Longitudinal Aspects of Earnings Inequality in Canada

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ABSTRACT

In this paper we ask the three following questions: 1) even after controlling for cyclical effects, do new spells of low earnings now last longer than they used to? 2) once a male worker starts a new spell of low earnings, does he receive lower real annual wages now than his counterparts did in the mid-seventies? 3) has long-term inequality in earnings risen in the eighties? The answers to these questions are the following. First, even after taking account of the relatively high unemployment rates observed since the mid-eighties, workers under 35 were less likely to move out of the bottom of the earnings distribution during the 1985-92 period than during the 1976-84 period. In other terms, new spells of low earnings now last longer for these workers. Second, real annual wages received by young males who went through a new spell of low earnings were significantly lower in 1985-93 than in 1975-84. Third, during the eighties, inequality in earnings cumulated over either six or ten years rose at the same pace as inequality in annual earnings.

"I had a job, I had a girl
I had something going mister in this world
I got laid-off down at the lumber yard
Our love went bad, times got hard
Now I work down at the carwash, where all it ever does is rain
Don't you feel like you're a rider on a downbound train"
Bruce Springsteen ("Downbound Train", Columbia Records, 1984)

I. Introduction

The distribution of annual earnings has become more unequal in the eighties in Canada among male earners and among women employed full year full-time (Wolfson 1992 ; Burbidge et al. 1993; Beach and Slotsve 1994; Morissette, Myles and Picot 1994; Richardson 1994). Because it took place in a period where average real annual wages of Canadians have been stagnating, the widening of the gap between low and high earners has meant that those workers receiving low earnings at the end of the eighties were worse off than their counterparts at the beginning of the last decade.

The growth of inequality has been associated with a polarization of annual earnings, i.e. a thickening of both the top and the bottom of the earnings distribution. In other words, the number of Canadians with either high or low earnings in a given year has risen. The growing number of low earners creates pressures on existing social programs and thus raises difficult questions for social policy in a context of high government debt and slow economic growth.

One important issue is whether the growing number of low earners is due to an increase in the duration of spells of low earnings. The number of Canadians with low annual wages could rise simply because, during any given period, more of them move into the lower end of the earnings distribution now than they did in the seventies but remain there for roughly the same time as before. Alternatively, those who moved into the lower end of the distribution in the eighties could have experienced much longer spells of low earnings than their counterparts in the seventies. In the latter case, the costs of adjustment borne by those workers are likely to be greater than in the former.

Even if the duration of spells of low earnings remains unchanged, the economic burden attached to these spells may increase. This could occur if workers who now move into the bottom of the earnings distribution earned less than their counterparts in the seventies[1]. Thus, a second question is whether the real earnings received by Canadians who entered the lower end of the distribution in the eighties were lower than those received by their counterparts in the seventies.

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[1] Another possibility is that Canadian workers now tend to experience **multiple** spells of low earnings to a greater extent than they did in the seventies. This could increase the economic burden attached to spells of low earnings even though both their duration and the real earnings associated with them remained unchanged. We do not investigate this possibility in this paper.

A third issue is whether the widening gap between low and high earners - measured on an annual basis - has increased inequality in earnings defined over a longer time interval. A large number of U.S. and Canadian studies have now unequivocally shown that annual earnings inequality has risen substantially since the 1970s. Yet whether long-term earnings inequality has risen in Canada remains unknown. If low earners enjoyed greater upward mobility and high earners experienced greater downward mobility in the eighties than in the seventies, long-term earnings inequality may have remained unchanged. Thus, a growing dispersion of earnings, measured on a cross-sectional basis, will not necessarily lead to greater inequality in earnings measured over a period longer than one year.

The goal of this paper is to answer these three questions. To do so, we take advantage of a unique data set. We use longitudinal data from Revenue Canada's T-4 Supplementary tax file. We cover the period 1975-1993. All previous Canadian studies have used cross-sectional data and thus have been unable to address the aforementioned issues.

In the United States, a fast-growing literature (Bound and Johnson 1992; Katz and Murphy 1992; Murphy and Welch 1992; Juhn, Murphy and Pierce 1993) has recently attempted to identify the causes of the growth of inequality in annual earnings. However, relatively few U.S. studies have examined the longitudinal aspects of inequality or, more generally, earnings mobility. Using longitudinal data for the 1967-1975 period, Shorrocks (1981) shows how the dispersion of individuals' **incomes** cumulated over several years differs from the dispersion of their annual incomes. Duncan et al. (1991) examine the extent to which prime age adults have moved into and out of the middle of the distribution of household income over the 1967-1988 period. Veum (1992), Hungerford (1993) and Smith (1994a) ask whether income mobility (defined either in relative or absolute terms) has changed between the 1980s and the 1970s. Smith (1994b) identifies which individuals are the most likely to experience downward income mobility. Gottschalk and Moffitt (1994) investigate whether earnings instability has increased between 1979-87 and 1970-78. All previous studies are based on the Panel Study of Income Dynamics (PSID). Smith and Vavrichek (1992) analyze the **wage-rate** mobility of workers employed at the minimum wage using the Survey of Income and Program Participation (SIPP). Schiller (1994) relies on the National Longitudinal Survey of Youth (NLSY) to examine **earnings** mobility among young workers in the 1980s. Gittleman and Joyce (1995) document earnings mobility over the 1967-1991 period, using March-March matched files from the Annual Demographic files of the Current Population Survey (CPS). All these studies use the individual as the unit of analysis.

Our main purpose is to address the three aforementioned issues for workers with a fairly stable lifetime work pattern. For this reason, we restrict our attention to male workers. Our interest about spells of low earnings is motivated by the public concern that structural changes in the labour market may have decreased Canadians' chances of reaching a 'decent' standard of living. While the concept of a decent standard of living is best studied using **after-tax family income**, we believe that documenting the time path of earnings of individuals may yield useful information on the causes and the effects of the rise of inequality in annual earnings.

The paper is organized as follows. First, we confirm the polarization of annual earnings observed in previous studies (Section II). Second, we show that, even after controlling for cyclical effects, male workers under 35 were less likely to move out of the bottom of the earnings distribution

during the 1985-92 period than during the 1976-84 period (Section III). In other terms, the duration of new spells of low earnings has risen in the eighties for these employees. Third, we find that, while they were going through new spells of low earnings, men aged 18-24 received significantly lower real annual wages in 1985-93 than their counterparts did in 1975-84 (Section IV). Fourth, we show that long-term earnings inequality rose at the same pace as short-term (i.e. annual) earnings inequality in the eighties (Section V). Concluding comments follow (Section VI).

II. The Growth of Inequality in Annual Earnings : A Review of Some Stylized Facts [2]

Most previous Canadian studies have documented the growth of inequality in annual earnings using data from the Survey of Consumer Finances (SCF) (Wolfson 1992; Burbidge et al. 1993; Beach and Slotsve 1994; Morissette, Myles and Picot 1994; Richardson 1994)[3]. A natural question is whether the main conclusions derived from SCF data still hold with data taken from tax records.

To address this issue, we select two samples. The first sample consists of men aged 18 to 64 with positive wages and salaries. Contrary to SCF, the tax file does not allow us to distinguish all earners from workers employed full year full-time. To take this into account, we select a second sample of male workers aged 25 to 54. This sample consists of workers who are likely to have a strong attachment to the labour market. The period considered is 1975-1993 [4]. Depending on the year considered, the size of the first (second) sample varies between 58,000 (38,000) and 70,000 (52,000) observations.

First, we plot average real annual earnings at the bottom, middle and top quintile (Figure 1). The numbers are presented for both samples and for both data sources. The message is unambiguous: whether one uses SCF data or the tax file, whether one examines workers aged 18-64 or those aged 25-54, the gap between low and high earners increased in the eighties in Canada. For both samples, real earnings at the bottom and middle quintile follow a remarkably similar path in the two data sources. Real earnings in the bottom quintile exhibit an S-shape. They fell dramatically between 1981 and 1983, recovered only slightly during the subsequent expansion period and dropped again with the 1990-92 recession. Depending on the sample and the data source

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[2] In this paper, the terms earnings and annual wages are used interchangeably and refer essentially to annual wages and salaries received by paid workers. Income received from self-employment is excluded from the analysis.

[3] Myles, Picot and Wannell (1988) use the Survey of Work History of 1981 and the Labour Market Activity Survey of 1986 to examine the distribution of **jobs** by hourly wage rate. Picot, Myles and Wannell (1990) combine these two surveys with SCF data to analyze the **polarization** of annual earnings. Macphail (1993) uses Survey of Work History of 1981 and the Labour Market Activity Surveys of 1986 and 1989 to examine trends in inequality in annual earnings over the last decade. Doiron and Barrett (1994) use the Survey of Work History of 1981 and the Labour Market Activity Survey of 1988 and focus on the importance of annual hours worked and hourly wage rates in explaining differences in earnings inequality between men and women. Morissette (1995) combines the Survey of Work History of 1981, the Survey of Union Membership of 1984 and the Labour Market Activity Surveys of 1986-1990 to document the growth of inequality in weekly earnings.

[4] The tax file used in this paper contains 1% of all personal tax records received by Revenue Canada. The file was constructed by merging employers' T-4 supplementary forms with T-1 personal tax records. While the tax file covers all years between 1975 and 1993, the SCF data used in this paper cover the years 1975, 1977, 1979, 1981, 1983, 1986, and 1988 to 1993. To maintain consistency over time, the wages and salaries taken from SCF include military pay. Appendix 1 describes in more detail the T-4 supplementary tax file.

selected, male workers in the bottom quintile in 1989 were earning 20-30% less (in real terms) than their counterparts in 1975. While real earnings in the middle quintile have also dropped during the last two recessions, they exhibit much less variation. For both samples and for both data sources, they were roughly 4% lower in 1989 than in 1975.

While the numbers from the two data sources are very similar for the bottom and middle quintile, the tax file suggests that real earnings in the upper part of the distribution have increased more in the eighties than SCF data would suggest. Tax records show that between 1975 and 1989, real earnings in the top quintile grew 14% and 10% among men aged 18-64 and those aged 25-54, respectively. In contrast, SCF data indicates a moderate growth of 2% among men aged 18-64 and virtually no growth among men aged 25-54.

Second, we examine the extent to which the middle of the earnings distribution has shrunk in the eighties. We present trends in three polarization measures (Figure 2). These are defined as the fraction of individuals whose earnings fall in the following intervals : 1) 75% to 125%, 2) 50% to 150% and 3) 25% to 175% of median earnings. While the percentage of men found within these intervals is slightly smaller in the tax file than in SCF, both data sources tell the same story. For both samples, the fraction of men receiving "middle class" wages and salaries fell during the 1981-82 recession, remained constant despite the expansion which took place between 1983 and 1989 and dropped again with the last recession. For instance, the tax file shows that the proportion of men aged 25-54 receiving between 75% and 125% of median earnings fell from 41% to 32 % between 1975 and 1989. SCF data indicates that this proportion dropped from 43% to 35% between these two years.

Thus, the tax file confirms the main conclusion of previous studies based on SCF data: the gap between low and high male earners has widened and the middle of the earnings distribution has shrunk over the last decade in Canada.

In Table 1, we use the tax file to show the distribution of annual earnings for the years 1975, 1981, 1989 and 1993. The first panel of the table refers to the sample of male earners aged 18-64. The second panel is based on the subset of male earners aged 25-54[5]. For each sample, the earnings boundaries partition the distribution into ten deciles in 1975 and are inflated for subsequent years using the consumer price index.

For both samples, there was a movement out of the fourth to eighth earnings group into the bottom and the top of the earnings distribution. More precisely, the fraction of male earners aged 18-64 earning between $20,244 and $46,280 (in 1993 constant dollars) dropped from 50% to 42% between 1975 and 1989. This 8 percentage point drop was split evenly into a 4 percentage

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[5] To allow comparisons with SCF data, Figures 1 and 2 were based on a sample of male workers with **positive annual wages**. We reached the same qualitative conclusions when we produced versions of Figures 1 and 2 based on annual wages earned from jobs paid at least $250 per year in 1975 constant dollars. As Appendix 1 shows, this condition is imposed to ensure that the sample of person-jobs selected from the T-4 supplementary tax file is consistent over time. **For the remainder of the paper, the numbers (including those in Table 1) will thus be based on annual wages received from all jobs paid at least $250 per year in 1975 constant dollars**. Consequently, for the remainder of the paper, whenever we refer to individuals with no earnings, we will include workers who did not receive any wages during the reference year as well as those whose annual earnings were totally derived from jobs which paid less than $250 per year (in 1975 constant dollars).

point increase in the relative importance of both the lowest three earning groups and the top two earning groups. Among male workers aged 25-54, the fraction of individuals earning between $27,107 and $50,464 fell from 50% in 1975 to 42% in 1989 and then to 38% in 1993. The decline was mainly linked to the growth of the lowest two earnings groups whose relative importance rose from 20% in 1975 to 26% in 1989 and then to 31% in 1993. Once again, as previous studies showed, more Canadians have been getting either low or high annual wages as the middle of the distribution shrank.

III. Do Spells of Low Earnings Last Longer Than They Used To?

A) Defining Low Earnings

Because any definition of low earnings is - like any definition of poverty - arbitrary, we select two thresholds to measure transitions into the bottom of the earnings distribution. The first threshold equals $13,509 (in 1993 constant dollars) and is close to Statistics Canada's low income cut-off (LICO) for one adult living in an urban area of less than 30,000 people (13,063[6]). In 1975, 20% of male earners aged 18-64 had real annual wages below this threshold (Table 1). The second boundary equals $21,073 (in 1993 constant dollars) and approximates the LICO for a family of two people living in an urban area of at least half a million people ($20,603). In 1975, 20% of male earners aged 25-54 received less than $21,073 (Table 1). For simplicity, these two boundaries will be referred to as being equal to $13,000 and $21,000 (in 1993 constant dollars), respectively, in the remainder of the paper.

