its importance for individuals' well-being, remarkably little attention has been devoted to the analysis of family earnings instability. Most studies of earnings instability conducted so far have considered the earnings profiles of individuals (Gottschalk and Moffitt, 1994; Haider, 2001; Baker and Solon, 2003; Beach *et al.*, 2003, Meghir and Pistaferri, 2004). While narrowing the focus on individuals is important for understanding earnings dynamics, the extent to which families can generate stable income flows from the labour market is a key concern for policymakers and thus, deserves particular attention.

The first goal of this study is to fill this gap. Using data from Statistics Canada's Longitudinal Administrative Databank (LAD), we document how family earnings instability has evolved between the 1986-1991 period and the 1996-2001 period. Following Gottschalk and Moffitt (1994), we decompose, in each period, the total variability of family earnings into a permanent component and a transitory component. While the permanent component measures inequality in families' permanent earnings, the transitory component captures family earnings instability. We can therefore quantify the extent to which changes over time in the total variability of family earnings are due to changes in inequality and changes in family earnings instability.

One of the key concerns about high levels of family earnings instability rests on the assumption that they lead to high instability in post-transfer after-tax family income, which in turn may prevent families from smoothing consumption over time. In a recent study, Johnson and Kuhn (2004) have documented the high sensitivity of the earnings of low-paid male workers to cyclical fluctuations, both in Canada and in the United States. This sensitivity, which is likely related to the instability of employment patterns of low-paid males, implies that low-paid husbands will face relatively high earnings instability at the *individual* level. What is currently unknown is the extent to which this high earnings instability is offset by: a) wives' earnings and, b) the tax and transfer system. Given that low-paid husbands tend to live with low-skilled wives, one might expect the ability of low-skilled wives to buffer unfavourable changes in male earnings to be limited. If so, low-skilled couples could have more unstable employment income than other couples. Whether they would end up having more unstable after-tax family income than other couples is an empirical question that has received little attention so far.

The second goal of this paper is to shed light on these issues. To do so, we first examine how husbands' earnings instability compares to couples' earnings instability. We perform this task for couples of various ages and both for the 1986-1991 period and the 1996-2001 period. We then take advantage of the various income measures available in LAD and compute measures of instability based on several additional income concepts: a) family earnings, b) family market income, c) family income before tax and, d) family income after-tax. This allows us to answer the following questions. First, to what extent do wives' earnings act as a buffer that reduces the

volatility of husbands' employment income? Second, to what extent does the tax and transfer system play a stabilization role, i.e., to what extent is instability reduced when we move from family market income to after-tax family income? Third, to what extent do wives' earnings, taxes and transfers reduce the differences in instability that are observed between couples in the bottom of the earnings distribution and those in the top of the earnings distribution? To our knowledge, no Canadian study has addressed these issues so far.

II. Survey of the literature

Most of the recent studies on earnings instability rely on the methodology developed in Gottschalk and Moffitt (1994) and extended in Haider (2001), Baker and Solon (2003), Moffitt and Gottschalk (2002). The basic idea is that the total variability of individual earnings observed in a given period (across years and individuals) is the sum of two components: a permanent component and a transitory one. The permanent component measures *inequality* in individuals' permanent earnings. The transitory component averages (across individuals) the *instability* of earnings that individuals experience over a given period of time. Permanent earnings are the earnings individuals can expect to receive given their observed and unobserved characteristics. Transitory earnings equal actual earnings minus expected earnings at any given time.

Using data from the Michigan Panel Study on Income Dynamics (PSID), Gottschalk and Moffitt (1994) apply their method to examine the growth of earnings instability in the United States between the 1970-1978 period and the 1979-1987 period. Their results indicate that although both earnings inequality and earnings instability rose during the 1980s, the rise in earnings inequality was much larger than the rise in earnings instability.

Although Gottschalk and Moffitt (1994) document an increase earnings instability, they do not come to any definitive conclusion as to why it happened. They examine the extent to which it can be attributed to cyclical effects and whether changes in transitory earnings are mostly due to changes in the instability of employment as opposed to the instability of wages. They argue that the increase in earnings instability observed in the 1980s cannot be fully attributed to cyclical factors. Similarly, it cannot be fully attributed to the cyclical instability of employment: approximately half of the increase in earnings instability is due to the increase in the variance of wages. The higher turnover rates in the 1980s do not appear to fully account for it either.

Gottschalk and Moffitt show that earnings instability increased for both those who did and those who did not change their jobs.[1]

Beach *et al.* (2003) use the basic analytical framework found in Gottschalk and Moffitt (1994) and examine changes in earnings instability in Canada between 1982-1989 and 1990-1997. Using data from the Longitudinal Administrative Databank of Statistics Canada, they find that, between these two periods, earnings instability generally rose for men but *fell* for women aged 25 to 54. Like Gottschalk and Moffitt (1994), they also find that earnings inequality rose more than earnings instability.

While these studies provide useful information on individual earnings dynamics, they leave several questions unanswered. Because they focus their attention on individuals, they cannot: a) identify which families face the most unstable earnings patterns, b) examine how family earnings instability evolved between the late 1980s and the late 1990s and, c) assess the extent to which spousal earnings, government transfers and taxes reduce earnings instability observed at the individual level. These are important issues which cannot be resolved through individual-level analyses. For instance, the increase in earnings instability of male workers, documented by Beach *et al*. (2003), may well have been offset by decreases in earnings instability among women. Thus, the growing earnings instability among male workers does not necessarily imply an increase in family earnings instability. Likewise, since low-paid workers have relatively high chances of being permanently laid-off (Galarneau and Stratychuk, 2001), they will likely have more unstable employment income than their better paid or educated counterparts. Yet, whether these (assumed) differences in earnings instability at the *individual* level persist when we consider spousal earnings, or government transfers and taxes, is currently unknown.

III. Data and concepts

The LAD is a 20% random sample of all taxfilers and their families in Canada. Individuals are selected into LAD based on their Social Insurance Number (SIN). Both legal and common-law spouses are matched by either the spousal SIN or the combination of a name, address, age and marital status. Once a person is selected into LAD, he or she will remain in the sample from that

1. The simple model used in Gottschalk and Moffitt (1994) has been extended in several directions. Haider (2001) discusses more formal log-earnings regression models in which the permanent component includes heterogeneous growth terms and even more flexible statistical models in which the heterogeneous growth term is year-specific. Furthermore, these models allow for serial correlation in the transitory component, which is assumed to follow an ARMA(1,1) process. Haider's findings confirm the increase in earnings inequality in the 1980s. However, contrary to Gottschalk and Moffitt, he argues that earnings instability actually decreased during this period. Moffitt and Gottschalk (2002) extend their previous analysis to more recent data and analyze a model in which the permanent component of individual earnings follows a random walk, while allowing for serial correlation in the transitory component. They document a substantial increase in the transitory variance in the mid-1990s, followed by a dramatic fall to the lowest level since the early 1980s.

   Baker and Solon (2003) use Canadian longitudinal tax data on male earnings and estimate a flexible statistical model of variance decomposition using the GMM (general method of moments) technique. Although computationally involved, the model allows for integrating different aspects of earnings dynamics noted in previous studies: heterogeneity in earning growth rates (as well as levels), permanent effects of earnings shocks, serial correlation in the error term and a particular functional form of the transitory component with respect to age or experience. Echoing the studies by Gottschalk and Moffitt, Baker and Solon find that both earnings inequality and earnings instability rose for Canadian male workers around the late 1980s - early 1990s.

year on and linked across years through a unique LAD identification number. Every year LAD is augmented so that it represents approximately 20% of taxfilers every year. In this study, we use the 10% version of the LAD.

The LAD has numerous strengths. It draws information from personal income tax returns and thus, provides an accurate measurement of family earnings. Its longitudinal nature allows us to decompose the total variability of family earnings into an inequality and an instability component, a task that cannot be performed with cross-sectional data. Its very large sample size allows us to conduct separate analyses for groups of families narrowly defined in terms of age. The LAD spans the 1982-2001 period, thereby allowing a comparison of earnings instability in the 1980s and the 1990s. Finally, starting in 1992, the LAD introduced information on government transfers and after-tax income and thus, allows us to assess the stabilization role played by government transfers and the progressivity of the tax system.

Like most administrative data sets, the LAD has limited information about family demographics. While it includes data on individuals' age, sex, marital status and province of residence, it has no information about a person's workhours, educational attainment or occupation, three variables that are potentially important for the analysis of earnings instability.

We analyze family earnings instability over two six-year periods: 1986-1991 and 1996-2001. We select these periods for the following reasons. First, we want to investigate how family earnings instability varies across segments of the (family-level) earnings distribution. Since families who lost a job in a given period will likely have both fairly low employment income and high earnings instability, measuring family earnings during the same period over which instability is measured will not be necessarily informative. Doing so might simply confirm that some families ended up having both relatively low earnings and high earnings instability due to job loss. A more meaningful exercise is to condition our results on the earnings received by families *prior to* the period over which instability is measured.[2] To do so, we classify families of a given age group into three tertiles, based on the average employment income received by *couples* during the four years preceding the observation period. Averaging earnings over four years minimizes the influence of unusually good or bad years in the labour market, a problem that would plague the classification of families if a single year of data prior to the observation period were used. However, because LAD starts in 1982, it implies that family earnings instability must be analyzed from 1986 and onwards. Since we wish to compare instability in the late 1980s and the late 1990s for two sufficiently long periods of time, we choose to analyze the 1986-1991 and the 1996-2001 periods.

2. We acknowledge the possibility that families who lost a job prior to the six-year observation period may be more likely to experience layoffs than others during the six-year observation period, i.e., high levels of earnings instability experienced prior to the observation period may cause both low earnings and high earnings instability during the six-year observation period. Whether this is the case or not, one of the goals of this study is to answer the following question: Given that some husbands do experience more instability in employment income than others (*for whatever reason*), to what extent do wives' earnings, government transfers and taxes offset these differences? Thus, we wish to investigate the extent to which spousal earnings, taxes and transfers reduce the differences in instability that are observed across segments of the (family-level) earnings distribution, not to investigate in depth the *sources* of these differences.

Admittedly, labour market conditions differed between these two periods. While the 1986-1991 period included an interval of rapid growth in the late 1980s followed by a severe recession in 1990-1991, the 1996-2001 period witnessed slower but more sustained employment growth. Because it included a period of sharply rising unemployment, one would expect the 1986-1991 period to be associated with greater family earnings instability than the 1996-2001 period. This implies that any increase in family earnings instability observed between the 1986-1991 period and the 1996-2001 period will likely be a conservative estimate of the growth of family earnings instability that would have prevailed under thoroughly comparable labour market conditions. In order to check the robustness of our conclusions regarding trends in family earnings instability, we also analyze how instability evolved between the 1984-1989 period and the 1994-1999 period.[3]

For each of the six-year observation periods considered, our sample consists of (married or common-law) couples where husbands are aged 25 to 50 at the beginning of the period.[4] Since our goal in this paper is to document the instability of family earnings due to labour market events (e.g., job loss, transitions in and out of temporary jobs, spells of non-employment, re-entry in the labour market) rather than demographic events (e.g., death and divorce), we restrict our attention to couples who remained intact throughout the six-year observation period as well as during the four years preceding it.[5] We exclude couples who have self-employment income at some point during the six-year observation period as well as during the four years preceding it because our main interest is to measure earnings instability associated with paid employment. In order to focus on families where husbands have a relatively strong attachment to the labour market, we also restrict our attention to couples where husbands have positive earnings throughout the six-year observation period. Nevertheless, we allow couples to have no earnings in some of the four years preceding the observation period.[6] These sample selection rules yield samples of 199,800 families for the 1986-1991 period and 204,600 families for the 1996-2001 period. These represent 51% and 45%, respectively, of all couples with husbands aged 25 to 50 in 1986 (1996) who have been intact for ten years during the 1982-1991 (1992-2001) period.[7]

3. In principle, one might consider using the LAD to assess how the stabilization role of the EI (UI) program has changed between the 1980s and the 1990s. However, because the EI (UI) program requires that individuals work a minimum number of (weeks) hours to qualify for benefits, a rigorous analysis of this issue requires having data on the number of (weeks) hours worked by workers in the months preceding a claim. Such information is not available in the LAD.