In Table 2, we show what fraction of male earners aged 18-64 have received low earnings - according to these two definitions - since the mid-seventies. The relative importance of low earners has increased in all age groups, especially among males under 35. For instance, 23% of male earners aged 25-34 received less than $21,000 in 1975, compared to 40% in 1993.

B) Overview

The number of Canadians receiving low earnings may have increased either because new spells of low earnings are more frequent than they used to be or because they last longer than they did previously. As for unemployment, the distinction between incidence and duration is important because the costs of adjustment borne by workers - and so, the policy implications - are likely to differ depending on the source of the movement.

One possibility is that more Canadians may have been **falling** out of the middle or the top of the distribution into the lower end in the eighties than in the seventies[7]. This could occur if, for

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[6] The LICO's referred to here are based on the 1992 Family Expenditure Survey. See Low Income Cut-Offs, Statistics Canada, Catalogue no. 13-551-XPB, 1995.

[7] For the remainder of the paper, the middle of the earnings distribution is defined in two different ways. When low earnings are defined as those lower than $13,509 (in 1993 constant dollars), the middle includes workers whose real earnings are between $13,509 and $46,280. When low earnings are defined as those lower than $21,073, the middle includes workers with annual earnings between $21,073 and $50,464. As can be seen from Table 1, these two pairs of boundaries correspond to the 20th and 80th percentile of the 1975 earnings distribution for male workers aged 18-64 and those aged 25-54, respectively.

instance, firms' restructuring and downsizing led to higher layoff rates and either long spells of unemployment or significant wage decreases among well-paid experienced workers. Charts 3.1 and 3.2 do not support that view[8]. While the fraction of men falling into the low-wage area has been rising markedly during the last two recessions, it was not higher during the expansion period of 1984-1989 than during the previous expansion period of 1976-1980[9].

A second possibility is that the fraction of males who receive low earnings when they (re)-enter the pool of employed workers (after being unemployed or inactive for at least one year) may have risen in the eighties. Charts 3.3 and 3.4 provide some evidence of such an increase, at least among men aged 25-34. During the second half of the seventies, roughly 3% of all men aged 25-34 received less than $21,000 in year t+1 after having no earnings during the preceding year[10]. That percentage rose to roughly 4.5% during the second half of the eighties.

A third possibility is that the upward mobility of low earners may have decreased. In other words, the chances of moving out of the bottom into either the middle or the top of the earnings distribution may have decreased in the eighties. Charts 3.5 and 3.6 suggests that this has been the case for male workers under 35. Between 1976 and 1980, roughly 20% of men aged 15-24 who earned less than $21,000 in a given year received higher earnings in the following year. In contrast, that percentage never exceeded 15% between 1984 and 1989.

Together, these results suggest that the number of low earners has risen partly because some spells of low earnings - those started after (re)-entering the pool of employed workers - appear to have become more frequent and partly because spells of low earnings may now last longer than they did in the seventies[11].

C) The Duration of Spells of Low Earnings : A Closer Look

To examine the latter issue in more detail, we proceed as follows. First, we calculate the fractions of new spells of low earnings started between 1976 and 1992 which lasted **at least** 2 years, 3

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[8] To avoid having cluttered charts, we do not present trends for males aged 35-44 and those aged 55-64. Including trends for these two age groups does not alter our main findings.

[9] One may argue that many of the workers who fall out of the middle of the earnings distribution experience earnings losses which are not significant from an empirical point of view. This is not the case. Preliminary work with the file (i.e. without imposing the $250 boundary) showed that the vast majority of the middle-to-bottom transitions involved significant real earnings losses. For instance, 98% of these transitions were associated with real earnings losses of 15% or more in 1975-76.

[10] As explained in Appendix 1, workers with no earnings include those who did not receive any wages during the reference year as well as those whose annual earnings were totally derived from jobs which paid less than $250 per year (in 1975 constant dollars).

[11] Clearly, other events have increased the number of low earners. Specifically, any **temporary** increase (decrease) in the flow of workers into (out of) the bottom of the earnings distribution will increase the stock of low earners **permanently** if it is not followed by offsetting movements. For instance, the number of male workers who fell out of the middle or the top into the bottom rose markedly during the last two recessions. Similarly, the fraction of men aged 15-24 who moved from non-employment into the lower end of the earnings distribution rose from roughly 4% in the second half of the seventies up to 7% in 1983-84. It then decreased slowly until 1989 and then rose again with the 1990-92 recession. Unless these temporary increases in inflows are followed by offsetting movements, the stock of low earners will rise.

years, 4 years, etc[12] [13]. To reduce the chances of a spell being influenced by early retirement, we concentrate on spells started by individuals aged 18-50 at the beginning of the spell. A spell of low earnings begins when a worker starts receiving **positive** earnings less than $13,000 or $21,000. It ends either when a worker stops receiving earnings **next year** or when he starts receiving higher earnings **next year**. It is right-censored (or incomplete) if a worker is still earning less than $13,000 or $21,000 at the end of the observation period, i.e. 1993.

Table 3 shows the results of this exercise. Of all workers who start earning less than $13,000 ($21,000) in a given year, roughly 40% (50%) remain in that state for at least two years. For instance, of all workers aged 18-50 who started receiving less than $13,000 ($21,000) in 1976, 39.1% (48.4%) remained in that state for at least two years. A quick examination of Table 3 reveals that the chances of remaining in the bottom of the earnings distribution for a given number of years rose in 1981-82, then fell slightly until 1989, and then rose again with the onset of the 1990-92 recession. Hence, to test whether or not spells of low earnings lasted longer in the eighties than in the seventies, we have to control for business cycle effects.

The duration of a spell of low earnings is likely to depend not only on macroeconomic conditions prevailing at the **beginning** of the spell, but also on those prevailing during the years **following** the beginning of that spell. It should also vary depending on the distance between workers' earnings and the threshold used to define low earnings. Other things being equal, the greater the distance, the longer the duration of a spell should be. To take these points into account, we need an empirical framework which can incorporate time-varying covariates. Even if we observed the endings of all spells, conventional regression analysis (i.e. using the method of ordinary least squares to model the duration of spells of low earnings as a function of certain explanatory variables) would not allow us to deal with this problem. As pointed out by Kiefer (1988, 647), "the problem that arises [...] is how to measure those [...] [explanatory variables] whose values change during the [...] spell". To incorporate time-varying covariates, we need to use a duration model.

Accelerated failure time models and proportional hazards models are examples of duration models (Cox 1972, Cox and Oakes 1984). They assume that time is measured on a continuum and that events - such as spells of low earnings - may occur at any time. Because the unit of time used to analyze spells of low earnings is large (one year) relative to the total period of observation (19 years for the period 1975-1993) and because spells of low earnings cannot take place at any time, we choose to use instead a duration model based on discrete time analysis. Specifically, we use a logit model to estimate the probability of a spell ending in a given year. This is the next step of our analysis.

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[12] As is well-known, neither the average duration of new spells in progress nor the average duration of new completed spells can provide unbiased estimates of the true duration of new spells of low earnings.

[13] Spells of low earnings for which we observe beginnings start in 1976 or after. If a male worker has low earnings in 1975, we cannot determine whether he started receiving low earnings in 1975 or before 1975 since we have no data prior to 1975. Similarly, spells of low earnings started in 1993 cannot be included in the analysis because we do not know whether these spells ended the following year or not. For this reason, the analysis is based on spells started between 1976 and 1992.

To estimate the probability of a spell ending in a given year, we construct a data set whose unit of observation is a spell-year of low earnings. Put simply, if a spell of low earnings lasts seven years, there will be seven observations associated with that spell in our data set. For each spell-year, we include the following explanatory variables: 1) four regional dummies, 2) a regional unemployment rate (specific for each age group), 3) the distance between workers' earnings and the threshold used to define low earnings, 4) a set of year dummies and 5) a dummy variable which equals 1 from 1985 on, 0 otherwise. The regional dummies allow the hazard rates - the chances of ending a spell of low earnings given that one has been in that state for a given number of years - to vary across regions. The age/region-specific unemployment rate is used to control for business cycle effects. The distance between workers' earnings and the low earnings threshold allows us to measure the rate of mobility conditional on workers' earnings. The set of year dummies allows the hazard rates to vary as the number of years spent receiving low earnings increases[14]. The last dummy variable, which equals 1 in 1985 and afterwards, plays a major role. It is used to test whether workers' chances of leaving the bottom of the earnings distribution are - after controlling for business cycle effects - lower in the eighties than in the seventies[15]. In other terms, has the duration of spells of low earnings risen in the eighties?

Because a spell of low earnings may end in two different ways (a worker may stop receiving earnings or may start receiving earnings higher than $13,000 or $21,000 next year), we have to use a **multinomial logit** model (Maddala 1983)[16]. Since earnings mobility is likely to differ across age groups, we estimate this model separately for the three following age groups: 1) 18-24, 2) 25-34, and 3) 35-50[17]. The model is estimated for the two thresholds defined above, i.e. $13,000 and $21,000. The dependent variable equals : 1) 0 if a worker remains in the bottom of the earnings distribution next year, 2) 1 if he stops receiving earnings next year, 3) 2 if he starts receiving higher earnings next year.

In Appendix 2 we present the detailed estimation results of this model. Whatever threshold is used, two facts emerge for workers under 35. First, the longer a male worker has been receiving

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[14] We include nine year dummies. The first one (Year2) measures whether spells are in their second year (Year2 =1) or not (Year2 =0). The ninth dummy (Year10) measures whether or not spells are in their tenth year or more. The first year of a spell is used as the reference category. Using a set of year dummies allows us to have a very flexible specification of the hazard rates, i.e. of the probabilities of ending a spell of low earnings, given that one has been receiving low earnings for a certain number of years. The hazard rates can be monotonically increasing/decreasing through time, have a U-shape or an inverted U-shape or exhibit other non-linear trends.

[15] We assume that the hazard rates have shifted between the two subperiods but that their slopes have remained constant. Another possibility is to use dummy variables for all calendar years (except one) instead of the dummy variable we use. This would allow the hazard rates to shift downward/upward each year while restricting their slopes to be constant. A model where calendar year effects and spell-year effects are fully interacted, i.e. a model which would allow both the slopes of the hazard rates and their intercepts to change across calendar years leads to perfect multicollinearity and thus cannot be estimated. The rationale for using a dummy variable which equals 1 starting in 1985 is that the 1981-82 recession may have induced permanent changes in the Canadian labour market. The growth of inequality in annual earnings and the decline of youth real wages in the eighties are consistent with that view.

[16] Using the terminology of duration models, one would say that **competing risks** occur when a spell can end in several different ways.

[17] The age groups refer to the age category of workers at the **beginning** of the spell.

low earnings, the smaller are his chances of ending a spell of low earnings[18]. Why this is so is unclear. As for unemployment or poverty (Bane and Ellwood 1986), at least two explanations can be put forward. One possibility is that, for given observable as well as an unobservable characteristics, it may be harder for workers to escape the bottom of the earnings distribution as time elapses. Long periods of low earnings could make it increasingly difficult for workers to get high-paying jobs that allow them to move up in the earnings distribution. A second possibility is that workers are heterogeneous in terms of unobserved abilities. Some workers can have low and constant exit rates while others can have high and constant exit rates. As time elapses, the former account for a larger fraction of spells. As a result, the declining exit rate observed in the aggregate could result from this mixture of group-specific exit probabilities. Second, - and more important - even after controlling for the business cycle, the chances of Canadian male workers aged 34 or less ending a spell of low earnings are slightly lower from 1985 on than before 1985.

To show these two points, we calculate the probability of a worker moving out of the bottom of the earnings distribution next year, given that he has been receiving low earnings for a given number of years (Tables 4 and 5)[19]. This probability is the sum of the probability of moving down - i.e. of receiving no earnings next year - and the probability of moving up, i.e. receiving higher earnings next year. We present estimates of these two probabilities as well[20]. The numbers are calculated for male workers employed in Ontario and are derived assuming an unemployment rate of 10%, 6% and 4% for male workers aged 18-24, 25-34 and 35-50, respectively[21]. Furthermore, they are based on the mean distance (defined for each age group) between workers' earnings and the low earnings threshold.

Table 4 shows that the probability of moving out of the low earnings area has dropped slightly among workers under 35. For these employees, the lower exit probabilities are mainly due to falling chances of moving up in the earnings distribution. For instance, among males aged 18-24, the probability of moving up after receiving less than $13,000 for two years dropped from 29% in 1976-84 to 26% in 1985-1992. This probability dropped from 31% to 29% among males aged

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[18] There are some exceptions. For instance, if low earnings are defined as those under $13,000, the chances of moving out of the bottom of the earnings distribution are, among males aged 35-50, higher if the spell has lasted 8 years than if it has lasted 7 years.

[19] The coefficients of a multinomial logit model can neither be used : 1) to determine whether a given explanatory variable increases/decreases the probability of occurrence of an event nor   2) to calculate the magnitude of the resulting change in probability. In contrast, the coefficients of a simple logit model can be used to determine the former but not the latter.

[20] The probabilities are calculated as follows. The dependent variable is subject to three events. It equals : a) 0 if a spell is not completed during a given year, b) 1 if a spell ended with the worker moving down, c) 2 if a spell ended with the worker moving up. Let b1 and b2 be the two vectors of coefficients associated with the vector of explanatory variables X. Then, the probability of a worker moving down equals : $\exp(b1*X) / [1 + \exp(b1*X) + \exp(b2*X)]$. Similarly, the probability of moving up equals : $\exp(b2*X) / [1 + \exp(b1*X) + \exp(b2*X)]$. The probability of a spell **not** ending during a given year equals one minus the sum of these last two probabilities.

[21] To assess the impact of the business cycle on workers' chances of leaving the bottom of the earnings distribution, we recalculated the aforementioned probabilities assuming unemployment rates of 14%, 9% and 6% for men aged 18-24, 25-34 and 35-50, respectively. For all age groups and for both thresholds, these higher unemployment rates led to lower probabilities of moving out, moving down and moving up. Thus, high unemployment rates appear to decrease the upward mobility (defined in real terms) of low earners.

25-34 and remained unchanged at 25% for males aged 35-50, suggesting no decline in upward mobility for older workers.

Table 5 confirms these findings. The probability of receiving more than $21,000 after earning less than this amount for one year fell from 20% in 1976-84 to 17% in 1985-92 among male employees aged 18-24. The corresponding numbers equal 29% and 27% for males aged 25-34. Once again, there is no decline un upward mobility among males aged 35-50.

Thus, the duration of spells of low earnings did rise in the eighties among young workers. Why do young workers now take longer to move up in the earnings distribution than they used to? At least three answers can be given to that question. One explanation is that more and more young individuals work part-time while they attend school full-time[22]. As a result, a larger fraction of youth could receive low earnings for a long period of time simply because more of them now combine part-time work and school.

A second explanation is that young men who have already made a transition from school to work may now face greater problems getting access to well paid permanent jobs than their counterparts did in the seventies. The fact that real hourly wages and real annual wages of young workers employed full year full-time dropped substantially over the last decade (Betcherman and Morissette 1993 ; Morissette, Myles and Picot 1994; Morissette 1995) is consistent with that view. Between 1979 and 1989, real annual earnings of workers aged 17-24 employed full year full-time fell 13 % (Figure 4). This could lower their rate of mobility.

A third explanation could be that some of the workers under 35 lack the skills or education in demand on the labour market[23]. Since the T-4 supplementary file contains no information on school attendance or on education levels, it is impossible to disentangle the relative contribution of each of these three factors.

IV. Real Earnings Associated With New Spells of Low Earnings

For social policy purposes, the economic burden faced by workers who enter the bottom of the earnings distribution depends not only on the time spent receiving low earnings but also on the level of earnings received while being in the low-wage area. In this section, we try to answer the following question: once a worker enters the lower end of the earnings distribution, does he receive lower real earnings now than his counterparts did in the seventies?

To answer that question, we regress real annual wages received while going through a new spell of low earnings on the set of explanatory variables defined above, i.e.: 1) four regional dummies, 2) a regional unemployment rate, 3) a set of year dummies and 4) a dummy variable which equals 1 from 1985 on, 0 otherwise. We include regional dummies to take account of potential regional

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[22] Between 1976 and 1993, the percentage of individuals aged 18-24 who were employed while attending school rose from 8.9% to 19.6 %.

[23] The fact that the relative unemployment rate of low-educated young workers has increased in the eighties is consistent with that view. Between 1981 and 1989, the ratio of the unemployment rate of individuals with 0-8 years of schooling to that of university graduates rose from 3.0 to 3.9 among individuals aged 15-24 and from 3.3 to 3.7 among individuals aged 25-34.

differences in earnings. We expect higher unemployment rates to be associated with lower real earnings[24]. We use a set of year dummies to allow earnings to rise as individuals get older[25]. We use the data set constructed for the multinomial logit model - i.e. a file whose unit of observation is a spell-year - and use ordinary least squares methods[26]. We run these regressions for both thresholds.

The detailed regression results are shown in Appendix 3. As expected, higher regional unemployment rates are associated with lower real earnings and significant earnings differences are observed between regions. More important, for both thresholds, real annual wages received while going through a new spell of low earnings have fallen the most among male workers aged 18-24. The real annual wages these workers received while earning less than $21,000 ($13,000) were almost $1,000 ($350) lower in 1985-1993 than in 1975-1984 . For older men, real annual wages associated with new spells of low earnings either remained unchanged or fell roughly $200-$300 between the two periods, depending on the threshold selected[27].

Thus, the major findings of sections III and IV can be summarized as follows. First, new spells of low earnings appear to last longer now than they used to, especially among male workers aged 18-24. Put simply, it is now harder for a male worker to move out of the bottom of the earnings distribution, once he gets into it, than it used to be fifteen years ago. Second, real annual wages young males receive while earning less than $21,000 have dropped significantly since the second half of the eighties. Once again, the longer durations and the lower real earnings observed among young workers can either reflect a decrease in the rate of mobility of those who have completed their transition from school to work or can reflect a greater tendency of young individuals to combine full-time school attendance with part-time work. The data set used in this paper does not allow us to assess the relative importance of these two factors.

V. Has Long-term Inequality Increased in the Eighties?

While repeated cross-sectional observations on earnings inequality may yield interesting information on changes in the structure of wages, they are not sufficient to draw inferences about the long-term gap between low and high earners. Consider two economies, A and B, composed each of two individuals. In economy A, Bill and Joe earn $10,000 and $50,000, respectively, both at time t and at time t+1. In economy B, Bill earns $5,000 at time t and then $15,000 at time t+1

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[24] Admittedly, this is contrary to the implications of the simplest version of the theory of compensating differentials (see Blanchflower and Oswald, 1994).

[25] This set of year dummies is likely to capture the impact of other workers' characteristics as well. For instance, assume the economy consists of two types of workers, low-skilled and high-skilled. Assume low-skilled workers : 1) start spells of low earnings at a much lower wage, 2) have positive but flatter age-earnings profiles and thus are much more likely to experience long spells and, 3) still have lower wages after, say, ten years, than high-skilled workers after five years. Under such circumstances, the correlation between earnings and the time spent receiving low earnings could be negative even though the age-earnings profiles of each group would be upward-sloping.

[26] One difference should be noted. In the multinomial logit model, we included all spell-years observed between 1976 and 1992. In the earnings model, we added spell-years of low earnings observed in 1993.

[27] These numbers are taken from the estimated coefficient of the variable named STRUC, in Appendix 3.

while Joe sees his earnings drop from \$60,000 at time t to \$40,000 at time t+1. Obviously, economy B exhibits a greater degree of inequality in annual earnings at time t than economy A. Yet economy A displays no mobility while economy B allows some individuals to move up and leads others to experience earnings losses. As a result, 'long-term' inequality - i.e. measured in this example over a two-year period - is the same in both economies ; cumulated earnings of low earners equal \$20,000 and cumulated earnings of high earners equal \$100,000[28].

The recent growth of inequality in annual earnings raises the possibility that long-term inequality is rising and thus, that the chances of Canadian men having access to a given rank in the earnings distribution is falling. However, if - as some observers conjecture - the Canadian labour market was more unstable in the eighties than it was in the seventies, there could have been a greater "reshuffling" of earnings across individuals during the last decade than two decades ago. If this were the case, the increase in long-term inequality could be less than the growth of inequality in annual earnings would suggest.

While the ideas of equal access to specific ranks and of high mobility lie "at the core of mainstream American socio-political ideology" (Schiller 1994, 441), one cannot infer that economy B leads **necessarily** to more desirable outcomes than economy A. If greater earnings mobility is associated with greater uncertainty, individuals may prefer a society which exhibits some mobility (e.g. a lower rate of mobility than economy B exhibits) while allowing them to make plans for the future with 'reasonable' success. Hence, without further assumptions about individuals' risk aversion and perceptions of fairness, one cannot conclude that economy B leads to a greater level of welfare than economy A.

To check whether long-term inequality has risen, we follow individuals over time. Specifically, we select a first cohort of male workers who were aged 18 to 64 in 1975 and who had positive earnings during each year of the 1975-1984 period. We compare the dispersion of earnings of that cohort to that of a second cohort composed of individuals aged 18 to 64 in 1984 and who had positive earnings throughout the 1984-1993 period. We calculate: 1) the average dispersion of annual earnings for each period and, 2) the dispersion of earnings cumulated over 10 years[29]. To do so, we use three different measures of inequality. The most widely known, the Gini coefficient, is sensitive to changes in the middle of the earnings distribution, the coefficient of variation to movements at the top, and the Theil-Entropy index to movements at the lower end of the distribution. Because attrition will be substantial among old workers, we calculate these measures for eight different age groups.

We select individuals who have positive earnings throughout the period for two reasons. First, the T-4 supplementary file contains no information on why an individual has no earnings in a given year. This could be so either because the individual is out of the labour force during that particular year or unemployed for the whole year. Thus, earnings inequality could be rising either because more workers face long-term unemployment or because more choose to leave the labour

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[28] For simplicity, we assume a discount rate of 0%.

[29] Calculations on cumulated earnings were made for nominal earnings, real earnings and real earnings discounted at 3% and 7%. The resulting inequality values differed very little across these four earning concepts. To avoid duplication, we present the results based on nominal earnings. Other results are available from the authors upon request.

force (e.g. through early retirement for older workers or through a return to school for younger workers) or because of a combination of these two events. Since there is no way to distinguish these two events - which may not be rare for workers under 25 or those over 54 - this makes the interpretation of inequality trends problematic. Second, - and more important - individuals who are employed throughout the period represent an important fraction of the labour force and thus, are a meaningful population to study. Of all male workers aged 18-64 in 1984 and who had positive earnings during that year, 60% had positive earnings throughout the 1984-1993 period and 75% had positive earnings during each year of the 1984-89 time interval. These percentages increase to 66% and 80%, respectively, when we consider only male workers aged 25-54 in 1984[30]. Thus, the sample selected is an important segment of the male workforce[31].

Table 6 presents the results of this exercise. Four points are worth noting. First, whatever inequality measure is used, the dispersion of earnings cumulated over 10 years is always lower than the average dispersion of annual earnings. This is so, simply because some individuals who had bad (good) luck in a given year will have higher (lower) earnings in subsequent years and thus change ranks in the earnings distribution (Atkinson and Bourguignon 1992, 6). As a result, the dispersion of earnings cumulated over a time interval longer than one year will be more equal than the 'typical' dispersion of annual earnings. Second, for all three inequality measures and for all workers under 45, long-term inequality rose at least 9% between the 1975-84 period and the 1984-93 period. Third, the growth of the dispersion is generally higher with the Theil-Entropy index than with the two other inequality measures. This suggests that substantial changes occurred in the bottom of the earnings distribution. Fourth - and more important - long-term inequality generally rose at the same pace as inequality in annual earnings did. For instance, among men aged 25-54 at the beginning of the time intervals considered, the average of Gini coefficients of annual earnings rose 9.2% between the two periods while the Gini coefficients of earnings cumulated over 10 years increased 9.3%.

These four conclusions hold when we shorten the time intervals and consider the periods 1975-80 and 1984-89 (Table 7). Among men aged 25-54, the average of the short-term Gini coefficients increased 10.6% while the long-term Gini coefficients rose 11.9%.

To find which segments of the earnings distribution were most affected, we calculate earnings at the bottom, middle and top quintile (Table 8, Panel I). The results are unambiguous. Whether based on annual earnings or on cumulated earnings, the gap between the top quintile and the bottom quintile rose mainly because low earners lost ground relative to those in the middle quintile. During the 1975-80 period, cumulated earnings at the top quintile were 3.6 times higher than those at the bottom quintile (T/B) among men aged 25-54. That number rose to 4.3 during the 1984-89 period. The increase occurred primarily because the ratio of cumulated earnings at the middle quintile to cumulated earnings at the bottom quintile (M/B) rose 15% between 1975-

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[30] Of all male workers aged 18-64 in 1975 and who had positive earnings during that year, 60% had positive earnings throughout the 1975-1984 period and 74% had positive earnings throughout the 1975-1980 period. These percentages rise to 66% and 78% for men aged 25-54 in 1975. To avoid spurious increases of inequality measures sensitive to extremely high earnings, the sample selected excludes workers with real annual earnings of $1 million or more (in 1989 constant dollars).

[31] The sample sizes are substantial. For men aged 18-64 with positive earnings during each year of the 1975-1984 (1984-1993) period, we have a sample of 35,143 (38,912) observations. The corresponding sample sizes for men aged 25-54 are 25,289 (29,325).

80 and 1984-89. In contrast, the top/middle ratio (T/M) increased by a modest 4%. Once again, the numbers show that the gap between low and high earners is smaller when we sum earnings across many years than for a single year. For instance, among men aged 18-64 at the beginning of the 1984-89 period, annual earnings at the top quintile were, on average, 7.5 times higher than annual earnings at the bottom quintile. However, this ratio drops to 5.5 when earnings are cumulated over six years.

Thus, for the subset of workers who were aged 18-64 at the beginning of the periods considered and who had positive annual wages throughout these periods, long-term earnings inequality did increase in the eighties in Canada. One disadvantage of selecting such a sample is that we exclude individuals who are the least successful in the labour market, i.e. those who remain unemployed for one year or more. To take this into account, we also calculate the aforementioned ratios for a sample of men who are aged 25-50 at the beginning of the period examined and who had positive earnings at the beginning of that period. Since most males aged 25-50 are in the labour force - the participation rate of men aged 25-54 varied from 92% to 95% between 1975 and 1993 - we minimize the cases where a value of zero earnings results from non-participation. Because most of them have already made a transition from school to work and because very few of them are likely to experience early retirement, we minimize the chances of inequality trends being contaminated by changes in the participation rate.

The second panel of Table 8 presents the results for this sample. As expected, the gap between low and high earners, measured either on annual basis or on a period covering many years, is much wider when one includes individuals with zero earnings. For instance, among men aged 25-50, annual earnings in the top quintile were on average 15 times higher than those in the bottom quintile between 1975 and 1980. In contrast, the corresponding average top/bottom ratio was equal to only 4.3 for men aged 25-54 with positive earnings throughout the 1975-80 interval (Table 8, Panel I). Among men aged 25-50, short-term inequality, as measured by the top/bottom ratio, rose 13% between the two periods. Interestingly, this increase is smaller than that observed in the first panel of Table 8 among men aged 25-54, i.e. 25%. When earnings are cumulated over six years, the top/bottom ratio rises 21% among men aged 25-50. Once again, most of this increase is driven by a widening gap between low earners and middle-wage earners, i.e. by an increase of 12% in the middle/bottom ratio.

What these numbers do not show is that the middle/bottom ratio exhibits a drastically different pattern depending on the sample selected. Among men aged 25-54 who were employed for all years considered, the middle/bottom ratio shows very little change between 1975 and 1980. It is higher during the 1984-89 period but, as for the previous period, displays no trend (Table 9). In contrast, among men aged 25-50, the middle/bottom ratio rises steadily as time elapses. For both periods, it is at least three times higher during the sixth year than during the first year. For instance, among men aged 25-50 in 1984 and who had positive earnings in 1984, those in the middle quintile in 1984 earned 4.4 times more than those in the bottom quintile. By 1989, the corresponding ratio for that cohort had risen to 12.7.