4. We use the term husbands to refer to men living common-law as well as those who are married.

5. Nevertheless, we acknowledge that demographic events are an important component of the income risk faced by individuals and thus, deserve separate analyses. See Burgess *et al.* (2000) for a discussion of the relative importance of labour market events and demographic events.

6. We also require that families have positive market income in all years of the observation period. This criterion leads to the exclusion of a very small number of observations, e.g., families with negative net rental income.

7. The number of couples with husbands aged 25-50 in 1986 who have been intact throughout the 1982-1991 period equals 389,500 in the 10% version of the LAD. For the 1990s, the corresponding number is 451,800. The number of couples with husbands aged 25-50 in 1986 (1996) equals 640,800 (764,000) in the 10% version of the LAD, thereby indicating that couples with husbands aged 25-50 in 1986 (1996) who are intact over the 1982-1991 (1992-2001) period represent 61% (59%) of all couples with husbands aged 25-50 observed in 1986 (1996).

To assess whether our conclusions hold for a broader sample, we relax the two aforementioned restrictions regarding self-employment income and husbands' earnings and perform, in section VIII, some robustness checks using a broader sample of intact couples (with husbands aged 25 to 50) who had both positive family earnings and family market income in all years of the six-year observation period. As long as they satisfy the restrictions regarding positive family earnings and family market income, these couples may have self-employment income. Broadening the sample selection rules in this way virtually doubles our sample size, yielding samples of 354,400 families for the 1986-1991 period and 394,500 families for the 1996-2001 period. In both periods, this broader sample covers between 87% and 91% of the universe of couples with husbands aged 25 to 50 who have been intact over ten years. As will be shown below, all our conclusions hold for both samples.[8, 9]

One of the variables of interest is annual earnings.[10] These include employment income from T4 slips and other income, i.e., tips, gratuities, or director's fees that are not reported on a T4 slip. We consider numerous income concepts: husbands' earnings, couples' earnings, family earnings, family market income, family income before tax and family income after-tax, among others. All these variables are expressed in 2004 constant dollars using the Consumer Price Index as a deflator.

To allow family earnings instability to vary throughout the lifecycle, we divide our sample into several five-year groups according to husbands' age at the beginning of the six-year observation period: 25-29, 30-34, 35-39, 40-44 and 45-50.

IV. Methods

We apply the method developed by Gottschalk and Moffitt's (1994) to assess changes in earnings instability. Assume that log earnings of family i in period t, y_{it}, are generated by the following random-effects model:

$$y_{it} = \beta_0 + \beta X_{it} + e_i + u_{it} \qquad (1)$$

where X_{it} is a vector of observable characteristics, e_i is a family-specific error term, u_{it} is an error term and where $\text{cov}[e_i\, u_{it}] = \text{cov}[e_i\, X_{it}] = \text{cov}[u_{it}\, X_{it}] = 0$.

8. Both samples include couples where: a) both partners filed a tax return and, b) those in which only one spouse filed a return. In the latter case, information about spousal income is imputed. Because the number of two-filer couples rose between the 1980s and the 1990s, about 8% of couples have imputed information about spousal income during the 1996-2001 period, compared to roughly 23% during the 1986-1991 period. All tables presented in this study as well as those referred to in Section VIII have been replicated using subsamples of two-filer couples only. None of the main conclusions are significantly altered when we do so. Minor differences, whenever they occur, will be noted below. All these tabulations are available from the authors upon request.

9. Since common-law couples with only one taxfiler cannot be identified before 1992, they are excluded from both samples.

10. We use the terms earnings and employment income interchangeably.

While equation (1) assumes a common slope for the age-earnings profile of families, it allows a distinct intercept for each family (through the family-specific error term, e_i). Thus, it allows low-skilled families to have lower permanent earnings than high-skilled families. To capture the general age-earnings profile of a given cohort, we include in X_{it} a quadratic term for the age of husbands.

To abstract from earnings mobility associated with the life cycle, we replace the actual reported log family earnings y_{it}, by the life-cycle adjusted (log) family earnings derived from equation (1):

$$y_{it}^{*} = y_{it} - (\hat{\beta}_0 + \hat{\beta} X_{it}) = \hat{e}_i + \hat{u}_{it} \tag{2}$$

If N families are observed in a longitudinal data set for a period of T years, then the total variability of family earnings (across families and years), σ^2_{total}, is given by:

$$\sigma^2_{total} = \left(\frac{1}{NT-1}\right)\sum_{i=1}^{N}\sum_{t=1}^{T}\left(y_{it}^{*} - \bar{\bar{y}}^{*}\right)^2 \tag{3}$$

The total variability of family earnings can be decomposed into a permanent and a transitory component. The permanent component measures inequality in families' permanent earnings while the transitory component provides a measure of family earnings instability (Figure 1).[11] The transitory component (for a balanced panel) is given by:

$$\sigma^2_w = \left(\frac{1}{N}\right)\sum_{i=1}^{N}\left[\left(\frac{1}{T-1}\right)\sum_{t=1}^{T}\left(y_{it}^{*} - \bar{y}_i^{*}\right)^2\right] = \left(\frac{1}{N}\right)\sum_{i=1}^{N}\left[\left(\frac{1}{T-1}\right)\sum_{t=1}^{T}\hat{u}_{it}^2\right] \tag{4}$$

and the permanent component is given by:

$$\sigma^2_b = \left(\frac{1}{N-1}\right)\sum_{i=1}^{N}\left(\bar{y}_i^{*} - \bar{\bar{y}}^{*}\right)^2 - \left(\frac{\sigma^2_w}{T}\right) \tag{5}$$

where N is the number of families in the sample and T is the number of years in the observation period. Equation (4) shows that the transitory component, σ^2_w, is an average, across families, of the instability of earnings families experience over a given period.

When we present instability measures for families in various age groups, we estimate age-specific and period-specific age-earnings profiles, i.e., we estimate equation (1) separately for various age groups and each observation period. As a result, we allow the age-earnings profiles of families to differ not only across age groups, but also to change between the late 1980s and the late 1990s. Hence, any steepening or flattening of age-earnings profiles across periods that would be common to all families of a given age group will be captured by our estimation procedure.

11. In Figure 1, an increase in the distance between the age-earnings profiles of high-skilled families and those of low-skilled families will cause an increase in the permanent component (i.e., an increase in inequality) while an increase in the fluctuations of earnings around a given age-earnings profile (e.g., an increase in the distance AB) will cause an increase in the transitory component (i.e., an increase in instability).

Likewise, when we present instability measures for families in various age groups and various tertiles of the earnings distribution, we estimate equation (1) separately by age, tertile and period, thereby estimating 15 models (5 age groups times 3 tertiles) for each 6-year observation period. Hence, for a given age group in a given period, we allow families in the bottom tertile to have a flatter or steeper age-earnings profile than those in the top tertile (Figure 2). By doing so, we can rule out the possibility that families in the bottom tertile and those in the top tertile exhibit different instability patterns simply because of differences in the slope of their tertile-specific age-earnings profile. Second, we allow differences in the age-earnings profiles across tertiles to vary not only across age groups, but also across periods. Third, we allow differences in the age-earnings profiles across age groups to vary not only across tertiles, but also across periods.

While the methodology used by Gottschalk and Moffitt (1994) provides a convenient decomposition of the total variability of family earnings into a permanent and a transitory component, it relies on a specific measure of dispersion of transitory earnings: the *variance* of transitory earnings. Admittedly, this is only one possible measure of dispersion of transitory earnings. The mean absolute deviation (MAD) of family earnings is another measure that can be used to assess the growth in family earnings instability. Compared to σ^2_w (or its square root), it is less sensitive to extreme values of transitory earnings. It is computed as:

$$MAD = \left(\frac{1}{N}\right)\sum_{i=1}^{N}\left[\left(\frac{1}{T}\right)\sum_{t=1}^{T}\left|y_{it}^{*} - \bar{y}_{i}^{*}\right|\right] = \left(\frac{1}{N}\right)\sum_{i=1}^{N}\left[\left(\frac{1}{T}\right)\sum_{t=1}^{T}\left|\hat{u}_{it}\right|\right] \qquad (6)$$

Furthermore, in a model of log family earnings, it has an intuitive interpretation. It measures the average deviation, in percentage terms, of actual family earnings from expected family earnings during the observation period, i.e., the proportion of expected family earnings represented by the distance AB in Figure 1.[12]

To put the mean absolute deviation and σ^2_w on a comparable scale, we also compute the square root of σ^2_w. To ensure the robustness of our findings regarding family earnings instability, we adopt the following strategy. First, we present all results based on both the square root of σ^2_w and MAD in subsequent sections. Second, we show selected results using the two additional instability measures:

Z1 = the square root of the median value of $Z1_i$, where $Z1_i$ equals:

$$Z1_i = \frac{\sum_{T}\hat{u}_{it}^2}{T-1} \qquad (7)$$

Z2 = the median value of $Z2_i$, where $Z2_i$ equals:

$$Z2_i = \frac{\sum_{T}\left|\hat{u}_{it}\right|}{T} \qquad (8)$$

12. One advantage of σ^2_w over MAD is that, under the assumption that u_{it} is normally distributed, σ^2_w follows a Chi-square distribution with *NT-N-K+1*degrees of freedom, thereby allowing us to test whether it differs across groups and/or across observation periods. In contrast, the underlying distribution of MAD is unknown. For these reasons, we perform statistical tests of significance for the former statistic but not for the latter.

While the square root of σ^2_w and MAD are based on averages, Z1 and Z2 are based on medians and thus, provide measures of earnings instability for what might be considered the "typical" Canadian family.

V. Family earnings instability: 1986 to 1991 and 1996 to 2001

In Table 1, we decompose the total variability of family earnings, σ^2_{total}, into its two components: σ^2_b and σ^2_w. For each period, the permanent variance of family earnings, σ^2_b, is by far the most important component of family earnings variability. In each age group, it accounts for at least 73% of the overall variance.[13]

Between the late 1980s and the late 1990s, the total variability of family earnings rose substantially: it increased by 34% overall. Both components of family earnings variability grew between the two periods. However, the permanent component rose 41%, much more than the 10% growth rate observed for the transitory component. Hence, among families where husbands had positive earnings throughout the observation period, family earnings inequality grew much more than family earnings instability.

The permanent component grew faster than the transitory component in all age groups.[14] Whatever age group is considered, family earnings inequality rose at least 26%. In contrast, family earnings instability rose *at most* 18%. Combined with the fact that the permanent component of family earnings is the most important component of family earnings variability, this explains why it ended up accounting for most of the growth in family earnings variability. In all age groups, the growth of permanent earnings inequality accounted for at least 82% of the increase in family earnings variability. Thus, the total variability of family earnings rose mainly because the dispersion of families' permanent earnings became more unequal.[15]

In fact, the growth of family earnings instability is quite limited when we consider alternative measures of instability. Using the mean absolute deviation, family earnings instability remained virtually unchanged at 0.133 in the aggregate, thereby suggesting that families' earnings deviated

13. Interestingly, the transitory variance σ^2_w accounts only for 19% of the total variability of family earnings (0.065/0.341) during the 1996-2001 period. In contrast, it accounts for 29% of the total variability of male and female earnings in the narrow estimation sample used by Beach *et al.* (2003, Table 4) for the 1990-1997 period. As one referee pointed out, this pattern suggests a positive correlation between husbands' and wives' permanent earnings and a negative correlation between their transitory earnings.

14. Among the subsamples of two-filer couples, the permanent component grew faster in all age groups except among couples with husbands aged 25 to 29. In this age group, the permanent component and the transitory component both rose 26%.