This pattern raises two possibilities. The first is that low earners spend less and less time employed relative to high earners as time elapses. This could occur if low earners' chances of either leaving the labour market or of experiencing long-term unemployment rose over time

relative to those of high earners. The second possibility is that low earners may exhibit flatter age-earnings profiles than highly skilled and highly paid earners.   The constancy of the middle/bottom ratio observed for men aged 25-54 who were employed all years does not support that view. In any event, in both cases, the average annual wages of low earners would fall over time relative to those of high earners.

Together, these results show that long-term earnings inequality rose in the eighties among men who were employed throughout the periods considered and among prime-aged men who were employed at least at the beginning of the periods considered. For all groups, most of the widening gap between the top and the bottom quintile occurred because low earners lost ground relative to middle-wage earners. Our implicit assumption in that section was that the growth of short-term inequality in the eighties could have been offset by an increase in earnings mobility which would leave long-term inequality unchanged. The evidence offered suggests that this has not been the case. The growth of inequality in annual earnings has been associated with a substantial increase in long-term earnings inequality.

VI. Conclusions

In this paper, we asked the three following questions:

1) is it harder now for a male worker to move out of the bottom of the earnings distribution than it used to be fifteen years ago? Put differently, do new spells of low earnings started by male employees now last longer than they used to?

2) once a male worker starts a new spell of low earnings, does he receive lower real annual wages now than his counterparts did in the seventies?

3) has long-term earnings inequality increased in Canada among men?

The findings reported here suggest the following answers. First, even after taking account of the relatively high unemployment rates observed since the mid-eighties, it was harder for Canadian male workers aged 34 or less to move out of the lower end of the earnings distribution during the 1985-92 period than during the 1976-84 period. Second, real annual wages received by males aged 18-24 who went through a new spell of low earnings were significantly lower in 1985-93 than in 1976-84.

Many explanations have been put forward to account for these two facts. One possibility is that young males who have completed their transition from school to work now face greater problems getting access to well paid permanent jobs and thus enjoy lower rates of mobility than their counterparts did in the seventies. A second explanation is that the lower chances of youth leaving the bottom of the earnings distribution and the subsequent lower earnings simply reflect a greater tendency for young individuals - who have **not** completed their school-to-work transition - to work part-time while studying full-time. Alternatively, some young workers may lack the skills required by employers.

These findings must be put in perspective. First, as can be seen from Charts 3.1-3.4, not all workers experience new spells of low earnings in a given year. During expansionary periods, roughly 5% of males aged 45-54 start a new spell each year. The corresponding number equals 8%-9% for men aged 25-54. The data set used in this paper, while allowing us to follow individuals over a very long time interval, contains no information on workers' and jobs' characteristics such as education level, occupation, industry and union status. Thus, it cannot be used to determine, within a given age group, which characteristics are associated with relatively long spells of low earnings. Second, even if only a small fraction of employees start a new spell of low earnings each year, the extent to which these spells are concentrated on a small subset of workers during a given time interval does matter for policy purposes. Third, even if new spells of low earnings did not last longer now than they used to nor did entail lower wages, they could now be concentrated on a **smaller** subset of workers than they used to. In other terms, the tendency of Canadian male workers to experience multiple spells of low earnings could have risen over time. We have not addressed these last two issues in this paper. Fourth, the longer durations of spells of low earnings and the subsequent lower annual wages of young male workers do not necessarily lead to lower real disposable incomes for young families. The transfer system and the growing number of dual-earner couples may offset these trends (Picot and Myles, 1995). Fifth, transitions of an individual from paid work into self-employment are not considered.

The rationale for the third question was the following. It is now well known that inequality in **annual** earnings rose among Canadian male workers in the eighties. One public concern is that this increase in the dispersion of annual earnings may have increased the long-term gap between low and high earners, i.e. increase the dispersion of earnings cumulated over many years. If this were the case, the chances of Canadian men having access to a given rank in the earnings distribution would fall. However, the growing dispersion of annual earnings could have been offset by a greater turbulence in earnings - which would lead more high earners to experience earnings losses and move down and more low earners to enjoy earnings gains and move up - during the eighties than during the seventies. As a result, the growth of inequality in annual earnings does not necessarily imply a rise in long-term earnings inequality.

Our findings do not support that conjecture. In the eighties, long-term earnings inequality rose at the same pace as inequality in annual earnings did. Whether based on earnings cumulated over six years or ten years, the gap between low and high earners is higher since the mid-eighties than it was since the mid-seventies. One could be tempted to infer from this that the chances of Canadian men reaching a given rank in the earnings distribution has dropped. While the evidence presented in this paper is consistent with that view, we think such a conclusion is premature. The reason is that long-term earnings inequality, as well as inequality in annual earnings, may be higher when the labour market is depressed. Since the unemployment rates observed since the mid-eighties were higher than those of the mid-seventies, one possibility is that the increase in long-term inequality that we found simply reflects a cyclical effect. Because we have been comparing two periods and thus have been using only two observations, we have been unable to control for such an effect.

A response to that argument is that even **if** the increase in long-term inequality simply reflected business cycle effects, this fact would be important for policy purposes. It would imply that long periods of high unemployment would increase the dispersion of **cumulated** earnings of individuals

and thus would produce less equal outcomes during a significant portion of individuals' lifetime. Hence, whether or not the increase in long-term earnings inequality was due to structural changes or to cyclical effects, our findings do show that, for at least ten years in their lifetime, a significant fraction of male workers experienced less equal outcomes in 1984-1993 than in 1975-84.

Table 1 : Percentage of male workers in given earnings boundaries, 1975-1993

Male workers aged 18-64

	1975	**1981**	**1989**	**1993**
(1993 constant dollars)				
<= $ 6,898	10.0	10.9	12.9	15.1
$6,898 - $13,509	10.0	10.5	11.2	12.5
$13,509 - $20,244	10.0	9.7	10.1	10.3
$20,244 - $25,791	10.0	8.9	8.7	8.4
$25,791 - $30,625	10.0	8.8	8.1	7.8
$30,625 - $35,114	10.0	8.8	7.4	7.0
$35,114 - $39,896	10.0	9.2	8.1	7.6
$39,896 - $46,280	10.0	10.2	9.5	8.3
$46,280 - $56,621	10.0	11.1	11.1	10.2
> $56,621	10.0	11.9	12.9	12.6

Male workers aged 25-54

	1975	**1981**	**1989**	**1993**
(1993 constant dollars)				
<= $11,512	10.0	11.0	13.8	17.0
$11,512 - $21,073	10.0	10.5	12.2	13.7
$21,073 - $27,107	10.0	9.3	9.6	9.7
$27,107 - $31,709	10.0	8.9	8.4	8.2
$31,709 - $35,651	10.0	8.6	7.3	6.9
$35,651 - $39,645	10.0	8.9	8.0	7.5
$39,645 - $44,425	10.0	9.8	8.8	7.5
$44,425 - $50,464	10.0	10.1	9.1	8.1
$50,464 - $60,692	10.0	11.3	10.8	10.3
> $60,692	10.0	11.6	12.0	11.2

Unless otherwise specified, the T-4 supplementary file (defined in Appendix 1) is the source of all tables and figures.

Table 2 : Percentage of male workers aged 18-64 earning less than :

A) $13,509 (1993 constant dollars)

Age Year	18-24	25-34	35-44	45-54	55-64	All
1975	44.8	13.9	10.1	10.0	15.2	**20.0**
1976	43.4	13.8	9.5	9.8	14.4	**19.4**
1977	44.4	14.5	9.7	10.0	14.9	**20.0**
1978	46.2	15.3	10.0	10.0	14.3	**20.7**
1979	44.9	14.6	9.9	9.6	14.0	**20.1**
1980	46.7	15.3	10.3	10.0	14.4	**20.7**
1981	48.0	16.3	10.7	10.1	15.0	**21.4**
1982	55.0	19.7	12.4	12.2	16.5	**24.3**
1983	60.3	22.3	13.9	13.2	18.1	**26.6**
1984	61.1	21.9	13.1	13.3	18.2	**26.4**
1985	61.0	21.8	12.6	13.1	18.2	**25.9**
1986	62.0	22.1	13.1	12.8	17.9	**25.9**
1987	60.3	21.6	13.3	12.3	18.8	**25.3**
1988	59.6	21.1	13.0	12.2	18.3	**24.5**
1989	60.1	20.5	13.4	11.8	19.1	**24.2**
1990	61.1	21.6	14.5	12.0	19.3	**24.6**
1991	66.2	24.7	16.0	13.8	20.9	**26.8**
1992	68.5	25.9	16.6	14.3	22.1	**27.6**
1993	69.7	26.2	17.0	14.3	22.1	**27.7**

B) $21,073 (1993 constant dollars)

Age Year	18-24	25-34	35-44	45-54	55-64	All
1975	64.9	23.4	16.8	17.9	26.0	**31.4**
1976	62.3	22.6	15.2	16.1	23.0	**29.6**
1977	62.9	23.5	15.9	16.5	23.2	**30.3**
1978	64.7	24.3	16.4	16.7	23.1	**31.1**
1979	64.1	24.1	16.3	16.6	22.9	**30.8**
1980	65.8	25.0	17.0	17.2	23.1	**31.5**
1981	66.8	26.5	17.5	17.4	24.2	**32.3**
1982	72.9	30.8	20.1	20.5	26.5	**35.6**
1983	77.3	33.9	21.7	21.5	28.1	**37.8**
1984	77.8	33.8	21.1	20.9	27.7	**37.5**
1985	78.5	34.0	20.4	20.9	28.1	**37.2**
1986	79.2	34.6	20.8	20.3	28.3	**37.2**
1987	78.9	34.3	20.8	19.8	28.8	**36.8**
1988	78.3	33.5	20.8	19.3	28.8	**36.0**
1989	78.2	33.3	21.3	19.1	29.5	**35.5**
1990	79.2	34.7	22.5	19.6	30.0	**36.1**
1991	82.6	38.3	25.0	21.8	32.6	**38.5**
1992	84.1	39.4	25.3	22.3	33.6	**38.9**
1993	85.3	40.3	25.7	22.8	33.2	**39.2**

Table 3 : Percentage of new spells of low earnings which lasted at least x years, 1976-1992

A) Low earnings : < $13,509 (1993 constant dollars)

Of all new spells of low earnings started in...

x percent lasted at least....	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
2 years	39.1	41.0	39.0	40.2	40.3	45.4	46.9	46.8	47.3	47.7	44.4	45.0	44.1	44.2	45.9	45.8	45.2
3 years	19.2	19.0	20.1	20.5	21.4	25.9	24.5	25.9	26.7	26.2	24.1	24.2	23.0	24.6	25.0	24.4	-
4 years	10.1	11.0	11.1	11.4	12.8	15.3	14.4	15.3	16.1	14.9	14.2	13.9	14.1	14.1	15.2	-	-
5 years	6.0	6.9	7.1	7.5	8.3	9.2	8.9	9.1	10.2	9.1	8.6	8.1	8.8	9.0	-	-	-
6 years	3.9	4.3	4.9	5.2	5.0	5.6	5.6	5.7	6.6	5.3	5.4	5.5	5.7	-	-	-	-
7 years	2.5	3.2	3.4	3.8	3.5	3.9	3.6	3.7	4.2	3.7	3.6	3.7	-	-	-	-	-
8 years	1.6	2.4	2.6	2.5	2.4	2.7	2.5	2.6	2.9	2.6	2.4	-	-	-	-	-	-
9 years	1.1	1.6	1.9	1.8	1.7	2.1	1.8	1.9	2.0	1.9	-	-	-	-	-	-	-
10 years	1.0	1.4	1.4	1.3	1.2	1.7	1.3	1.5	1.6	-	-	-	-	-	-	-	-
Number of spells	3,775	4,129	4,280	4,087	4,452	4,659	5,667	5,976	5,446	5,269	5,365	5,272	5,147	5,272	5,674	6,323	6,062

B) Low earnings ; < $21,073 (1993 constant dollars)

Of all new spells of low earnings started in...

x percent lasted at least ...	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
2 years	48.4	49.7	48.8	51.2	50.8	55.7	55.8	56.4	57.0	57.8	56.4	56.3	54.0	53.7	57.0	54.0	53.9
3 years	28.3	28.6	28.6	31.7	32.3	36.7	34.0	36.3	37.7	37.6	35.4	34.9	33.8	34.9	36.7	33.3	-
4 years	18.1	18.8	18.6	21.0	23.0	25.8	23.0	24.9	26.4	25.5	24.4	24.0	23.7	23.3	25.9	-	-
5 years	12.3	13.5	12.0	15.1	17.0	18.5	16.0	17.8	19.2	18.4	17.3	16.9	16.9	16.6	-	-	-
6 years	8.9	9.5	8.6	11.3	12.6	13.2	11.3	12.5	14.0	13.2	12.5	12.9	12.6	-	-	-	-
7 years	6.7	7.6	6.5	8.5	9.1	9.4	8.3	9.0	10.8	10.0	9.1	9.6	-	-	-	-	-
8 years	5.3	5.7	5.4	6.5	7.0	6.8	6.3	6.6	8.4	7.6	6.9	-	-	-	-	-	-
9 years	4.3	4.6	4.1	4.9	5.4	4.9	4.8	5.2	6.5	6.0	-	-	-	-	-	-	-
10 years	3.4	3.8	3.3	3.9	4.2	3.8	3.8	4.0	5.1	-	-	-	-	-	-	-	-
Number of spells	4,201	4,692	4,841	4,693	5,109	5,218	6,206	6,375	5,721	5,608	5,652	5,620	5,487	5,762	6,127	6,614	6,182

* The numbers above refer to new spells of low earnings started by male workers who were aged 18-50 at the beginning of the spell. Incomplete spells as well as completed spells are included