15. In Appendix Table 1, we show this substantial growth in inequality in a simple manner by computing, for each age-tertile cell, the average annual discounted earnings families received over a given six-year period. Among families with husbands aged 30 and over, average annual earnings (discounted at a rate of 3%) of families located in the top tertile rose at least 20 percentage points faster than those of their counterparts located in the bottom tertile. The growing earnings gap between the two groups of families was the result of two factors. First, husbands' earnings rose substantially in the top tertile but fell in the bottom tertile. Second, wives' earnings rose at least as fast in the top tertile as they did in the bottom tertile. However, they initially accounted for a larger share of couples' earnings in the top tertile than in the bottom tertile. As a result, they tended to boost earnings growth more among the former group of families than among the latter.

from their permanent earnings by an average of roughly 14% (i.e. $e^{0.133}$ minus one) in both periods (Table 2). Using the square root of σ^2_w as a metric, family earnings instability increased by only 5% overall between the late 1980s and the late 1990s.[16] Among couples with husbands aged 30 and over, family earnings instability: a) either fell or grew at most 4% with MAD, b) rose by *at most* 5% with the square root of σ^2_w, c) either fell or grew at most 5% using the square root of the median value of $Z1_i$ or the median value of $Z2_i$. Taken together, these findings do *not* support the notion that, among the subset of families where husbands had positive employment income in all years, family earnings instability grew substantially between the late 1980s and the late 1990s.

Table 3 confirms this statement. Both the mean absolute deviation and the square root of σ^2_w indicate that family earnings instability grew little among couples with husbands aged 40 and over (with the possible exception of those with husbands aged 45 to 50 and located in the middle and top tertile of the (age-specific) earnings distribution). Among younger families, increases in family earnings instability occurred sometimes in the bottom tertile (for couples with husbands aged 25 to 29), sometimes in the top tertile (for couples with husbands aged 30 to 39), but they were certainly not widespread.

The aforementioned conclusions are based on a comparison of two periods that witnessed different economic conditions. As mentioned above, the 1986-1991 period included the beginning of the 1990-1992 recession—and saw the unemployment rate jump from 8.1% in 1990 to 10.3% in 1991—while the 1996-2001 period was a period of economic expansion. Do these qualitative conclusions hold when we consider two periods that are more comparable in terms of the business cycle, i.e., when we compare the 1984-1989 period to the 1994-1999 period?[17]

The answer is 'yes.' Appendix Table 3 indicates that between these two periods: 1) the total variability of family earnings rose 27% overall, 2) the permanent component grew by 33%, more than three times the 10% growth rate observed overall for the transitory component, 3) in all age groups, family earnings inequality increased by at least 26%, 4) in contrast, family earnings instability (as measured by σ^2_w) rose *at most* 18%, 5) for all age groups, the growth of permanent earnings inequality accounted for at least 80% of the increase in family earnings variability.[18]

16. A careful reader will note that the *level* of instability observed in a given period is much higher using the square root of σ^2_w than using the mean absolute deviation. This reflects the high sensitivity of the former measure to high values of transitory earnings. This pattern can also be seen clearly by comparing Z1, the square root of the *median* value of $Z1_i$, to the square root of σ^2_w (which simply equals the square root of the *average* value of $Z1_i$). It confirms the need to use several measures of instability to assess the robustness of our results. Although conclusions regarding the level of instability observed at a given point in time differ depending on whether MAD or the square root of σ^2_w is considered, conclusions regarding changes in instability over time or differences in instability across groups of families—which constitute the focus of the paper—hold for both measures.

17. Although the period following the 1990-1992 recession witnessed a slower recovery than that following the 1981-1982 recession, the aggregate unemployment rate was fairly similar during the 1984-1989 period and the 1994-1999 period. On average, it amounted to 9.3% and 9.1%, respectively.

18. These results are based on a sample that differs slightly from that used in Table 1. It consists of couples who are intact throughout the observation period (e.g., 1984-1989 or 1994-1999) as well as during the *two* years preceding it (e.g. 1982-1983 or 1992-1993).

VI. Wives' earnings and instability

Over the last two decades, women's labour force participation has grown markedly, leading to a substantial increase in the proportion of families with two earners.[19] As a result, for a growing fraction of families, the risk of job loss is now spread across two earners rather than being concentrated on a single worker. In this context, one important question is: to what extent do wives' earnings mitigate the instability of earnings experienced by husbands?

Wives' employment income can reduce earnings instability in numerous ways. In the case of dual-earner couples, the mere presence of a female earner implies that a given negative shock to husbands' earnings is associated with a smaller decrease—in *relative* terms—in couples' earnings than the one which would have been observed in the absence of a second earner. Second, there may be an "added worker effect" (Stephens, 2002), i.e., a negative shock to husbands' earnings due to job loss may induce an increase in wives' workhours. Third, wives can change their hours of work in response to unexpected shifts in the hourly wages of their husbands (Hyslop, 2001). While disentangling these effects is beyond the scope of the paper, one simple way of assessing the impact of wives' earnings on instability is to compare the instability of *husbands*' earnings to the instability of earnings experienced by *couples*. To do so, we first estimate equation (1) using husbands' (log) earnings as a dependent variable. Next, we re-estimate equation (1) using couples' (log) earnings as a dependent variable. From both sets of regressions, we then derive measures of earnings instability.[20]

Whatever instability measure is used, wives' earnings appear to reduce instability in a non-negligible way. Using the square root of σ^2_w, instability in couples' earnings is 26% lower than instability in husbands' earnings during the 1996-2001 period (0.256/0.344 minus one) in the aggregate (Table 4). Using the mean absolute deviation, the corresponding difference between couples' earnings instability and husbands' earnings instability amounts to 16% (0.124/0.147 minus one) during that period.[21]

During the 1996-2001 period, the stabilization role played by wives' earnings appears to have been more pronounced among older couples. For instance, among couples where husbands are aged 45 to 50, adding wives' earnings to husbands' earnings tends to reduce the mean absolute deviation by 3.0 *percentage points* (0.156–0.126). In contrast, the corresponding decrease amounts to only 1.9 percentage point (0.152–0.133) among couples where husbands are aged 30 to 34.

19. Data from the Labour Force Survey indicate that women's labour force participation rate (among those aged 15 and over) amounted to 62.1% in 2004, up from 50.6% in 1980.

20. Admittedly, such a comparison has certain limitations. For instance, it does not tell us what would have been the instability of the earnings of husbands *if they had not been married*. This is so since men's labour supply may vary depending on whether or not they are married. Nevertheless, comparing husbands' earnings instability and couples' earnings instability allows us to assess whether husbands' *observed* earnings instability appears, in fact, to be mitigated by wives' employment income.

21. During the 1986-1991 period, instability in couples' earnings is 22% (9%) lower than instability in husbands' earnings using the square root of σ^2_w (MAD).

In a recent study using a time series of cross-sectional data, Johnson and Kuhn (2004) have shown that wages of male workers in the bottom of the earnings distribution tend to be more sensitive to business cycle fluctuations than those of other males. As a result, one would expect husbands' employment income to be more unstable among families with relatively low earnings (prior to the observation period over which instability is measured) than among others.

Table 5 confirms this hypothesis. For both the square root of σ^2_w and MAD, the employment income of *husbands* aged under 45 and living in families located in the bottom tertile of the (age-specific) earnings distribution was, during the 1996-2001 period, at least 1.57 times more unstable than that of their counterparts living in families located in the top tertile.[22,23] For instance, among husbands aged 30 to 34, instability in husbands' earnings, as measured by MAD, was 71% higher in the bottom tertile than it was in the top tertile (0.205 vs 0.120). These dramatic differences in husbands' earnings instability raise the following question: do wives' earnings tend to reduce instability in employment income *more* among families located in the bottom third of the earnings distribution than among their counterparts located in the top tertile?

The answer to that question appears to be positive among couples where husbands are aged under 45. For these couples, wives' earnings reduce the mean absolute deviation of employment income by up to 3.2 percentage points in the bottom tertile, compared to, at most, 1.7 percentage point in the top tertile. Likewise, adding wives' earnings to husbands' earnings reduces the value of the square root of σ^2_w more in the bottom tertile than in the top tertile for couples with husbands under 45, but not for older couples.

Even though wives' earnings seem to reduce instability to a larger extent in the bottom tertile, the extent to which they do so never suffices to eliminate the substantial instability differences that are observed between the bottom tertile and the top tertile. As a result, couples' earnings instability remains always higher at the bottom of the earnings distribution than at the top. For example, for both periods and both instability measures, *couples* with husbands aged under 45 and located in the bottom tertile have employment income that is at least 1.54 times more unstable than that of their counterparts located in the top tertile. Whether such differences persist when government transfers and taxes are considered is an issue we examine in the next section.[24]

VII. Instability and the tax and transfer system

It is well known that the Employment Insurance (EI) program and Social Assistance (SA) compensate partially for the loss of employment income experienced by family members as a

22. This conclusion also holds for the 1986-1991 period.

23. We investigate the sources of these differences in Appendix 1. We show that the relatively high earnings instability experienced by husbands living in families located in the bottom tertile appears to be mainly related to negative events such as job loss or end of contracts rather than positive events such as unexpected bonuses or wage increases.

24. Wives' earnings also appear to have moderated somewhat the growth in family earnings instability between the 1980s and the 1990s. This can be seen by noting that: a) the growth in couples' earnings instability has generally been lower than the growth in husbands' earnings instability (Table 4), and b) except among couples with husbands aged 45-50, the growth in couples' earnings instability has been virtually identical to the growth in family earnings instability (Tables 2 and 4).

result of job loss or prolonged periods of unemployment. Other transfers, such as refundable tax credits and the Canada Child Tax Benefit (CCTB), provide additional sources of income that may shift upward the age-income profile of families and thus, reduce the proportional income losses they may experience as a result of negative earnings shocks. Because of its progressivity, the tax system also tends to reduce the volatility of family income, restricting both income gains and income losses (Kniesner and Ziliak, 2002).

To assess the extent to which government transfers and personal taxes reduce the differences in instability that are observed across segments of the (family-level) earnings distribution, we reestimate equation (1) using a wide variety of income concepts: a) family market income, b) family market income plus EI benefits, c) family market income plus EI and SA benefits, d) family market income plus EI/SA benefits and refundable tax credits, e) family market income plus EI/SA benefits, refundable tax credits and family-related benefits (i.e., the Canada Child Tax Benefit plus provincially-funded family-related benefits), f) post-transfer before tax family income, g) post-transfer after-tax family income, and h) post-transfer after-tax family income adjusted for family size. Since we have already analyzed instability in husbands' earnings, couples' earnings and family earnings, we consider a total of 11 income concepts. In all cases, the specification of equation (1) remains unchanged but the dependent variable changes depending on the income concept used.[25] Table 6 shows the results.

The first point to note is that even after taking account of wives' earnings, earnings of other family members, and other sources of market income, sizable differences in instability persist between families in the bottom tertile of the earnings distribution and those in the top tertile: in all age groups and for both the square root of σ^2_w and the mean absolute deviation, family market income in the former group is at least 1.51 times more unstable than in the latter.

Government transfers attenuate these differences considerably, however. First, depending on the instability measure used, simply adding EI benefits to family market income reduces these differences in instability by 22% to 39%. For instance, adding EI benefits to family market income reduces the mean absolute deviation by 2.5 percentage points (0.160–0.135) among families with husbands aged 35 to 39 and located in the bottom tertile. The corresponding reduction among their counterparts located in the top tertile is more limited: it amounts to only 0.5 percentage point (0.105–0.100). As a result, the differences in instability observed between the former group of families and the latter drop from 5.5 percentage points (0.160–0.105) to 3.5 percentage points (0.135–0.100), i.e., by 36%, when we add EI benefits to family market income.

Second, incorporating income from Social Assistance reduces these differences further. As expected, the inclusion of SA benefits reduces instability in the bottom tertile but has, in all age groups, generally no effect on instability in the middle and top tertiles. In fact, including both EI and SA benefits reduce the instability gap between the bottom tertile and the top tertile by 40% to

25. In all cases, the dependent variable is specified in natural logarithms. We define family market income as the sum of family earnings, interest, dividends, limited partnership income, net rental income, alimony or separation allowances and other market income. Refundable tax credits include provincial refundable tax credits and the Goods and Services Tax Credit. Post-transfer before tax family income includes, apart from EI benefits, SA benefits, refundable tax credits and family-related benefits, net federal supplements and Workers' Compensation. Post-transfer after-tax family income is adjusted for family size by dividing it by the square root of family size.