Table 4 : Given that a spell of low earnings has lasted x years, what are the probabilities of workers' :
A) Moving down, i.e. start receiving no earnings next year : P(moving down)
B) Moving up, i.e. start receiving higher earnings next year : P(moving up)
C) Moving out of the bottom of the earnings distribution : P(moving out) = P(moving down) + P(moving up)

Spells of low earnings started by men aged 18-24 at the beginning of the spell

	P(moving down)		P(moving up)		P(moving out)	
Year	**1976-84**	**1985-92**	**1976-84**	**1985-92**	**1976-84**	**1985-92**
1	15.8%	15.2%	34.3%	30.6%	50.1%	45.8%
2	15.7%	14.9%	29.1%	25.7%	44.8%	40.6%
3	13.9%	13.1%	28.0%	24.7%	41.9%	37.8%
4	14.1%	13.3%	26.7%	23.4%	40.8%	36.8%
5	15.5%	14.6%	25.8%	22.7%	41.3%	37.3%
6	12.5%	11.7%	22.5%	19.6%	35.0%	31.3%
7	13.7%	12.8%	23.4%	20.4%	37.1%	33.2%
8	12.4%	11.5%	16.7%	14.4%	29.2%	25.9%
9	12.4%	11.4%	15.2%	13.1%	27.6%	24.5%
10 or more	12.1%	11.1%	10.6%	9.0%	22.7%	20.0%

Spells of low earnings started by men aged 25-34 at the beginning of the spell

	P(moving down)		P(moving up)		P(moving out)	
Year	**1976-84**	**1985-92**	**1976-84**	**1985-92**	**1976-84**	**1985-92**
1	24.5%	24.1%	38.2%	36.7%	62.7%	60.7%
2	22.6%	22.0%	30.8%	29.3%	53.3%	51.2%
3	21.6%	21.0%	26.8%	25.4%	48.5%	46.4%
4	20.7%	20.0%	23.9%	22.6%	44.6%	42.5%
5	19.1%	18.4%	19.9%	18.7%	38.9%	37.0%
6	19.2%	18.4%	17.4%	16.4%	36.6%	34.7%
7	18.5%	17.6%	12.5%	11.7%	31.0%	29.3%
8	18.5%	17.7%	13.7%	12.9%	32.3%	30.6%
9	17.7%	16.8%	7.2%	6.7%	24.9%	23.5%
10 or more	14.3%	13.6%	10.0%	9.3%	24.2%	22.8%

Spells of low earnings started by men aged 35-50 at the beginning of the spell

	P(moving down)		P(moving up)		P(moving out)	
Year	**1976-84**	**1985-92**	**1976-84**	**1985-92**	**1976-84**	**1985-92**
1	30.0%	30.0%	33.5%	33.5%	63.4%	63.4%
2	27.5%	27.5%	25.1%	25.1%	52.6%	52.6%
3	24.5%	24.5%	20.6%	20.6%	45.0%	45.0%
4	21.5%	21.5%	14.9%	14.9%	36.4%	36.4%
5	20.4%	20.4%	13.0%	13.0%	33.4%	33.4%
6	20.9%	20.9%	12.3%	12.3%	33.2%	33.2%
7	15.9%	15.9%	10.7%	10.7%	26.5%	26.5%
8	16.6%	16.6%	12.9%	12.9%	29.5%	29.5%
9	12.2%	12.2%	6.9%	6.9%	19.1%	19.1%
10 or more	14.3%	14.3%	5.6%	5.6%	19.9%	19.9%

Note : Low earnings are those less than $13,509 in 1993 constant dollars. The numbers presented in this table are calculated for workers employed in Ontario. The calculations assume that the unemployment rate equals 10%, 6% and 4% for men aged 18-24, 25-34 and 35-50, respectively.

Table 5 : **Given that a spell of low earnings has lasted x years, what are the probabilities of workers' :**
      A) Moving down, i.e. start receiving no earnings next year : P(moving down)
      B) Moving up, i.e. start receiving higher earnings next year : P(moving up)
      C) Moving out of the bottom of the earnings distribution : P(moving out) = P(moving down) + P(moving up)

Spells of low earnings started by men aged 18-24 at the beginning of the spell

	P(moving down)		P(moving up)		P(moving out)	
Year	**1976-84**	**1985-92**	**1976-84**	**1985-92**	**1976-84**	**1985-92**
1	13.3%	12.4%	19.7%	16.7%	33.0%	29.1%
2	13.0%	12.0%	16.6%	13.9%	29.6%	25.9%
3	11.6%	10.7%	15.2%	12.7%	26.8%	23.4%
4	11.2%	10.3%	14.2%	11.9%	25.5%	22.2%
5	11.6%	10.6%	14.4%	12.0%	26.0%	22.7%
6	10.1%	9.3%	13.8%	11.5%	23.9%	20.7%
7	11.1%	10.1%	11.4%	9.5%	22.5%	19.5%
8	9.8%	8.9%	11.4%	9.4%	21.2%	18.3%
9	10.7%	9.8%	11.1%	9.2%	21.8%	19.0%
10 or more	10.9%	9.9%	7.8%	6.4%	18.7%	16.3%

Spells of low earnings started by men aged 25-34 at the beginning of the spell

	P(moving down)		P(moving up)		P(moving out)	
Year	**1976-84**	**1985-92**	**1976-84**	**1985-92**	**1976-84**	**1985-92**
1	21.5%	21.2%	29.1%	27.1%	50.6%	48.3%
2	18.6%	18.2%	23.4%	21.6%	42.0%	39.8%
3	17.2%	16.7%	19.3%	17.8%	36.5%	34.5%
4	16.6%	16.1%	16.6%	15.2%	33.2%	31.3%
5	15.0%	14.5%	14.0%	12.8%	29.0%	27.3%
6	14.4%	13.9%	13.1%	12.0%	27.5%	25.9%
7	13.7%	13.2%	11.7%	10.6%	25.3%	23.8%
8	14.7%	14.2%	10.3%	9.3%	25.0%	23.5%
9	14.6%	14.0%	8.1%	7.4%	22.7%	21.4%
10 or more	12.1%	11.6%	6.7%	6.1%	18.8%	17.7%

Spells of low earnings started by men aged 35-50 at the beginning of the spell

	P(moving down)		P(moving up)		P(moving out)	
Year	**1976-84**	**1985-92**	**1976-84**	**1985-92**	**1976-84**	**1985-92**
1	24.8%	24.8%	28.6%	28.6%	53.4%	53.4%
2	20.9%	20.9%	21.7%	21.7%	42.6%	42.6%
3	18.3%	18.3%	15.0%	15.0%	33.3%	33.3%
4	16.9%	16.9%	12.9%	12.9%	29.7%	29.7%
5	14.6%	14.6%	11.6%	11.6%	26.2%	26.2%
6	14.8%	14.8%	9.6%	9.6%	24.4%	24.4%
7	13.2%	13.2%	8.8%	8.8%	22.0%	22.0%
8	12.1%	12.1%	7.9%	7.9%	20.0%	20.0%
9	12.9%	12.9%	5.5%	5.5%	18.4%	18.4%
10 or more	12.4%	12.4%	4.7%	4.7%	17.1%	17.1%

Note : Low earnings are those less than $21,073 in 1993 constant dollars. The numbers presented in this table are calculated for workers employed in Ontario. The calculations assume that the unemployment rate equals 10%, 6% and 4% for men aged 18-24, 25-34 and 35-50, respectively.

Table 6: Short-term and long-term inequality measures, male workers with positive earnings all years, 1975-1984 and 1984-1993

I.	Average of coefficients of variation for annual earnings			Coefficient of variation for earnings cumulated over 10 years		
	1975-84	1984-93	%change	1975-84	1984-93	%change
Age*						
18-24	0.503	0.593	17.9%	0.388	0.459	18.3%
25-34	0.492	0.560	13.8%	0.442	0.486	10.0%
35-44	0.589	0.642	9.0%	0.512	0.573	11.9%
45-54	0.687	0.766	11.5%	0.624	0.667	6.9%
55-64	1.084	1.188	9.6%	0.957	1.033	7.9%
18-64	0.625	0.705	12.8%	0.543	0.612	12.7%
25-54	0.583	0.651	11.7%	0.517	0.571	10.4%
25-44	0.543	0.615	13.3%	0.477	0.544	14.0%

II.	Average of Theil-Entropy indexes for annual earnings			Theil-Entropy index for earnings cumulated over 10 years		
	1975-84	1984-93	%change	1975-84	1984-93	%change
Age *						
18-24	0.134	0.175	30.6%	0.076	0.100	31.6%
25-34	0.108	0.133	23.1%	0.083	0.101	21.7%
35-44	0.128	0.150	17.2%	0.103	0.124	20.4%
45-54	0.164	0.192	17.1%	0.137	0.156	13.9%
55-64	0.313	0.389	24.3%	0.253	0.315	24.5%
18-64	0.151	0.185	22.5%	0.113	0.142	25.7%
25-54	0.130	0.155	19.2%	0.103	0.124	20.4%
25-44	0.118	0.146	23.7%	0.093	0.116	24.7%

III.	Average of Gini coefficients for annual earnings			Gini coefficients for earnings cumulated over 10 years		
	1975-84	1984-93	%change	1975-84	1984-93	%change
Age *						
18-24	0.278	0.319	14.7%	0.215	0.248	15.3%
25-34	0.243	0.269	10.7%	0.217	0.240	10.6%
35-44	0.260	0.278	6.9%	0.238	0.257	8.0%
45-54	0.291	0.313	7.6%	0.269	0.287	6.7%
55-64	0.387	0.443	14.5%	0.346	0.400	15.6%
18-64	0.284	0.314	10.6%	0.250	0.280	12.0%
25-54	0.261	0.285	9.2%	0.237	0.259	9.3%
25-44	0.251	0.278	10.8%	0.227	0.252	11.0%

* Age at the beginning of the period considered.

Table 7 : Short-term and long-term inequality measures, male workers with positive earnings all years, 1975-1980 and 1984-1989

I.	Average of coefficients of variation for annual earnings			Coefficient of variation for earnings cumulated over 6 years		
	1975-80	1984-89	%change	1975-80	1984-89	%change
Age*						
18-24	0.547	0.656	19.9%	0.446	0.543	21.7%
25-34	0.48	0.572	19.2%	0.427	0.507	18.7%
35-44	0.578	0.627	8.5%	0.515	0.57	10.7%
45-54	0.664	0.744	12.0%	0.616	0.658	6.8%
55-64	0.889	1.049	18.0%	0.831	0.922	11.0%
18-64	0.642	0.742	15.6%	0.578	0.663	14.7%
25-54	0.576	0.654	13.5%	0.519	0.586	12.9%
25-44	0.536	0.617	15.1%	0.475	0.557	17.3%

II.	Average of Theil-Entropy indexes for annual earnings			Theil-Entropy index for earnings cumulated over 6 years		
	1975-80	1984-89	%change	1975-80	1984-89	%change
Age*						
18-24	0.158	0.211	33.5%	0.100	0.140	40.0%
25-34	0.110	0.144	30.9%	0.085	0.114	34.1%
35-44	0.129	0.153	18.6%	0.107	0.130	21.5%
45-54	0.159	0.184	15.7%	0.138	0.156	13.0%
55-64	0.227	0.300	32.2%	0.195	0.250	28.2%
18-64	0.164	0.207	26.2%	0.131	0.170	29.8%
25-54	0.132	0.163	23.5%	0.108	0.135	25.0%
25-44	0.121	0.155	28.1%	0.096	0.128	33.3%

III.	Average of Gini coefficients for annual earnings			Gini coefficients for earnings cumulated over 6 years		
	1975-80	1984-89	%change	1975-80	1984-89	%change
Age*						
18-24	0.304	0.354	16.4%	0.248	0.294	18.5%
25-34	0.248	0.282	13.7%	0.222	0.256	15.3%
35-44	0.263	0.283	7.6%	0.243	0.266	9.5%
45-54	0.289	0.306	5.9%	0.270	0.286	5.9%
55-64	0.332	0.382	15.1%	0.306	0.353	15.4%
18-64	0.298	0.334	12.1%	0.270	0.308	14.1%
25-54	0.265	0.293	10.6%	0.243	0.272	11.9%
25-44	0.256	0.289	12.9%	0.233	0.267	14.6%

*Age at the beginning of the period considered.

Table 8 : Relative earnings at the bottom, middle and top quintile, 1975-80 and 1984-89

I. Men with positive earnings all years

	1975-80			1984-89			% change		
	T/B	T/M	M/B	T/B	T/M	M/B	T/B	T/M	M/B
A) Annual earnings*									
Age									
18-64	5.59	1.94	2.88	7.46	2.06	3.62	33.5%	6.2%	25.7%
25-54	4.25	1.85	2.3	5.31	1.92	2.77	24.9%	3.8%	20.4%
25-44	4.15	1.78	2.33	5.25	1.87	2.82	26.5%	5.1%	21.0%
B) Cumulated earnings**									
Age									
18-64	4.25	1.9	2.24	5.46	2.04	2.67	28.5%	7.4%	19.2%
25-54	3.59	1.81	1.98	4.32	1.89	2.28	20.3%	4.4%	15.2%
25-44	3.44	1.74	1.98	4.24	1.84	2.3	23.3%	5.7%	16.2%

II. Men aged 25-50 with positive earnings at the beginning of the period

	1975-80			1984-89			% change		
	T/B	T/M	M/B	T/B	T/M	M/B	T/B	T/M	M/B
A) Annual earnings *	15.03	1.91	7.82	16.91	2.03	8.26	12.5%	6.3%	5.6%
B) Cumulated earnin	6.8	1.87	3.63	8.24	2.02	4.08	21.2%	8.0%	12.4%

T/B = average earnings at the top quintile/ average earnings at the bottom quintile.

T/M = average earnings at the top quintile/ average earnings at the middle quintile.

M/B = average earnings at the middle quintile/ average earnings at the bottom quintile.

* For annual earnings, the numbers show the average of the ratios across all years covered by the period.