64% among families with husbands aged under 45. Among older families, the stabilization role of EI and SA benefits induces a drop in instability differences that varies between 31% and 47%.

Third, other government transfers also play a non-negligible role in reducing the differences in instability observed across the distribution of family earnings. As expected, adding refundable tax credits to EI and SA benefits has generally no effect on instability in the top tertile. Moving from family market income to post-transfer before tax family income (i.e., adding EI benefits, SA benefits and all other government transfers to family market income) reduces the instability differences (between the bottom tertile and the top tertile) by 60% to 97% among families with husbands under 45 and by 48% to 69% among older families.

Finally, taking account of the progressivity of the tax system reduces further the differences in instability observed between families in the bottom third and those in the top third of the earnings distribution. *During the 1996-2001 period, the tax and transfer system has eliminated at least 73% (and up to all) of the differences in instability in family market income (measured in terms of proportional income gains/losses) that were observed, between the bottom tertile and the top tertile, among families with husbands aged under 45*. Among older families, the tax and transfer system has eliminated between 59% and 78% of these differences. This can be seen by comparing instability measures associated with family market income with those associated with post-transfer after-tax family income. Thus, government transfers and taxes have played a key role in reducing the proportional income losses that families at the bottom of the earnings distribution may face as a result of negative earnings shocks.

Government transfers and taxes have also reduced the degree of instability, measured in *absolute* terms, that these families face. For instance, the mean absolute deviation implies that families in the bottom tertile with husbands aged 35 should have seen their market income deviate, on average, by $5,600 from their expected market income (Table 7). However, their after-tax family income deviated from their expected after-tax family income by only $3,800, on average.[26] In all age groups, taxes and transfers appear to have reduced instability in the bottom tertile by between $1,700 and $1,900, with most of the reduction in absolute terms generally coming from the tax system. For families located in the top tertile, the corresponding reduction varies between $2,700 and $4,400. Nevertheless, government transfers and taxes have reduced instability, measured in relative terms, much more in the bottom tertile than in the top tertile simply because, taken together, they have increased family income proportionately more in the former group than in the latter.[27]

26. These numbers are obtained as follows. First, we compute two predicted values from the log earnings/income equations, assuming a given age for husbands, $e_i = 0$, and either a positive or a negative shock u_{it} equal to the value of the mean absolute deviation (MAD). Next, we take the antilog of these two predicted values, compute their difference and divide it by 2. Finally, the numbers are rounded to the nearest 100 to comply with confidentiality requirements.

27. Interestingly, families in the bottom tertile face less instability, measured in *absolute* terms, than their counterparts located in the top tertile. However, because average earnings in the bottom tertile are much lower than in the top tertile, the former group ends up facing much greater proportional income gains/losses than the latter. The same argument applies for the comparison between husbands' earnings instability and couples' earnings instability.

Taken together, the results of Tables 6 and 7 suggest that government transfers and taxes play a dual role. First, they reduce the fluctuations of income that families face in absolute terms. Second, by shifting upward the age-income profile of families in the bottom of the earnings distribution, they ensure that, even if negative earnings shocks do occur, these families will be able to rely on higher levels of income (e.g., to finance consumption on necessities) than those they would otherwise had in the absence of net transfers. As a result, they reduce the proportional income losses associated with these negative earnings shocks, attenuate the potentially negative consequences of these shocks on consumption, and thus, increase the economic security of families located at the bottom of the earnings distribution.

VIII. Further robustness checks

In order to test the robustness of our findings, we performed several additional robustness checks. First, in order to allow the idiosyncratic shocks u_{it}: a) to be correlated with families' unobserved skills e_i and, b) to be serially correlated over time, we reestimated equation (1) using a fixed-effects model in which the error term u_{it} followed an AR(1) process. We did so for both pairs of periods: a) 1986-1991 versus 1996-2001 and, b) 1984-1989 versus 1994-1999. The resulting estimates of MAD and of the square root of σ^2_w confirmed our initial conclusion: family earnings instability changed little between the late 1980s and the late 1990s for the sample of families considered in this study (Appendix Tables 4 and 5).

Second, we replicated Table 6 using the aforementioned econometric specification (Appendix Table 6). The results confirm that sizable differences in instability exist between families in the bottom tertile and those in the top tertile: whether the mean absolute deviation or the square root of σ^2_w is used, family market income in the former group is at least 1.43 times more unstable than in the latter. Once again, the tax and transfer system eliminates a substantial portion of the instability differences observed between families in the bottom tertile and those in the top tertile. For example, the results indicate that, taken together, all components of the tax and transfer system have eliminated, during the 1996-2001 period, at least 75% of the differences in instability in family market income that were observed, between the bottom tertile and the top tertile, among families with husbands aged under 45.

Third, we also replicated Table 6 for the broad sample defined above, using equation (1). Again, our conclusions are confirmed. For both the mean absolute deviation or the square root of σ^2_w, family market income in the bottom tertile is always at least 1.51 times more unstable than in the top tertile (Appendix Table 7). Furthermore, the tax and transfer system has eliminated, during the 1996-2001 period, at least 62% (and up to 92%) of the differences in instability in family market income that were observed, between the bottom tertile and the top tertile, among families with husbands aged under 45.

Finally, we replicated Table 1 using the broad sample defined above (Appendix Table 8). In all age groups, family earnings inequality rose at least 16% while family earnings instability rose at most 9%. As a result, at least 77% of the increase in the total variability of family earnings was due to an increase in the permanent component. Thus, these results confirm our conclusion that

the total variability of family earnings rose mainly because the dispersion of families' permanent earnings became more unequal.[28]

IX. The role of family-related benefits

We examine, for the broad sample defined above, the role of family-related benefits in greater depth by distinguishing families who had children under 18 at some point during the 1996-2001 period from other families (Appendix Tables 9 and 10). As expected, families without children are not affected by these benefits. Families with children under 18, on the other hand, experience a drop in the instability of their income, as estimated by either MAD or the square root of σ^2_w. For families with children in the bottom tertile and in the 30-34 age group, provincially-funded family-related benefits (FABEN) reduce income instability (estimated by MAD) by 0.4 percentage points (from 0.162 to 0.158), while the Canada Child Tax Benefit program (CCTB) brings an additional 1.2 percent reduction, which results in a combined reduction of 1.6 percentage points (from 0.162 to 0.146).

In general, the drop in instability associated with family-related benefits is much larger for the families in the bottom tertile than in the top tertile. Overall, it appears that family-related benefits produce their intended effects, i.e., reduce the income instability of families who have children and have fairly low earnings, without affecting families without children and high-income families.

X. Conclusion

Despite its potentially important implications for the well-being of Canadian families, remarkably little attention has been devoted so far to the analysis of family earnings instability and family income instability. The contribution of this study is to fill this gap. Using data from the Longitudinal Administrative Databank, we have uncovered four key patterns.

First, among the subset of families who have been intact over a ten-year period (whether or not husbands had positive earnings and whether or not couples had self-employment income), our results do not support the view that Canadian families experienced a *widespread* increase in earnings instability over the last two decades. Instead, they indicate that conclusions regarding changes in family earnings instability vary depending on the age group and the employment income tertile considered.

Second, our results show that in all age groups, long-term family earnings inequality, as measured by the variance of families' permanent (log) earnings, rose substantially between the late 1980s and the late 1990s. Thus, both the Canadian labour market and the demographic factors that affect the skill composition of Canadian families (e.g., the growing tendency of men and women with similar levels of education to live together) have tended to produce an increasingly unequal distribution of family earnings in recent years. Because these forces have

28. Among the subsamples of two-filer couples, family earnings inequality rose at least as much as family earnings instability in all age groups except among the 25-29 age category. In all age groups, at least 62% of the increase in the total variability of family earnings was due to an increase in the permanent component.

been only partially offset by the tax and transfer system, inequality in after-tax family income rose during the 1990s (Frenette *et al*., 2004).

Third, in all age groups, wives' employment income reduces the proportional income losses that families face as a result of negative earnings shocks. Although we find some evidence that the stabilizing role of wives' earnings is more pronounced among couples with relatively low earnings than among others, dramatic differences in instability persist across the earnings distribution: families in the bottom tertile of the earnings distribution (prior to the observation period) display much more unstable employment income, in relative terms, than their counterparts in the top tertile.

Fourth, government transfers substantially reduce the family-level differences in instability, measured in terms of proportional income gains/losses, that are observed across earnings tertiles. While the progressivity of the tax system reduces these differences to a lesser extent, it still plays an important role in reducing instability, measured in absolute terms, in all tertiles.

Our results bring to the forefront the crucial role played by government transfers in stabilizing the income of Canadian families at the bottom of the earnings distribution. Combined with the tax system, the whole set of government transfers have substantially reduced the differences in instability that were observed across segments of the earnings distribution during the 1996-2001 period. As such, our results remind us of a simple lesson: the optimal size of government transfers depends not only on their costs (in terms of their distorting effects on worker and firm behaviour), but also on the benefits they generate, in terms of economic security. For instance, the optimal size of an insurance program like EI depends not only on its costs (e.g., in terms of work disincentives) but also on the benefits it generates in terms of smoothing consumption over time (Baily, 1978; Gruber, 1997) and reducing income instability. While the question of whether the size of various government transfers is currently optimal remains open to debate, our results make it clear that any discussion of this issue should consider both the distorting effects of transfers and the fact that they reduce economic insecurity for a substantial portion of the Canadian population.

Table 1: Decomposition of family earnings variability, 1986-1991 versus 1996-2001

Age of husbands at the beginning of the period	1986-1991			1996-2001			Percentage change between periods		
	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]
25-29	0.254	0.186	0.068	0.314	0.235	0.080	24	26	18
30-34	0.245	0.187	0.059	0.316	0.253	0.063	29	35	7
35-39	0.246	0.194	0.052	0.326	0.268	0.057	33	38	10
40-44	0.247	0.193	0.054	0.320	0.267	0.053	30	38	-2
45-50	0.284	0.214	0.070	0.360	0.280	0.079	27	31	13
25-50	0.255	0.196	0.059	0.341	0.276	0.065	34	41	10

Note: The permanent variance and the transitory variance may not add to the total variance due to rounding.

Source: Longitudinal Administrative Databank.

Table 2: Selected measures of family earnings instability, 1986-1991 versus 1996-2001

Age of husbands at the beginning of the period	Square root of σ^2_w			Mean absolute deviation		
	1986-1991	1996-2001	% change*	1986-1991	1996-2001	% change
25-29	0.260	0.282	**8**	0.145	0.155	7
30-34	0.242	0.252	**4**	0.129	0.134	4
35-39	0.228	0.240	**5**	0.121	0.125	3
40-44	0.233	0.229	**-2**	0.127	0.121	-5
45-50	0.264	0.282	**7**	0.148	0.142	-4
25-50	0.244	0.255	**5**	0.133	0.132	-1
	Z1			**Z2**		
Age of husbands at the beginning of the period	1986-1991	1996-2001	% change	1986-1991	1996-2001	% change
25-29	0.141	0.150	6	0.108	0.115	6
30-34	0.121	0.127	5	0.092	0.096	4
35-39	0.112	0.113	1	0.085	0.086	1
40-44	0.121	0.111	-8	0.092	0.085	-8
45-50	0.148	0.131	-11	0.114	0.100	-13
25-50	0.127	0.122	-4	0.097	0.093	-5

* Percentage changes for the square root of σ^2_w are in shaded areas (bold) whenever the transitory variance σ^2_w differs between the two periods at the 1% (5%) level [two-tailed test]. See text for details.

Source: Longitudinal Administrative Databank.