**Ratios for earnings cumulated over 6 years.

Table 9 :   Relative earnings at the bottom, middle and top quintile : short-term ratios, 1975-80 and 1984-89 *

A) Men aged 25-54 with positive earnings all years

Year	T/M	M/B	Year	T/M	M/B
1975	1.9	2.3	1984	1.9	3.2
1976	1.8	2.2	1985	1.9	2.8
1977	1.8	2.3	1986	1.9	2.7
1978	1.8	2.3	1987	1.9	2.6
1979	1.9	2.2	1988	2.0	2.6
1980	1.8	2.5	1989	2.0	2.7

B) Men aged 25-50 with positive earnings at the beginning of the period

Year	T/M	M/B	Year	T/M	M/B
1975	1.9	3.2	1984	2.0	4.4
1976	1.9	4.4	1985	2.0	5.9
1977	1.9	6.5	1986	2.0	7.6
1978	1.9	9.7	1987	2.0	8.7
1979	1.9	10.0	1988	2.1	10.2
1980	2.0	13.3	1989	2.1	12.7

* The numbers show average annual earnings at various quintiles expressed in terms of ratios.

Figure 1 : Indexed real annual earnings at the bottom, middle and top quintile, 1975-1993

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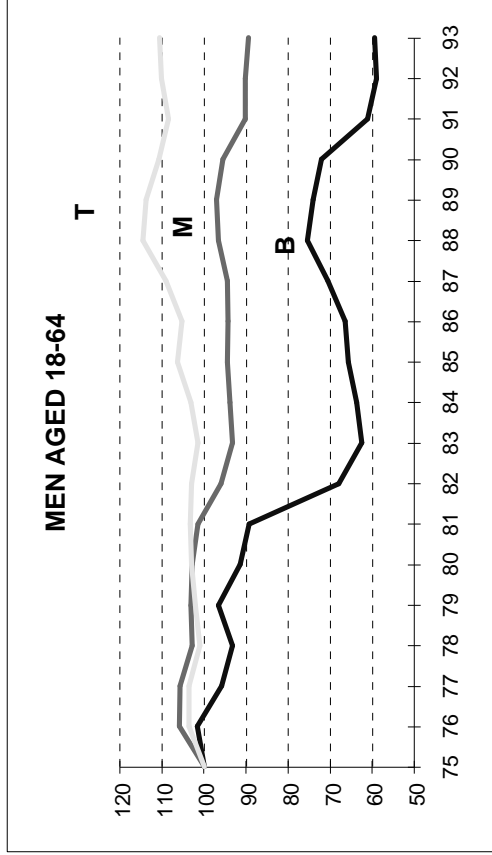
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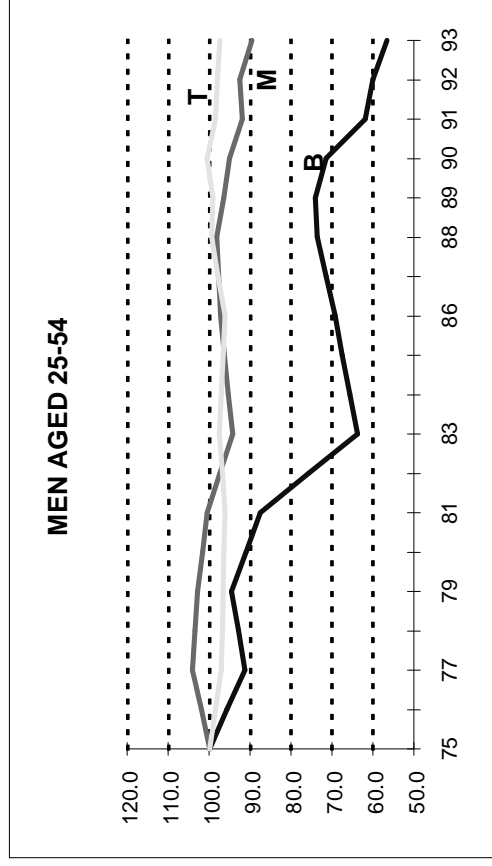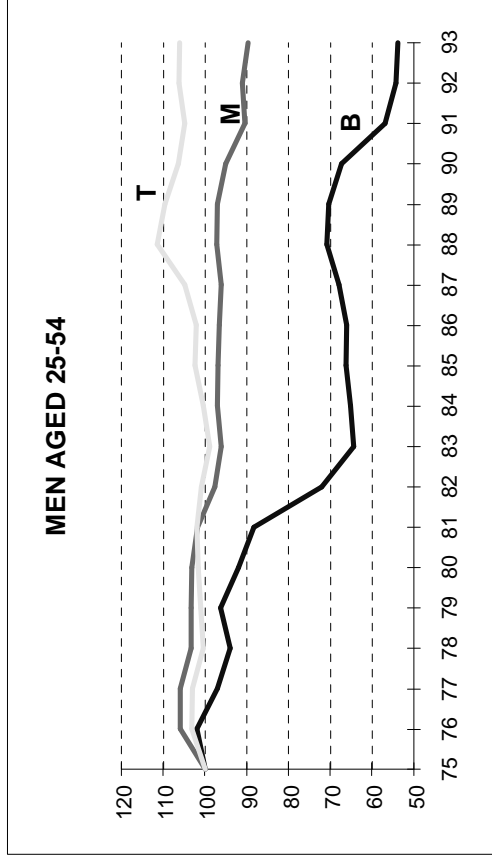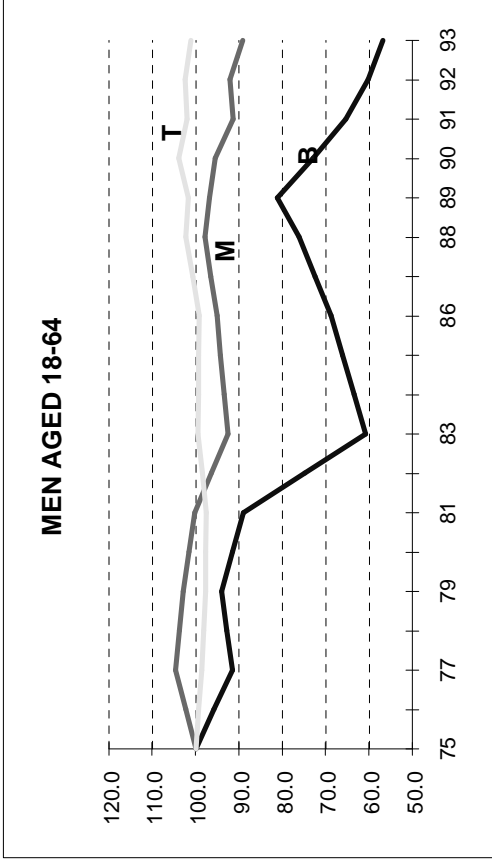
MEN AGED 18-64

MEN AGED 18-64

MEN AGED 25-54

MEN AGED 25-54

* All figures are based on samples of men with positive annual wages during the reference year.

Figure 2 : Percentage of individuals in the middle of the earnings distribution, 1975-1993

SURVEY OF CONSUMER FINANCES
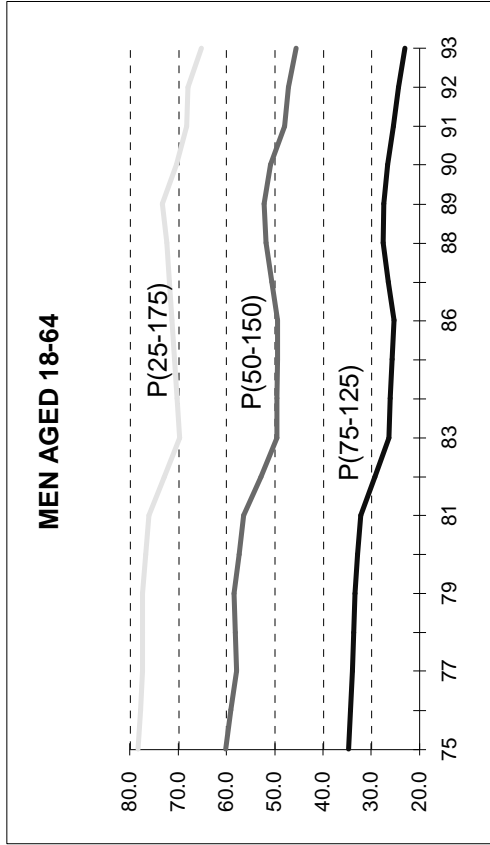
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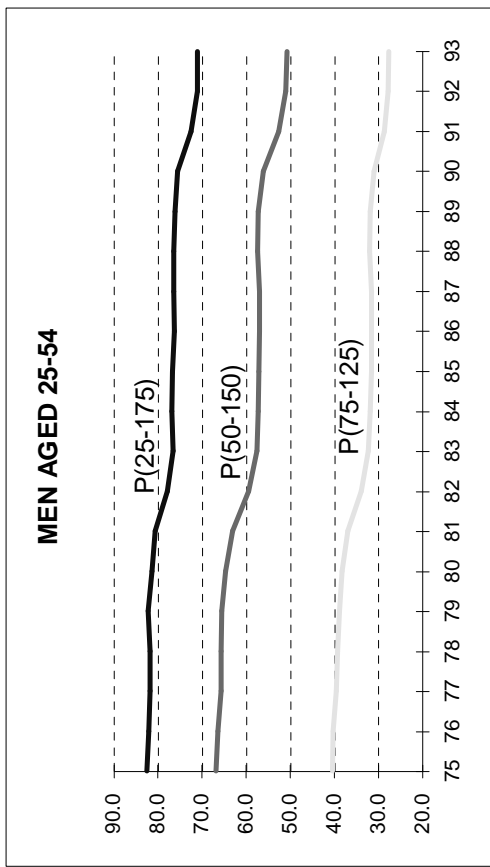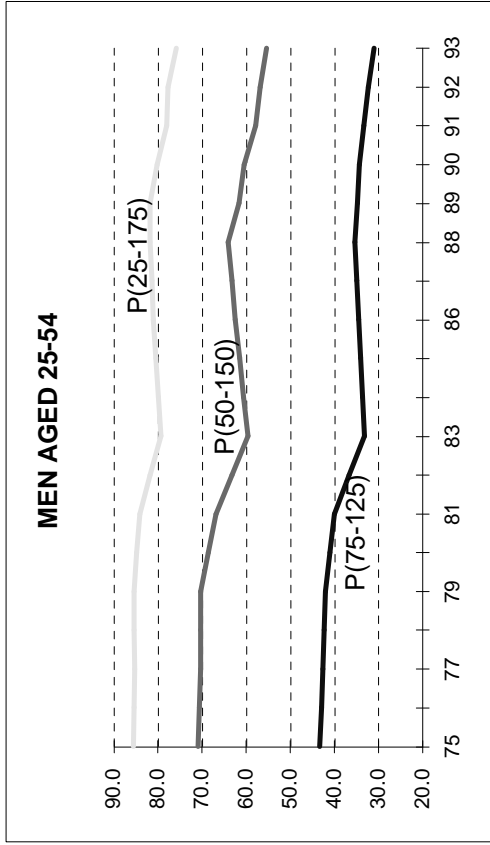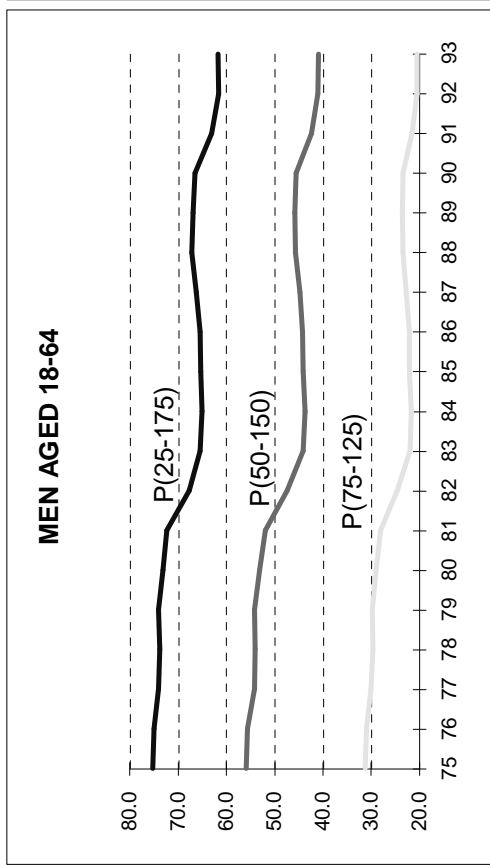
*All figures are based on samples of men with positive annual wages during the reference year.

Figure 3 : Movements into and out of the bottom of the earnings distribution, 1976-1992

**Of all men aged x-y, what percentage moved out of the middle of the earnings distribution
in year t into the bottom of the earnings distribution in year t+1 ?**

Chart 3.1

Chart 3.2
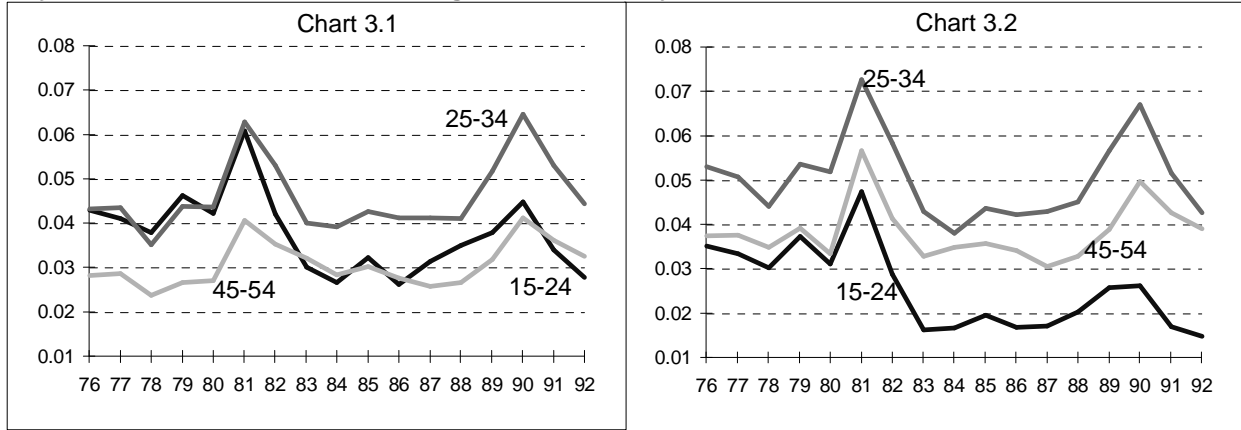
**Of all men aged x-y, what percentage moved from non-employment in year t into the bottom
of the earnings distribution in year t+1 ?**

Chart 3.3

Chart 3.4
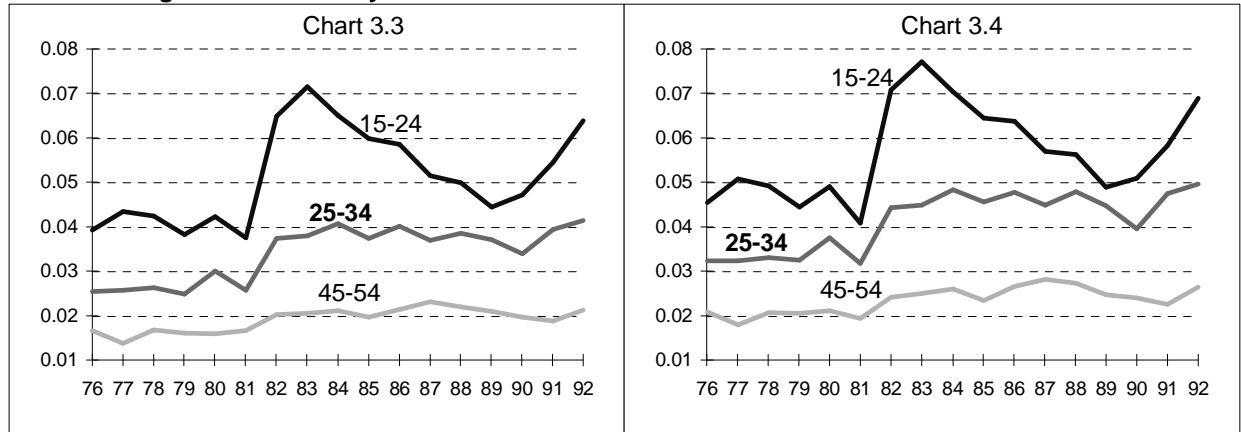
**Of all men aged x-y who were in the bottom of the earnings distribution in year t, what percentage
moved into the middle or the top of the earnings distribution in year t+1 ?**

Chart 3.5

Chart 3.6
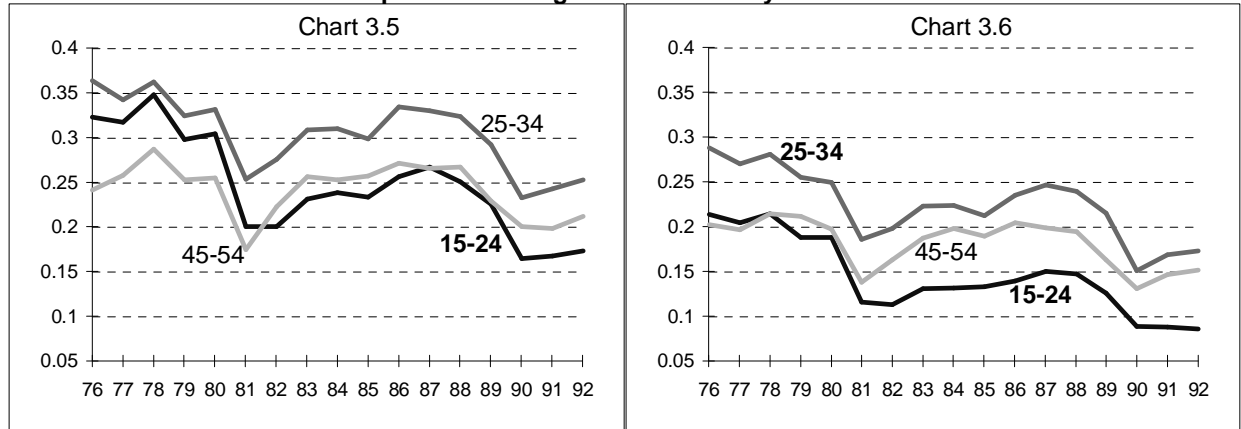
* Charts 3.1-3.3-3.5 refer to the first definition of low earnings (< $13,509) and Charts 3.2-3.4-3.6 refer to the
second definition of low earnings (< $21,073 in 1993 constant dollars)

Figure 4 : **Indexed Real Annual Earnings of Men Working Full Year Full-Time, by Age, 1969-1993**
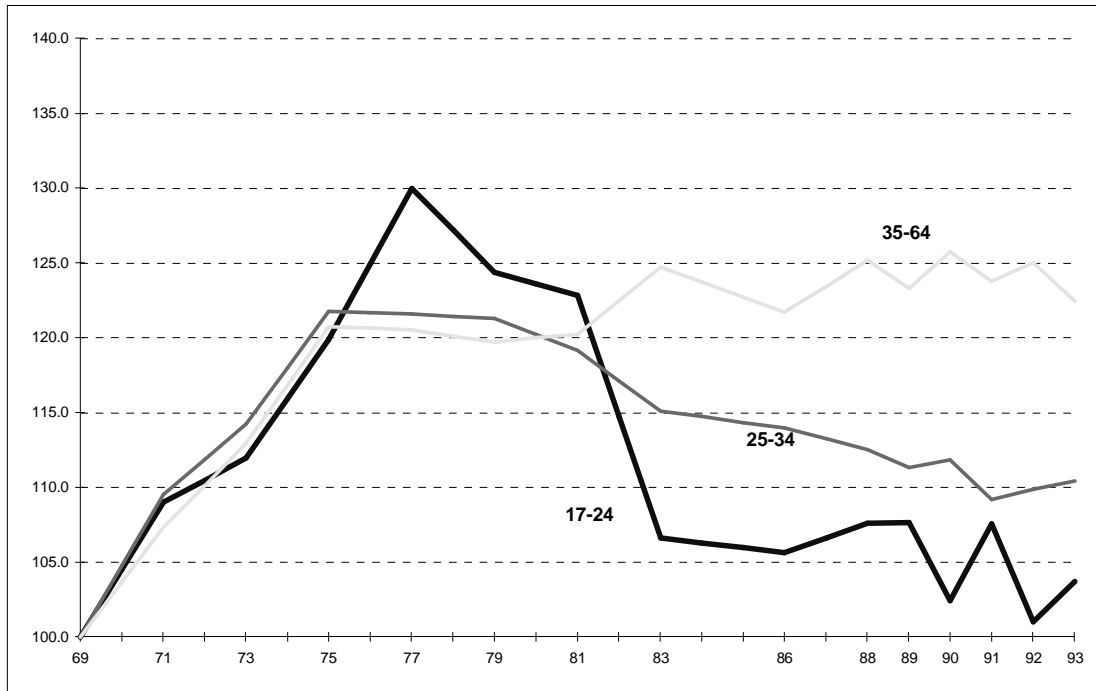
Source : Survey of Consumer Finances

Appendix 1 : The Data

The data set used in this study is the T-4 supplementary tax file of Revenue Canada. The period covered is 1975-1993. The sample used contains 1% of all personal tax records received by Revenue Canada. Specifically, the sample consists of 1% of individuals who received a T-4 supplementary form **at least one year** between 1975 and 1993. The file was constructed by merging employers' T-4 supplementary forms with T-1 personal tax records.

Employers have to fill a T-4 supplementary form in the following cases :

a) income tax, contributions to Canada's or Quebec's pension plan or to the unemployment insurance system have to be deducted from an employee's pay ;

b) the annual wage of an employee exceeds a certain threshold.

Between 1975 and 1988, that threshold amounted to $250. In 1989, it rose to $500 and remained constant during the 1989-1993 period. Income tax has to be deducted whenever an employee's annual **income** (i.e. annual wages plus interests, dividends, etc) exceeds his/her personal exemption. In most cases, the underlying annual wages should be higher than the thresholds of either $250 or $500. Contributions to Canada's pension plan have to be deducted whenever the annual wage of an employee exceeds the Year's Basic Exemption (YBE). The YBE amounts roughly to 10% of the average industrial annual wage and thus exceeds the thresholds of $250 and $500. Contributions to UI have to be deducted from an employee's pay whenever he/she works more than a certain number of hours per week (15 hours in 1993) or earns more than a given amount per week ($149 in 1993).

Since the thresholds associated to income tax (i.e. the personal exemption) or to CPP contributions (i.e. the YBE) exceed $250 or $500, condition b should cover most jobs. However, in the cases where individuals earn more than the UI threshold on a weekly basis (or work more hours per week than the minimum number required) yet earn less than either $250 or $500 on an annual basis, condition b will not include such jobs. We expect such cases to be of very limited importance.

To have a sample which is consistent over time, we use a two-step procedure. First, we exclude all jobs with annual wages less than $250 in 1975 constant dollars. The resulting thresholds equal $250 in 1975, $645 in 1989 and $738 in 1993. Then we derive annual wages by summing earnings from all remaining jobs individuals held in a given year. Thus, - unless otherwise stated - **the earning concept used in this paper consists of annual wages resulting from jobs paid at least $250 in 1975 constant dollars.**

This implies that whenever we refer to workers with no earnings, we include workers who did not receive any wages during the reference year as well as those whose earnings were totally based on jobs that paid less than $250 per year in 1975 constant dollars. Thus, the term "workers with no earnings" should be viewed as referring to workers who did not have a meaningful spell of employment during the reference year.

A related point is that the earnings concept used in this paper excludes any income from self-employment. Thus, an individual whose annual wages drop from year t to t+1 but who starts receiving income from self-employment in year t+1 could, under the earning concept used in this paper, start a new spell of low earnings in year t+1 even though his employment income - i.e. the sum of annual wages and salaries plus self-employment income - had remained unchanged between these two years. More generally, transitions of individuals from paid work into self-employment are excluded from the analysis.

Appendix 2 : Definition of the explanatory variables used for the multinomial logit model
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URATE : Regional unemployment rate (for men) by age group for a given year. The five following age groups are used : 1) 18-24, 2) 25-34, 3) 35-44, 4) 45-54 and, 5) 55-64. The data are taken from the September files of the Labour Force Survey.

STRUC : Dummy variable. Equals 1 if a spell occurs in 1985 or after, 0 otherwise.

ATL : Dummy variable. Equals 1 if a male worker had his main job in the Atlantic provinces during a given year, 0 otherwise.

QUE : Dummy variable. Equals 1 if a male worker had his main job in Quebec during a given year, 0 otherwise.

PRA : Dummy variable. Equals 1 if a male worker had his main job in the Prairies during a given year, 0 otherwise.

BRI : Dummy variable. Equals 1 if a male worker had his main job in British-Columbia during a given year, 0 otherwise.

ONTARIO is the omitted category.

YEARi : Dummy variable. Equals 1 if a record refers to the ith year of a spell, 0 otherwise (i= 1,... 9).

YEAR10 : Dummy variable. Equals 1 if a record refers to the tenth or higher year of a spell, 0 otherwise.

YEAR1 is the omitted category.

DISTANCE : Difference between the low earnings threshold and the annual earnings of worker i at time t.
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APPENDIX 2 : RESULTS OF MULTINOMIAL LOGIT MODEL

TABLE A1 :


Sample : new spells of low earnings started between 1976 and 1992 by men aged 18-24
Definition of low earnings : earnings less than $13,509 (in 1993 constant dollars)

The dependent variable equals :
0 for 40780 spell-years
1 for 11469 spell-years
2 for 19777 spell-years
Sample size = 72026 spell-years
Y=0 means the individual did not leave the bottom of the earnings distribution next year
Y=1 means the individual left the bottom of the earnings distribution next year by moving down
Y=2 means the individual left the bottom of the earnings distribution next year by moving up

Maximum Likelihood Estimates
Log likelihood function       -65839.83
Restricted log likelihood     -69831.93
Chi-squared                    7984.207
Significance level             0.0000000

Variable  Coefficient    Standard Error  z=b/s.e. P[Z=z]  Mean of X
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Coefficients for Y = 1 :

Constant -1.5062          0.43994E-01  -34.235   0.00000
URATE    -0.23685E-01     0.24285E-02   -9.753   0.00000   12.76
STRUC    -0.12512         0.21998E-01   -5.688   0.00000  0.5296
ATL      -0.16678         0.42129E-01   -3.959   0.00008  0.1150
QUE       0.42280E-01     0.30452E-01    1.388   0.16502  0.2714
PRA       0.62282E-01     0.31453E-01    1.980   0.04769  0.1729
BRI       0.23094         0.37027E-01    6.237   0.00000  0.1136
YEAR2    -0.11091         0.26779E-01   -4.142   0.00003  0.2330
YEAR3    -0.28128         0.35012E-01   -8.034   0.00000  0.1260
YEAR4    -0.28351         0.44435E-01   -6.380   0.00000  0.7153E-01
YEAR5    -0.18554         0.55464E-01   -3.345   0.00082  0.4115E-01
YEAR6    -0.49669         0.78885E-01   -6.296   0.00000  0.2288E-01
YEAR7    -0.37971         0.97474E-01   -3.896   0.00010  0.1379E-01
YEAR8    -0.59169         0.13188       -4.487   0.00001  0.7969E-02
YEAR9    -0.61565         0.16677       -3.692   0.00022  0.5123E-02
YEAR10   -0.70557         0.13669       -5.162   0.00000  0.7969E-02
DISTANCE  0.10220E-03     0.36488E-05   28.009   0.00000   5999.