Table 3: Family earnings instability by employment income tertile, 1986-1991 versus 1996-2001

I. Square root of σ^2_w	1986-1991			1996-2001			Percentage change between periods*		
Age of husbands at the beginning of the period	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
25-29	0.336	0.216	0.204	0.383	0.221	0.198	14	2	-3
30-34	0.318	0.197	0.186	0.327	0.196	0.207	3	**-1**	11
35-39	0.302	0.190	0.170	0.312	0.188	0.195	3	-1	15
40-44	0.300	0.201	0.179	0.304	0.175	0.182	1	-13	2
45-50	0.322	0.241	0.217	0.333	0.263	0.238	3	9	10
25-50	0.313	0.210	0.190	0.324	0.213	0.214	4	1	13

II. Mean absolute deviation	1986-1991			1996-2001			Percentage change between periods		
Age of husbands at the beginning of the period	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
25-29	0.190	0.125	0.119	0.210	0.131	0.118	11	5	-1
30-34	0.172	0.110	0.104	0.175	0.111	0.113	2	1	9
35-39	0.165	0.105	0.093	0.166	0.102	0.104	1	-3	12
40-44	0.170	0.113	0.097	0.164	0.100	0.097	-4	-12	0
45-50	0.190	0.139	0.116	0.179	0.129	0.117	-6	-7	1
25-50	0.176	0.119	0.105	0.174	0.115	0.110	-1	-3	5

* Percentage changes for the square root of σ^2_w are in shaded areas (bold) whenever the transitory variance σ^2_w differs between the two periods at the 1% (5%) level [two-tailed test].

Source: Longitudinal Administrative Databank.

Table 4: Wives' earnings and instability

Instability in:	1986-1991 (a) Husbands' earnings	1986-1991 (b) Couples' earnings	1996-2001 (a) Husbands' earnings	1996-2001 (b) Couples' earnings	Percentage change between periods (a) Husbands' earnings	Percentage change between periods (b) Couples' earnings
I. Square root of σ^2_w						
Age of husbands at the beginning of the period						
25-29	0.327	0.260	0.361	0.282	10	8
30-34	0.307	0.242	0.328	0.251	7	4
35-39	0.296	0.229	0.317	0.240	7	5
40-44	0.298	0.232	0.309	0.228	4	-2
45-50	0.328	0.256	0.398	0.289	21	13
25-50	0.309	0.242	0.344	0.256	11	6
II. Mean absolute deviation						
Age of husbands at the beginning of the period						
25-29	0.159	0.145	0.174	0.155	9	7
30-34	0.141	0.129	0.152	0.133	8	3
35-39	0.131	0.119	0.142	0.122	8	3
40-44	0.130	0.116	0.134	0.113	3	-3
45-50	0.142	0.125	0.156	0.126	10	1
25-50	0.138	0.125	0.147	0.124	7	-1

Source: Longitudinal Administrative Databank.

Table 5: Wives' earnings and instability, by employment income tertile, 1996-2001

I. Square root of σ^2_w	Bottom tertile		Middle tertile		Top tertile	
Age of husbands at the beginning of the period	(a) Husbands' earnings instability	(b) Couples' earnings instability	(a) Husbands' earnings instability	(b) Couples' earnings instability	(a) Husbands' earnings instability	(b) Couples' earnings instability
25-29	0.464	0.383	0.326	0.220	0.257	0.198
30-34	0.416	0.326	0.281	0.196	0.261	0.207
35-39	0.404	0.313	0.267	0.188	0.257	0.196
40-44	0.399	0.304	0.253	0.173	0.251	0.181
45-50	0.435	0.337	0.375	0.272	0.378	0.249

II. Mean absolute deviation	Bottom tertile		Middle tertile		Top tertile	
Age of husbands at the beginning of the period	(a) Husbands' earnings instability	(b) Couples' earnings instability	(a) Husbands' earnings instability	(b) Couples' earnings instability	(a) Husbands' earnings instability	(b) Couples' earnings instability
25-29	0.240	0.210	0.154	0.131	0.123	0.118
30-34	0.205	0.174	0.128	0.111	0.120	0.113
35-39	0.192	0.162	0.116	0.100	0.117	0.103
40-44	0.185	0.153	0.108	0.091	0.110	0.093
45-50	0.191	0.158	0.140	0.113	0.141	0.110

Source: Longitudinal Administrative Databank.

Table 6: Instability and the tax and transfer system, 1996-2001

Families with husbands aged:	Square root of σ^2_w			Mean absolute deviation		
	Bottom tertile*	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
25-29 years						
1. Husbands' earnings	0.464	0.326	0.257	0.240	0.154	0.123
2. Couples' earnings	0.383	0.220	0.198	0.210	0.131	0.118
3. Family earnings	0.383	0.221	0.198	0.210	0.131	0.118
4. Family market income = MI	0.349	0.214	0.197	0.198	0.129	0.118
5. MI + EI	0.296	0.183	0.178	0.165	0.109	0.103
6. MI + EI + SA	0.249	0.183	0.178	0.148	0.109	0.102
7. MI + EI + SA + Tax credits = MIB	0.235	0.180	0.177	0.142	0.108	0.102
8. MIB + Family-related benefits	0.209	0.171	0.172	0.129	0.103	0.100
9. Post-transfer before tax income	0.203	0.166	0.169	0.126	0.101	0.099
10. Post-transfer after-tax income	0.180	0.149	0.155	0.109	0.090	0.091
11. Post-transfer after-tax income s.a.*	0.186	0.163	0.172	0.115	0.102	0.106
30-34 years						
1. Husbands' earnings	0.416	0.281	0.261	0.205	0.128	0.120
2. Couples' earnings	0.326	0.196	0.207	0.174	0.111	0.113
3. Family earnings	0.327	0.196	0.207	0.175	0.111	0.113
4. Family market income = MI	0.308	0.193	0.196	0.169	0.111	0.112
5. MI + EI	0.262	0.170	0.184	0.140	0.097	0.103
6. MI + EI + SA	0.228	0.167	0.184	0.130	0.097	0.103
7. MI + EI + SA + Tax credits = MIB	0.215	0.165	0.183	0.126	0.097	0.103
8. MIB + Family-related benefits	0.192	0.159	0.181	0.115	0.094	0.102
9. Post-transfer before tax income	0.182	0.153	0.179	0.111	0.092	0.101
10. Post-transfer after-tax income	0.162	0.141	0.169	0.097	0.084	0.094
11. Post-transfer after-tax income s.a.*	0.166	0.151	0.180	0.101	0.091	0.103
35-39 years						
1. Husbands' earnings	0.404	0.267	0.257	0.192	0.116	0.117
2. Couples' earnings	0.313	0.188	0.196	0.162	0.100	0.103
3. Family earnings	0.312	0.188	0.195	0.166	0.102	0.104
4. Family market income = MI	0.291	0.182	0.189	0.160	0.102	0.105
5. MI + EI	0.245	0.166	0.183	0.135	0.094	0.100
6. MI + EI + SA	0.220	0.165	0.183	0.128	0.094	0.100
7. MI + EI + SA + Tax credits = MIB	0.211	0.163	0.182	0.124	0.094	0.100
8. MIB + Family-related benefits	0.192	0.157	0.180	0.115	0.092	0.100
9. Post-transfer before tax income	0.183	0.152	0.178	0.111	0.089	0.099
10. Post-transfer after-tax income	0.166	0.144	0.171	0.100	0.084	0.094
11. Post-transfer after-tax income s.a.*	0.167	0.148	0.175	0.102	0.087	0.097

Table 6: Instability and the tax and transfer system, 1996-2001 (*concluded*)

Families with husbands aged:	Square root of σ^2_w			Mean absolute deviation		
	Bottom tertile*	**Middle tertile**	**Top tertile**	**Bottom tertile**	**Middle tertile**	**Top tertile**
40-44 years						
1. Husbands' earnings	0.399	0.253	0.251	0.185	0.108	0.110
2. Couples' earnings	0.304	0.173	0.181	0.153	0.091	0.093
3. Family earnings	0.304	0.175	0.182	0.164	0.100	0.097
4. Family market income = MI	0.280	0.170	0.179	0.158	0.101	0.099
5. MI + EI	0.239	0.159	0.175	0.137	0.095	0.096
6. MI + EI + SA	0.222	0.159	0.175	0.132	0.095	0.096
7. MI + EI + SA + Tax credits = MIB	0.213	0.159	0.175	0.130	0.095	0.097
8. MIB + Family-related benefits	0.200	0.157	0.174	0.123	0.094	0.096
9. Post-transfer before tax income	0.190	0.152	0.173	0.119	0.092	0.096
10. Post-transfer after-tax income	0.177	0.147	0.171	0.110	0.090	0.094
11. Post-transfer after-tax income s.a.*	0.171	0.144	0.171	0.107	0.088	0.094
45-50 years						
1. Husbands' earnings	0.435	0.375	0.378	0.191	0.140	0.141
2. Couples' earnings	0.337	0.272	0.249	0.158	0.113	0.110
3. Family earnings	0.333	0.263	0.238	0.179	0.129	0.117
4. Family market income = MI	0.293	0.195	0.194	0.168	0.116	0.107
5. MI + EI	0.256	0.184	0.190	0.150	0.111	0.105
6. MI + EI + SA	0.243	0.184	0.190	0.147	0.111	0.105
7. MI + EI + SA + Tax credits = MIB	0.236	0.182	0.189	0.145	0.111	0.105
8. MIB + Family-related benefits	0.229	0.181	0.188	0.141	0.110	0.105
9. Post-transfer before tax income	0.218	0.175	0.187	0.136	0.108	0.104
10. Post-transfer after-tax income	0.206	0.175	0.184	0.129	0.108	0.104
11. Post-transfer after-tax income s.a.*	0.186	0.161	0.177	0.115	0.097	0.099

* Post-transfer after-tax income adjusted for family size.

Note: The square root of σ^2_w in the bottom tertile is in shaded areas (bold) whenever σ^2_w in the bottom tertile is significantly higher than σ^2_w in the top tertile at the 1% (5%) level.

Source: Longitudinal Administrative Databank.

Table 7: Instability in absolute terms, and the tax and transfer system, 1996-2001

Families with husbands aged:	25 years			30 years			35 years		
	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
1. Husbands' earnings	4,400	4,900	5,300	4,900	5,000	6,700	5,000	5,300	7,100
2. Couples' earnings	5,100	6,200	8,100	5,400	6,600	9,900	5,500	6,400	10,600
3. Family earnings	5,100	6,100	8,100	5,500	6,600	9,900	5,300	6,700	10,300
4. Family market income = MI	4,900	5,800	8,200	5,200	6,300	9,400	5,600	6,300	10,000
5. MI + EI	4,600	5,500	7,500	4,900	6,200	8,900	5,100	6,100	10,100
6. MI + EI + SA	4,400	5,500	7,400	4,900	6,200	8,900	5,100	6,100	10,100
7. MI + EI + SA + Tax credits = MIB	4,500	5,400	7,400	4,700	6,200	9,000	4,800	6,100	10,100
8. MIB + Family-related benefits	4,300	5,400	7,400	4,600	6,000	8,900	4,900	6,600	10,000
9. Post-transfer before tax income	4,300	5,300	7,400	4,400	5,900	9,600	4,800	6,400	9,800
10. Post-transfer after-tax income	3,200	3,700	5,300	3,300	4,300	6,400	3,800	4,200	7,300
11. Post-transfer after-tax income s.a.*	1,900	2,600	3,700	1,800	2,400	4,000	1,800	2,300	3,800

Families with husbands aged:	40 years			45 years		
	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
1. Husbands' earnings	5,100	5,800	7,700	5,500	7,400	10,900
2. Couples' earnings	5,600	6,600	10,800	6,200	8,600	13,100
3. Family earnings	6,200	6,700	9,800	7,400	10,200	14,200
4. Family market income = MI	6,100	7,100	11,500	7,300	9,200	13,000
5. MI + EI	5,800	7,200	10,500	7,100	9,000	12,900
6. MI + EI + SA	5,800	7,200	10,500	7,000	9,000	12,900
7. MI + EI + SA + Tax credits = MIB	5,600	7,200	10,500	7,000	9,000	12,900
8. MIB + Family-related benefits	5,400	6,700	10,300	7,000	9,000	12,900
9. Post-transfer before tax income	5,200	6,500	10,100	6,900	8,900	12,800
10. Post-transfer after-tax income	4,400	5,300	7,100	5,500	6,800	9,300
11. Post-transfer after-tax income s.a.*	2,100	2,500	3,700	2,600	3,200	4,700

* Post-transfer after-tax income adjusted for family size.

Source: Longitudinal Administrative Databank.

Figure 1: Permanent versus transitory variance components

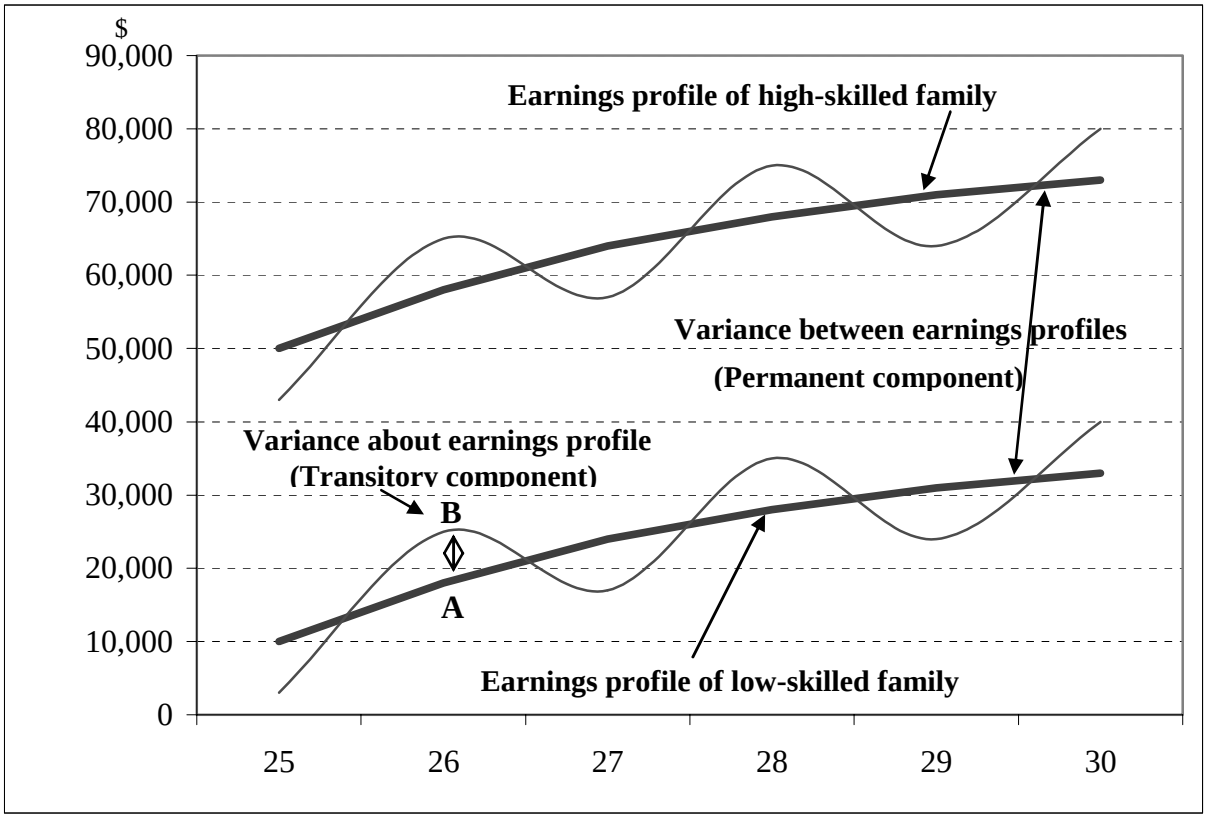
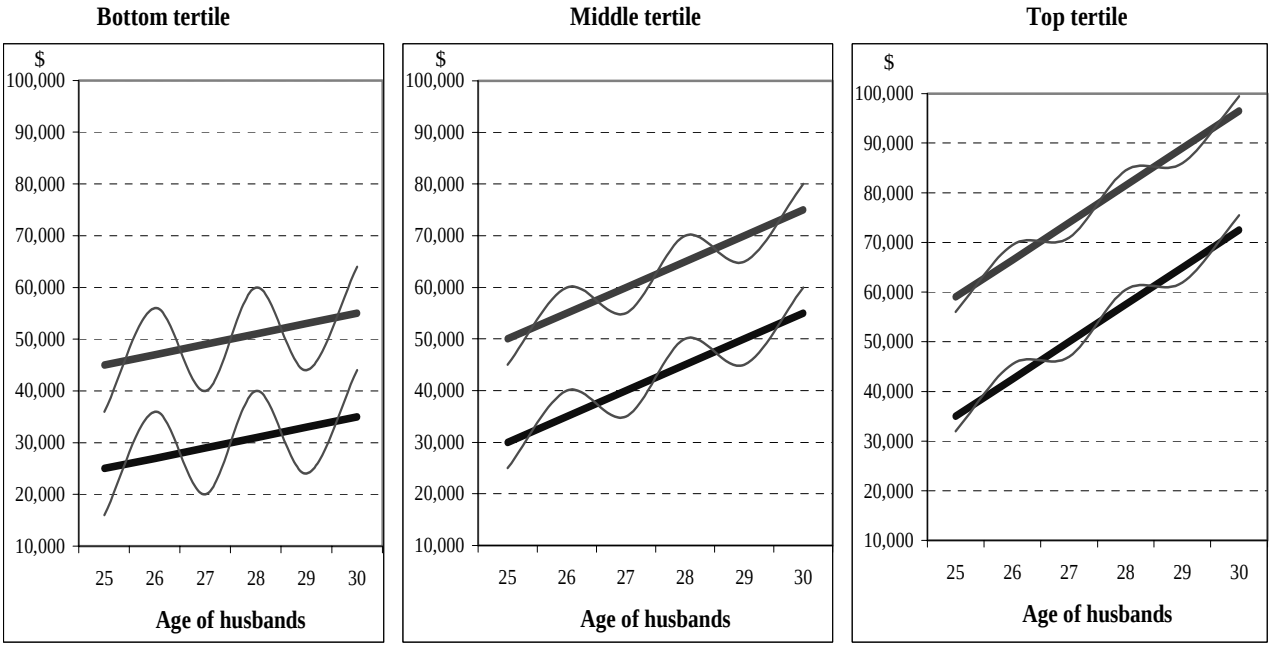


Figure 2: Hypothetical earnings of young families, by tertile



Note: The thick line represents families' age-earnings profiles in the absence of shocks while the thin line represents families' actual earnings.

Appendix Table 1: Average annual discounted earnings, 1986-1991 and 1996-2001

	1986-1991			1996-2001			% change between periods		
	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
I. Family earnings									
Age*									
25-29	40,100	57,100	75,900	40,200	58,600	85,100	0	3	12
30-34	44,000	63,400	87,100	44,600	67,900	106,000	1	7	22
35-39	47,300	69,200	98,600	46,800	73,300	119,400	-1	6	21
40-44	51,400	75,200	107,800	51,400	79,800	128,900	0	6	20
45-50	52,800	75,400	110,000	53,900	83,000	134,700	2	10	22
II. Husbands' earnings									
Age*									
25-29	32,000	43,900	54,900	30,400	41,600	58,100	-5	-5	6
30-34	35,000	48,900	61,900	33,200	47,800	71,900	-5	-2	16
35-39	36,900	52,500	68,200	34,100	51,300	81,700	-8	-2	20
40-44	37,400	54,000	72,800	35,700	53,600	85,600	-5	-1	18
45-50	35,800	51,100	71,900	35,100	53,500	87,000	-2	5	21
III. Wives' earnings									
Age*									
25-29	8,100	13,200	21,000	9,800	17,000	27,000	21	29	29
30-34	8,900	14,400	25,100	11,200	19,900	34,000	26	38	35
35-39	9,300	15,400	29,300	11,700	20,900	36,800	26	36	26
40-44	9,500	16,100	30,300	12,100	22,000	39,500	27	37	30
45-50	8,300	14,500	28,700	11,500	21,400	39,800	39	48	39

* Age of husbands at the beginning of the 6-year observation period.

Source: Longitudinal Administrative Databank.

Appendix 1

To understand why husbands' earnings instability is much higher in the bottom tertile than in the top tertile, we regress individual-specific values of husbands' earnings instability (i.e., the logarithm of $Z1_i$) on a constant, tertiles indicators (bottom tertile and middle tertile : the top tertile is the omitted category), a binary variable for whether husbands received Employment Insurance benefits at some point during the 1996-2001 period, and a binary variable for whether husbands were covered by a registered pension plan in 1996.

The results are shown below. They indicate that among husbands aged 30 or more, *at least* half (and up to all) of the differences in earnings instability observed during the 1996-2001 period (between those living in families located in the bottom tertile and their counterparts living in families located in the top tertile) can be explained simply by the fact that husbands in the bottom tertile were much more likely to be temporarily or permanently laid-off (as proxied by whether or not they received EI benefits at some point during the 1996-2001 period) than their counterparts in the top tertile. Adding to the EI receipt indicator an indicator measuring the relatively low propensity of husbands in the bottom tertile to be covered by a pension plan in 1996 (a proxy for their relatively high propensity to be employed in small firms) helps explain at least 72% of these differences.[29]

Since: a) pension coverage is highly (positively) correlated with firm size (Frenken and Maser, 1992), b) layoff rates are much higher in small firms than in larger ones (Morissette, 2004), and c) temporary employment is more frequent in small firms than in larger ones,[30] our indicator of (or lack of) pension coverage may also capture layoffs experienced in the bottom tertile by males not eligible to EI as well as end of contracts associated with temporary jobs. Taken together, the indicator for EI receipt and the indicator of (or lack of) pension coverage suggest that the relatively high levels of earnings instability experienced by husbands in the bottom tertile appear to be mainly related to negative events such as job loss or end of contracts rather than positive events such as unexpected bonuses or wage increases.

29. Among husbands aged 30 and over, at least 62% of the differences in earnings instability (between the bottom and top tertile) can be explained by the two aforementioned indicators when $Z1_i$ is used as a dependent variable (rather than its logarithm).

30. Data from the Labour Force Survey show that between 1997 and 2001, the incidence of temporary employment among husbands aged 25 to 50 and employed in firms with less than 20 employees averaged 14.2%. For those employed in firms with 500 or more employees, the corresponding number was 5.5%.

Appendix Table 2: Sources of differences in husbands' earnings instability, 1996-2001 - Regression results*

Difference between the bottom tertile and the top tertile:	Age of husbands at the beginning of the period				
	25-29	30-34	35-39	40-44	45-50
No controls:	1.289	0.995	0.922	0.956	0.671
Control for husbands' EI receipt**	0.823	0.470	0.356	0.342	0.027
Controls for husbands' EI receipt and pension coverage***	0.640	0.274	0.144	0.083	-0.179

* The dependent variable is the logarithm of $Z1_i$. Each cell represents the results from a separate regression.

** Includes a dummy variable for whether husbands received EI benefits at some point during the 1996-2001 period.

*** Include dummy variables for whether husbands received EI benefits at some point during the 1996-2001 period and whether they were covered by a registered pension plan in 1996.

Note: Numbers in shaded areas are statistically significant at the 1% level.

Source: Longitudinal Administrative Databank.

Appendix Table 3: Decomposition of family earnings variability, 1984-1989 versus 1994-1999

Age of husbands at the beginning of the period	1984-1989			1994-1999			Percentage change between periods		
	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]
25-29	0.254	0.188	0.066	0.315	0.237	0.078	24	26	18
30-34	0.244	0.186	0.058	0.315	0.251	0.064	29	35	10
35-39	0.242	0.190	0.052	0.320	0.261	0.058	32	37	12
40-44	0.251	0.196	0.054	0.310	0.256	0.054	24	31	0
45-50	0.288	0.216	0.072	0.359	0.279	0.080	25	29	11
25-50	0.261	0.200	0.060	0.331	0.265	0.066	27	33	10

Note: The permanent variance and the transitory variance may not add to the total variance due to rounding.
Source: Longitudinal Administrative Databank.

Appendix Table 4: Selected measures of family earnings instability, 1986-1991 versus 1996-2001 - Fixed effects model with AR(1)

Age of husbands at the beginning of the period	Square root of $\sigma^2 w$			Mean absolute deviation		
	1986-1991	1996-2001	% change	1986-1991	1996-2001	% change
25-29	0.249	0.262	5	0.134	0.140	4
30-34	0.233	0.236	1	0.119	0.122	3
35-39	0.221	0.223	1	0.113	0.114	1
40-44	0.228	0.219	-4	0.119	0.112	-6
45-50	0.260	0.276	6	0.140	0.134	-4

Source: Longitudinal Administrative Databank.

Appendix Table 5: Selected measures of family earnings instability, 1984-1989 versus 1994-1999 - Fixed effects model with AR(1)

Age of husbands at the beginning of the period	Square root of σ^2_w			Mean absolute deviation		
	1984-1989	1994-1999	% change	1984-1989	1994-1999	% change
25-29	0.249	0.262	5	0.136	0.139	2
30-34	0.234	0.236	1	0.121	0.121	0
35-39	0.222	0.223	0	0.114	0.113	-1
40-44	0.228	0.219	-4	0.122	0.112	-8
45-50	0.262	0.276	5	0.146	0.135	-8

Source: Longitudinal Administrative Databank.

Appendix Table 6: Instability and the tax and transfer system, 1996-2001 - Fixed effects model with with AR(1)

	Square root of σ^2_w			Mean absolute deviation		
Families with husbands aged:	**Bottom tertile***	**Middle tertile**	**Top tertile**	**Bottom tertile**	**Middle tertile**	**Top tertile**
25-29 years						
1. Husbands' earnings	0.424	0.298	0.249	0.208	0.136	0.114
2. Couples' earnings	0.353	0.209	0.191	0.185	0.120	0.110
3. Family earnings	0.353	0.209	0.191	0.185	0.120	0.110
4. Family market income = MI	0.318	0.203	0.191	0.175	0.119	0.109
5. MI + EI	0.262	0.176	0.175	0.144	0.101	0.096
6. MI + EI + SA	0.234	0.175	0.175	0.134	0.101	0.096
7. MI + EI + SA + Tax credits = MIB	0.221	0.173	0.174	0.129	0.100	0.096
8. MIB + Family-related benefits	0.194	0.164	0.169	0.116	0.096	0.094
9. Post-transfer before tax income	0.188	0.158	0.166	0.113	0.094	0.093
10. Post-transfer after-tax income	0.167	0.143	0.153	0.098	0.084	0.086
11. Post-transfer after-tax income s.a.*	0.173	0.155	0.167	0.104	0.094	0.098
30-34 years						
1. Husbands' earnings	0.385	0.271	0.259	0.178	0.117	0.113
2. Couples' earnings	0.299	0.188	0.203	0.154	0.102	0.105
3. Family earnings	0.300	0.188	0.203	0.155	0.103	0.105
4. Family market income = MI	0.283	0.185	0.190	0.150	0.103	0.105
5. MI + EI	0.239	0.163	0.179	0.124	0.091	0.097
6. MI + EI + SA	0.216	0.162	0.179	0.118	0.091	0.097
7. MI + EI + SA + Tax credits = MIB	0.204	0.160	0.178	0.114	0.090	0.097
8. MIB + Family-related benefits	0.181	0.154	0.177	0.105	0.088	0.096
9. Post-transfer before tax income	0.171	0.148	0.174	0.101	0.085	0.095
10. Post-transfer after-tax income	0.153	0.137	0.166	0.089	0.079	0.089
11. Post-transfer after-tax income s.a.*	0.157	0.144	0.174	0.092	0.084	0.096
35-39 years						
1. Husbands' earnings	0.371	0.259	0.253	0.168	0.108	0.110
2. Couples' earnings	0.285	0.179	0.192	0.143	0.092	0.096
3. Family earnings	0.284	0.179	0.191	0.147	0.095	0.097
4. Family market income = MI	0.267	0.174	0.184	0.144	0.095	0.098
5. MI + EI	0.227	0.160	0.179	0.122	0.088	0.094
6. MI + EI + SA	0.208	0.159	0.178	0.117	0.088	0.094
7. MI + EI + SA + Tax credits = MIB	0.199	0.157	0.178	0.114	0.088	0.094
8. MIB + Family-related benefits	0.181	0.151	0.176	0.106	0.086	0.094
9. Post-transfer before tax income	0.173	0.146	0.174	0.102	0.084	0.093
10. Post-transfer after-tax income	0.158	0.138	0.168	0.093	0.079	0.090
11. Post-transfer after-tax income s.a.*	0.159	0.141	0.171	0.094	0.082	0.092

Appendix Table 6: Instability and the tax and transfer system, 1996-2001 - Fixed effects model with AR(1) (*concluded*)

Families with husbands aged:	Square root of σ^2_w			Mean absolute deviation		
	Bottom tertile*	**Middle tertile**	**Top tertile**	**Bottom tertile**	**Middle tertile**	**Top tertile**
40-44 years						
1. Husbands' earnings	0.376	0.244	0.248	0.164	0.101	0.104
2. Couples' earnings	0.284	0.167	0.179	0.137	0.085	0.088
3. Family earnings	0.286	0.169	0.180	0.149	0.094	0.092
4. Family market income = MI	0.265	0.164	0.177	0.144	0.095	0.094
5. MI + EI	0.226	0.154	0.173	0.126	0.090	0.092
6. MI + EI + SA	0.213	0.154	0.173	0.122	0.090	0.092
7. MI + EI + SA + Tax credits = MIB	0.205	0.153	0.172	0.120	0.090	0.092
8. MIB + Family-related benefits	0.192	0.151	0.172	0.115	0.089	0.092
9. Post-transfer before tax income	0.182	0.147	0.171	0.111	0.087	0.091
10. Post-transfer after-tax income	0.171	0.143	0.170	0.103	0.085	0.091
11. Post-transfer after-tax income s.a.*	0.163	0.138	0.169	0.099	0.082	0.090
45-50 years						
1. Husbands' earnings	0.420	0.374	0.385	0.175	0.139	0.145
2. Couples' earnings	0.325	0.274	0.251	0.145	0.110	0.109
3. Family earnings	0.320	0.262	0.239	0.167	0.123	0.115
4. Family market income = MI	0.280	0.192	0.191	0.157	0.110	0.103
5. MI + EI	0.245	0.181	0.188	0.140	0.106	0.101
6. MI + EI + SA	0.235	0.181	0.188	0.137	0.106	0.101
7. MI + EI + SA + Tax credits = MIB	0.228	0.179	0.187	0.136	0.106	0.101
8. MIB + Family-related benefits	0.222	0.178	0.187	0.133	0.105	0.101
9. Post-transfer before tax income	0.210	0.172	0.185	0.128	0.103	0.100
10. Post-transfer after-tax income	0.199	0.170	0.183	0.121	0.102	0.100
11. Post-transfer after-tax income s.a.*	0.179	0.155	0.176	0.107	0.091	0.094

* Post-transfer after-tax income adjusted for family size.

Source: Longitudinal Administrative Databank.

Appendix Table 7: Instability and the tax and transfer system, 1996-2001 - Broad sample

	Square root of σ^2_w			Mean absolute deviation		
Families with husbands aged:	**Bottom tertile***	**Middle tertile**	**Top tertile**	**Bottom tertile**	**Middle tertile**	**Top tertile**
25-29 years						
3. Family earnings	0.532	0.325	0.283	0.287	0.172	0.148
4. Family market income = MI	0.414	0.270	0.235	0.234	0.154	0.137
5. MI + EI	0.355	0.237	0.212	0.198	0.133	0.121
6. MI + EI + SA	0.318	0.233	0.212	0.182	0.133	0.121
7. MI + EI + SA + Tax credits = MIB	0.292	0.224	0.210	0.174	0.131	0.121
8. MIB + Family-related benefits	0.257	0.209	0.203	0.157	0.124	0.118
9. Post-transfer before tax income	0.252	0.203	0.199	0.154	0.121	0.116
10. Post-transfer after-tax income	0.225	0.183	0.183	0.135	0.108	0.107
11. Post-transfer after-tax income s.a.*	0.230	0.193	0.198	0.140	0.118	0.121
30-34 years						
3. Family earnings	0.491	0.302	0.288	0.257	0.150	0.142
4. Family market income = MI	0.376	0.244	0.231	0.210	0.136	0.130
5. MI + EI	0.325	0.219	0.217	0.180	0.121	0.121
6. MI + EI + SA	0.296	0.217	0.217	0.169	0.121	0.121
7. MI + EI + SA + Tax credits = MIB	0.276	0.212	0.216	0.163	0.120	0.120
8. MIB + Family-related benefits	0.244	0.200	0.212	0.148	0.115	0.119
9. Post-transfer before tax income	0.234	0.193	0.209	0.142	0.112	0.118
10. Post-transfer after-tax income	0.210	0.179	0.198	0.126	0.102	0.110
11. Post-transfer after-tax income s.a.*	0.213	0.186	0.207	0.129	0.109	0.118
35-39 years						
3. Family earnings	0.477	0.282	0.281	0.249	0.138	0.134
4. Family market income = MI	0.363	0.234	0.233	0.205	0.128	0.125
5. MI + EI	0.319	0.213	0.225	0.179	0.118	0.120
6. MI + EI + SA	0.294	0.212	0.225	0.170	0.118	0.120
7. MI + EI + SA + Tax credits = MIB	0.277	0.208	0.223	0.164	0.117	0.120
8. MIB + Family-related benefits	0.249	0.199	0.220	0.151	0.113	0.119
9. Post-transfer before tax income	0.238	0.192	0.218	0.145	0.111	0.118
10. Post-transfer after-tax income	0.219	0.182	0.209	0.131	0.104	0.111
11. Post-transfer after-tax income s.a.*	0.220	0.185	0.213	0.132	0.106	0.115

Appendix Table 7: Instability and the tax and transfer system, 1996-2001 - Broad sample (*concluded*)

	Square root of σ^2_w			Mean absolute deviation		
Families with husbands aged :	**Bottom tertile***	**Middle tertile**	**Top tertile**	**Bottom tertile**	**Middle tertile**	**Top tertile**
40-44 years						
3. Family earnings	0.474	0.272	0.269	0.253	0.136	0.129
4. Family market income = MI	0.360	0.225	0.227	0.208	0.127	0.121
5. MI + EI	0.323	0.209	0.221	0.187	0.120	0.118
6. MI + EI + SA	0.303	0.208	0.221	0.179	0.119	0.118
7. MI + EI + SA + Tax credits = MIB	0.289	0.206	0.220	0.174	0.119	0.118
8. MIB + Family-related benefits	0.267	0.200	0.218	0.164	0.117	0.117
9. Post-transfer before tax income	0.255	0.195	0.217	0.158	0.114	0.116
10. Post-transfer after-tax income	0.239	0.188	0.212	0.146	0.110	0.113
11. Post-transfer after-tax income s.a.*	0.233	0.184	0.211	0.141	0.108	0.113
45-50 years						
3. Family earnings	0.495	0.340	0.341	0.271	0.167	0.161
4. Family market income = MI	0.369	0.247	0.244	0.218	0.142	0.133
5. MI + EI	0.336	0.232	0.239	0.200	0.135	0.131
6. MI + EI + SA	0.320	0.232	0.239	0.194	0.135	0.131
7. MI + EI + SA + Tax credits = MIB	0.306	0.228	0.238	0.190	0.135	0.130
8. MIB + Family-related benefits	0.294	0.226	0.237	0.184	0.134	0.130
9. Post-transfer before tax income	0.281	0.218	0.235	0.177	0.130	0.129
10. Post-transfer after-tax income	0.267	0.214	0.230	0.166	0.128	0.127
11. Post-transfer after-tax income s.a.*	0.250	0.200	0.224	0.152	0.116	0.121

* Post-transfer after-tax income adjusted for family size.
Source: Longitudinal Administrative Databank.

Appendix Table 8: Decomposition of family earnings variability, 1986-1991 versus 1996-2001 - Broad sample

Age of husbands at the beginning of the period	1986-1991			1996-2001			Percentage change between periods		
	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]	Total variance [σ^2_{total}]	Permanent variance [σ^2_b]	Transitory variance [σ^2_w]
25-29	0.420	0.275	0.145	0.476	0.318	0.158	13	16	9
30-34	0.437	0.304	0.133	0.501	0.361	0.140	15	19	5
35-39	0.454	0.330	0.124	0.541	0.411	0.130	19	25	5
40-44	0.477	0.350	0.127	0.553	0.427	0.126	16	22	-1
45-50	0.534	0.383	0.151	0.611	0.449	0.162	14	17	7

Note: The permanent variance and the transitory variance may not add to the total variance due to rounding.
Source: Longitudinal Administrative Databank.

Appendix Table 9: Instability and the tax and transfer system, 1996-2001 - Results with MAD

	Families with no children under 18 during the 1996-2001 period			Families with children under 18 during the 1996-2001 period		
	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
Families with husbands aged:						
25-29 years						
3. Family earnings	0.256	0.167	0.133	0.290	0.172	0.150
4. Family market income = MI	0.202	0.149	0.128	0.236	0.154	0.138
5. MI + EI	0.184	0.135	0.119	0.199	0.133	0.122
6. MI + EI + SA	0.177	0.135	0.119	0.183	0.133	0.122
7. MI + EI + SA + Tax credits = MIB	0.173	0.134	0.118	0.174	0.130	0.121
8. MIB + Family benefits (FABEN)	0.173	0.134	0.118	0.170	0.129	0.120
9. MIB + FABEN + CCTB	0.173	0.134	0.118	0.156	0.123	0.118
10. Post-transfer before tax income	0.173	0.132	0.118	0.152	0.120	0.116
11. Post-transfer after-tax income	0.154	0.120	0.107	0.133	0.107	0.107
12. Post-transfer after-tax income s.a.*	0.154	0.120	0.107	0.139	0.118	0.122
30-34 years						
3. Family earnings	0.241	0.144	0.141	0.258	0.151	0.143
4. Family market income = MI	0.199	0.128	0.130	0.211	0.136	0.131
5. MI + EI	0.176	0.116	0.123	0.180	0.122	0.120
6. MI + EI + SA	0.170	0.116	0.123	0.169	0.122	0.120
7. MI + EI + SA + Tax credits = MIB	0.166	0.116	0.123	0.162	0.120	0.120
8. MIB + Family benefits (FABEN)	0.166	0.116	0.123	0.158	0.119	0.120
9. MIB + FABEN + CCTB	0.166	0.116	0.123	0.146	0.115	0.118
10. Post-transfer before tax income	0.162	0.113	0.122	0.141	0.112	0.117
11. Post-transfer after-tax income	0.147	0.104	0.114	0.124	0.102	0.109
12. Post-transfer after-tax income s.a.*	0.146	0.104	0.113	0.128	0.110	0.119
35-39 years						
3. Family earnings	0.227	0.140	0.140	0.250	0.138	0.134
4. Family market income = MI	0.191	0.130	0.125	0.206	0.128	0.125
5. MI + EI	0.167	0.118	0.120	0.180	0.118	0.120
6. MI + EI + SA	0.162	0.118	0.120	0.171	0.118	0.120
7. MI + EI + SA + Tax credits = MIB	0.159	0.118	0.120	0.165	0.117	0.120
8. MIB + Family benefits (FABEN)	0.159	0.118	0.120	0.161	0.116	0.119
9. MIB + FABEN + CCTB	0.158	0.118	0.120	0.150	0.113	0.118
10. Post-transfer before tax income	0.152	0.115	0.119	0.145	0.110	0.117
11. Post-transfer after-tax income	0.137	0.108	0.113	0.130	0.103	0.111
12. Post-transfer after-tax income s.a.*	0.136	0.106	0.112	0.131	0.106	0.115

Appendix Table 9: Instability and the tax and transfer system, 1996-2001 - Results with MAD (*concluded*)

	Families with no children under 18 during the 1996-2001 period			Families with children under 18 during the 1996-2001 period		
	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
Families with husbands aged:						
40-44 years						
3. Family earnings	0.245	0.143	0.133	0.254	0.134	0.128
4. Family market income = MI	0.209	0.132	0.122	0.207	0.125	0.121
5. MI + EI	0.183	0.123	0.118	0.186	0.118	0.118
6. MI + EI + SA	0.178	0.123	0.118	0.179	0.118	0.118
7. MI + EI + SA + Tax credits = MIB	0.175	0.123	0.118	0.174	0.118	0.117
8. MIB + Family benefits (FABEN)	0.175	0.123	0.118	0.171	0.117	0.117
9. MIB + FABEN + CCTB	0.175	0.123	0.118	0.161	0.115	0.117
10. Post-transfer before tax income	0.167	0.120	0.117	0.156	0.113	0.116
11. Post-transfer after-tax income	0.156	0.116	0.113	0.144	0.108	0.113
12. Post-transfer after-tax income s.a.*	0.145	0.107	0.109	0.140	0.107	0.113
45-50 years						
3. Family earnings	0.267	0.183	0.179	0.271	0.152	0.146
4. Family market income = MI	0.219	0.149	0.137	0.215	0.134	0.128
5. MI + EI	0.199	0.141	0.135	0.198	0.128	0.126
6. MI + EI + SA	0.195	0.141	0.135	0.191	0.128	0.126
7. MI + EI + SA + Tax credits = MIB	0.191	0.141	0.135	0.186	0.127	0.125
8. MIB + Family benefits (FABEN)	0.191	0.141	0.135	0.184	0.127	0.125
9. MIB + FABEN + CCTB	0.191	0.141	0.135	0.177	0.126	0.125
10. Post-transfer before tax income	0.183	0.137	0.133	0.171	0.123	0.124
11. Post-transfer after-tax income	0.172	0.133	0.131	0.160	0.121	0.122
12. Post-transfer after-tax income s.a.*	0.152	0.117	0.122	0.150	0.113	0.118

* Post transfer after-tax income adjusted for family size.
Note: FABEN: Provincially-funded family-related benefits; CCTB: Canada Child Tax Benefit.
Source: Longitudinal Administrative Databank.

Appendix Table 10: Instability and the tax and transfer system, 1996-2001 - Results with square root of σ^2_w

	Families with no children under 18 during the 1996-2001 period			Families with children under 18 during the 1996-2001 period		
	Bottom tertile	Middle tertile	Top tertile	Bottom tertile	Middle tertile	Top tertile
Families with husbands aged:						
25-29 years						
3. Family earnings	0.453	0.309	0.238	0.537	0.326	0.287
4. Family market income = MI	0.326	0.261	0.224	0.420	0.271	0.236
5. MI + EI	0.299	0.241	0.207	0.359	0.236	0.212
6. MI + EI + SA	0.283	0.241	0.207	0.320	0.232	0.212
7. MI + EI + SA + Tax credits = MIB	0.274	0.237	0.206	0.293	0.223	0.210
8. MIB + Family benefits (FABEN)	0.274	0.237	0.206	0.284	0.218	0.207
9. MIB + FABEN + CCTB	0.274	0.237	0.206	0.256	0.206	0.202
10. Post-transfer before tax income	0.273	0.235	0.204	0.250	0.199	0.199
11. Post-transfer after-tax income	0.245	0.215	0.190	0.223	0.179	0.183
12. Post-transfer after-tax income s.a.*	0.245	0.215	0.190	0.228	0.191	0.198
30-34 years						
3. Family earnings	0.462	0.279	0.285	0.493	0.303	0.289
4. Family market income = MI	0.349	0.224	0.237	0.378	0.245	0.230
5. MI + EI	0.316	0.206	0.227	0.326	0.220	0.216
6. MI + EI + SA	0.295	0.205	0.227	0.296	0.218	0.216
7. MI + EI + SA + Tax credits = MIB	0.283	0.203	0.227	0.276	0.212	0.214
8. MIB + Family benefits (FABEN)	0.283	0.203	0.227	0.267	0.209	0.213
9. MIB + FABEN + CCTB	0.283	0.203	0.227	0.241	0.199	0.210
10. Post-transfer before tax income	0.275	0.196	0.226	0.231	0.193	0.207
11. Post-transfer after-tax income	0.255	0.184	0.211	0.207	0.179	0.196
12. Post-transfer after-tax income s.a.*	0.255	0.183	0.211	0.211	0.187	0.206
35-39 years						
3. Family earnings	0.433	0.285	0.313	0.479	0.281	0.276
4. Family market income = MI	0.335	0.233	0.241	0.365	0.234	0.232
5. MI + EI	0.293	0.209	0.233	0.320	0.213	0.224
6. MI + EI + SA	0.277	0.206	0.233	0.295	0.213	0.224
7. MI + EI + SA + Tax credits = MIB	0.266	0.205	0.232	0.278	0.208	0.222
8. MIB + Family benefits (FABEN)	0.266	0.205	0.232	0.270	0.206	0.221
9. MIB + FABEN + CCTB	0.266	0.205	0.232	0.248	0.198	0.218
10. Post-transfer before tax income	0.255	0.200	0.231	0.237	0.191	0.216
11. Post-transfer after-tax income	0.234	0.191	0.223	0.218	0.181	0.207
12. Post-transfer after-tax income s.a.*	0.232	0.189	0.222	0.219	0.184	0.211

Appendix Table 10: Instability and the tax and transfer system, 1996-2001 - Results with square root of σ^2_w (*concluded*)

	Families with no children under 18 during the 1996-2001 period			Families with children under 18 during the 1996-2001 period		
Families with husbands aged:	**Bottom tertile**	**Middle tertile**	**Top tertile**	**Bottom tertile**	**Middle tertile**	**Top tertile**
40-44 years						
3. Family earnings	0.459	0.287	0.274	0.475	0.269	0.268
4. Family market income = MI	0.360	0.234	0.224	0.359	0.223	0.227
5. MI + EI	0.312	0.213	0.217	0.324	0.207	0.221
6. MI + EI + SA	0.299	0.212	0.217	0.303	0.207	0.221
7. MI + EI + SA + Tax credits = MIB	0.289	0.210	0.216	0.288	0.204	0.220
8. MIB + Family benefits (FABEN)	0.289	0.210	0.216	0.282	0.203	0.219
9. MIB + FABEN + CCTB	0.289	0.210	0.216	0.263	0.198	0.218
10. Post-transfer before tax income	0.274	0.205	0.213	0.252	0.192	0.217
11. Post-transfer after-tax income	0.260	0.198	0.209	0.235	0.185	0.212
12. Post-transfer after-tax income s.a.*	0.247	0.187	0.204	0.230	0.182	0.212
45-50 years						
3. Family earnings	0.491	0.378	0.383	0.495	0.305	0.304
4. Family market income = MI	0.372	0.258	0.249	0.364	0.237	0.239
5. MI + EI	0.334	0.241	0.244	0.335	0.223	0.234
6. MI + EI + SA	0.319	0.239	0.244	0.317	0.222	0.234
7. MI + EI + SA + Tax credits = MIB	0.309	0.236	0.242	0.302	0.219	0.233
8. MIB + Family benefits (FABEN)	0.309	0.236	0.242	0.298	0.218	0.232
9. MIB + FABEN + CCTB	0.308	0.236	0.242	0.283	0.214	0.232
10. Post-transfer before tax income	0.292	0.228	0.239	0.272	0.208	0.230
11. Post-transfer after-tax income	0.278	0.223	0.233	0.258	0.204	0.225
12. Post-transfer after-tax income s.a.*	0.254	0.204	0.224	0.245	0.195	0.221

* Post-transfer after-tax income adjusted for family size.
Note: FABEN: Provincially-funded family-related benefits; CCTB: Canada Child Tax Benefit.
Source: Longitudinal Administrative Databank.

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