Coefficients for Y = 2 :

Constant  0.98234         0.33609E-01   29.228   0.00000
URATE    -0.28492E-01     0.20547E-02  -13.867   0.00000   12.76
STRUC    -0.19640         0.18625E-01  -10.545   0.00000  0.5296
ATL      -0.23095         0.35778E-01   -6.455   0.00000  0.1150
QUE      -0.35720E-01     0.25476E-01   -1.402   0.16089  0.2714
PRA      -0.13299         0.26711E-01   -4.979   0.00000  0.1729
BRI       0.99121E-01     0.31866E-01    3.111   0.00187  0.1136
YEAR2    -0.26717         0.22868E-01  -11.683   0.00000  0.2330
YEAR3    -0.35400         0.28954E-01  -12.226   0.00000  0.1260
YEAR4    -0.42348         0.37232E-01  -11.374   0.00000  0.7153E-01
YEAR5    -0.44768         0.48216E-01   -9.285   0.00000  0.4115E-01
YEAR6    -0.68745         0.65368E-01  -10.517   0.00000  0.2288E-01
YEAR7    -0.61539         0.82171E-01   -7.489   0.00000  0.1379E-01
YEAR8    -1.0703          0.12002       -8.918   0.00000  0.7969E-02
YEAR9    -1.1838          0.15312       -7.731   0.00000  0.5123E-02
YEAR10   -1.6169          0.14512      -11.142   0.00000  0.7969E-02
DISTANCE -0.18292E-03     0.29261E-05  -62.513   0.00000   5999.
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*See the first page of Appendix 2 for the definition of the explanatory variables.
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Number of spells censored                              = 2652
Number of spells ending with the individual moving down = 11469
Number of spells ending with the individual moving up   = 19777
Total number of spells started between 1976 and 1992    = 33898
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APPENDIX 2 : RESULTS OF MULTINOMIAL LOGIT

TABLE A2 :


Sample : new spells of low earnings started between 1976 and 1992 by men aged 25-34
Definition of low earnings : earnings less than $13,509 (in 1993 constant dollars)

The dependent variable equals :
0 for 24246 spell-years
1 for 11873 spell-years
2 for 15853 spell-years
Sample size = 51972 spell-years
Y=0 means the individual did not leave the bottom of the earnings distribution next year
Y=1 means the individual left the bottom of the earnings distribution next year by moving down
Y=2 means the individual left the bottom of the earnings distribution next year by moving up

Maximum Likelihood Estimates
Log likelihood function      -52022.85
Restricted log likelihood    -54839.20
Chi-squared                   5632.706
Significance level            0.0000000

Variable  Coefficient     Standard Error z=b/s.e.  P[Z=z]    Mean of X
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Coefficients for Y = 1 :


Constant -0.82285          0.42460E-01  -19.379   0.00000
URATE    -0.19747E-01      0.45180E-02   -4.371   0.00001   7.586
STRUC    -0.69853E-01      0.23858E-01   -2.928   0.00341   0.5900
ATL      -0.51723          0.45433E-01  -11.384   0.00000   0.1160
QUE      -0.94814E-01      0.33491E-01   -2.831   0.00464   0.2712
PRA      -0.92863E-01      0.33642E-01   -2.760   0.00577   0.1759
BRI       0.71256E-01      0.39715E-01    1.794   0.07278   0.1237
YEAR2    -0.30671          0.28780E-01  -10.657   0.00000   0.2127
YEAR3    -0.44845          0.39758E-01  -11.280   0.00000   0.9628E-01
YEAR4    -0.56739          0.55014E-01  -10.314   0.00000   0.4766E-01
YEAR5    -0.74160          0.76341E-01   -9.714   0.00000   0.2542E-01
YEAR6    -0.77619          0.97461E-01   -7.964   0.00000   0.1522E-01
YEAR7    -0.89714          0.12517        -7.167   0.00000   0.9486E-02
YEAR8    -0.87640          0.15600        -5.618   0.00000   0.6157E-02
YEAR9    -1.0239           0.20429        -5.012   0.00000   0.3848E-02
YEAR10   -1.2493           0.17148        -7.286   0.00000   0.6677E-02
DISTANCE  0.92901E-04      0.36295E-05   25.596   0.00000   5766.

Coefficients for Y = 2 :


Constant  0.90468          0.36805E-01   24.580   0.00000
URATE    -0.31061E-01      0.41976E-02   -7.400   0.00000   7.586
STRUC    -0.92432E-01      0.22095E-01   -4.183   0.00003   0.5900
ATL      -0.45678          0.41657E-01  -10.965   0.00000   0.1160
QUE      -0.12676          0.31095E-01   -4.077   0.00005   0.2712
PRA      -0.17161          0.31425E-01   -5.461   0.00000   0.1759
BRI       0.85559E-01      0.36976E-01    2.314   0.02067   0.1237
YEAR2    -0.43976          0.26668E-01  -16.490   0.00000   0.2127
YEAR3    -0.67457          0.37855E-01  -17.820   0.00000   0.9628E-01
YEAR4    -0.86398          0.53981E-01  -16.005   0.00000   0.4766E-01
YEAR5    -1.1463           0.77035E-01  -14.880   0.00000   0.2542E-01
YEAR6    -1.3145           0.10474       -12.550   0.00000   0.1522E-01
YEAR7    -1.7306           0.15165       -11.412   0.00000   0.9486E-02
YEAR8    -1.6170           0.18171        -8.899   0.00000   0.6157E-02
YEAR9    -2.3679           0.30140        -7.856   0.00000   0.3848E-02
YEAR10   -2.0523           0.19743       -10.395   0.00000   0.6677E-02
DISTANCE -0.12296E-03      0.33043E-05   -37.213   0.00000   5766.
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*See the first page of Appendix 2 for the definition of the explanatory variables.
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Number of spells censored                               =  2239
Number of spells ending with the individual moving down = 11873
Number of spells ending with the individual moving up   = 15853
Total number of spells started between 1976 and 1992    = 29965
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APPENDIX 2 : RESULTS OF MULTINOMIAL LOGIT

TABLE A3 :

Sample : new spells of low earnings started between 1976 and 1992 by men aged 35-50
Definition of low earnings : earnings less than $13,509 (in 1993 constant dollars)

The dependent variable equals :
0 for 18101 spell-years
1 for 10436 spell-years
2 for 10780 spell-years
Sample size = 39317 spell-years
Y=0 means the individual did not leave the bottom of the earnings distribution next year
Y=1 means the individual left the bottom of the earnings distribution next year by moving down
Y=2 means the individual left the bottom of the earnings distribution next year by moving up

Maximum Likelihood Estimates
Log likelihood function   -39326.43
Restricted log likelihood   -41831.96
Chi-squared   5011.060
Significance level   0.0000000

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X

Coefficients for Y = 1 :

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X
Constant	-0.70282	0.46745E-01	-15.035	0.00000	
URATE	-0.21879E-01	0.71424E-02	-3.063	0.00219	5.567
STRUC	-0.55942E-02	0.26463E-01	-0.211	0.83258	0.5998
ATL	-0.44287	0.49361E-01	-8.972	0.00000	0.1197
QUE	-0.95211E-01	0.38293E-01	-2.486	0.01291	0.2675
PRA	-0.15131	0.38093E-01	-3.972	0.00007	0.1657
BRI	0.70165E-01	0.43559E-01	1.611	0.10723	0.1294
YEAR2	-0.34624	0.31985E-01	-10.825	0.00000	0.2022
YEAR3	-0.61076	0.45124E-01	-13.535	0.00000	0.8958E-01
YEAR4	-0.88597	0.63445E-01	-13.964	0.00000	0.4532E-01
YEAR5	-0.98509	0.82818E-01	-11.895	0.00000	0.2701E-01
YEAR6	-0.96321	0.10326	-9.328	0.00000	0.1694E-01
YEAR7	-1.3338	0.14501	-9.197	0.00000	0.1066E-01
YEAR8	-1.2482	0.16929	-7.373	0.00000	0.7529E-02
YEAR9	-1.6934	0.23933	-7.076	0.00000	0.4934E-02
YEAR10	-1.5283	0.14978	-10.204	0.00000	0.1101E-01
DISTANCE	0.10072E-03	0.39328E-05	25.610	0.00000	5783.

Coefficients for Y = 2 :

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X
Constant	0.69877	0.43890E-01	15.921	0.00000	
URATE	-0.33707E-01	0.71771E-02	-4.696	0.00000	5.567
STRUC	-0.23923E-01	0.26528E-01	-0.902	0.36716	0.5998
ATL	-0.46592	0.50213E-01	-9.279	0.00000	0.1197
QUE	-0.58934E-01	0.38290E-01	-1.539	0.12377	0.2675
PRA	-0.10147	0.38114E-01	-2.662	0.00776	0.1657
BRI	0.12007	0.43704E-01	2.747	0.00601	0.1294
YEAR2	-0.54660	0.32373E-01	-16.885	0.00000	0.2022
YEAR3	-0.89526	0.47497E-01	-18.849	0.00000	0.8958E-01
YEAR4	-1.3601	0.72431E-01	-18.777	0.00000	0.4532E-01
YEAR5	-1.5438	0.97999E-01	-15.754	0.00000	0.2701E-01
YEAR6	-1.6039	0.12596	-12.733	0.00000	0.1694E-01
YEAR7	-1.8409	0.16802	-10.957	0.00000	0.1066E-01
YEAR8	-1.6098	0.18457	-8.722	0.00000	0.7529E-02
YEAR9	-2.3771	0.30107	-7.895	0.00000	0.4934E-02
YEAR10	-2.5640	0.22631	-11.330	0.00000	0.1101E-01
DISTANCE	-0.11075E-03	0.39035E-05	-28.373	0.00000	5783.

*See the first page of Appendix 2 for the definition of the explanatory variables.

Number of spells censored   = 1776
Number of spells ending with the individual moving down = 10436
Number of spells ending with the individual moving up   = 10780
Total number of spells started between 1976 and 1992   = 22992

APPENDIX 2 : RESULTS OF MULTINOMIAL LOGIT MODEL

TABLE A4 :

Sample : new spells of low earnings started between 1976 and 1992 by men aged 18-24
Definition of low earnings : earnings less than $21,073 (in 1993 constant dollars)

The dependent variable equals :
0 for 61495 spell-years
1 for 12162 spell-years
2 for 15355 spell-years
Sample size = 89012 spell-years
Y=0 means the individual did not leave the bottom of the earnings distribution next year
Y=1 means the individual left the bottom of the earnings distribution next year by moving down
Y=2 means the individual left the bottom of the earnings distribution next year by moving up

Maximum Likelihood Estimates
Log likelihood function   -66501.71
Restricted log likelihood   -73933.51
Chi-squared   14863.60
Significance level   0.0000000

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X

Coefficients for Y = 1 :

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X
Constant	-2.3654	0.45304E-01	-52.212	0.00000	
URATE	-0.24413E-01	0.23454E-02	-10.409	0.00000	12.13
STRUC	-0.12912	0.21070E-01	-6.128	0.00000	0.5563
ATL	-0.14321	0.40486E-01	-3.537	0.00040	0.1085
QUE	0.19790E-01	0.28845E-01	0.686	0.49266	0.2726
PRA	0.84706E-01	0.29478E-01	2.874	0.00406	0.1753
BRI	0.23754	0.34669E-01	6.852	0.00000	0.1141
YEAR2	-0.74773E-01	0.26554E-01	-2.816	0.00486	0.2194
YEAR3	-0.22720	0.32388E-01	-7.015	0.00000	0.1428
YEAR4	-0.27896	0.38863E-01	-7.178	0.00000	0.9568E-01
YEAR5	-0.24157	0.45975E-01	-5.254	0.00000	0.6500E-01
YEAR6	-0.40265	0.58548E-01	-6.877	0.00000	0.4305E-01
YEAR7	-0.33277	0.68663E-01	-4.846	0.00000	0.2857E-01
YEAR8	-0.47117	0.86874E-01	-5.424	0.00000	0.1905E-01
YEAR9	-0.37123	0.10316	-3.598	0.00032	0.1240E-01
YEAR10	-0.39535	0.84143E-01	-4.699	0.00000	0.1978E-01
DISTANCE	0.10434E-03	0.23895E-05	43.664	0.00000	0.1001E+05

Coefficients for Y = 2 :

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X
Constant	0.95149	0.35365E-01	26.905	0.00000	
URATE	-0.39000E-01	0.22634E-02	-17.231	0.00000	12.13
STRUC	-0.22466	0.20469E-01	-10.976	0.00000	0.5563
ATL	-0.27559	0.41165E-01	-6.695	0.00000	0.1085
QUE	-0.88695E-01	0.27389E-01	-3.238	0.00120	0.2726
PRA	-0.13364	0.27745E-01	-4.817	0.00000	0.1753
BRI	0.14368	0.33249E-01	4.321	0.00002	0.1141
YEAR2	-0.22519	0.26246E-01	-8.580	0.00000	0.2194
YEAR3	-0.34555	0.30562E-01	-11.306	0.00000	0.1428
YEAR4	-0.43401	0.35975E-01	-12.064	0.00000	0.9568E-01
YEAR5	-0.41198	0.41688E-01	-9.882	0.00000	0.6500E-01
YEAR6	-0.48655	0.49792E-01	-9.772	0.00000	0.4305E-01
YEAR7	-0.69411	0.62377E-01	-11.128	0.00000	0.2857E-01
YEAR8	-0.71179	0.75549E-01	-9.422	0.00000	0.1905E-01
YEAR9	-0.73013	0.94562E-01	-7.721	0.00000	0.1240E-01
YEAR10	-1.1189	0.85506E-01	-13.086	0.00000	0.1978E-01
DISTANCE	-0.17673E-03	0.20367E-05	-86.775	0.00000	0.1001E+05

*See the first page of Appendix 2 for the definition of the explanatory variables.

Number of spells censored   = 4015
Number of spells ending with the individual moving down = 12162
Number of spells ending with the individual moving up   = 15355
Total number of spells started between 1976 and 1992   = 31532

APPENDIX 2 : RESULTS OF MULTINOMIAL LOGIT MODEL

TABLE A5 :

Sample : new spells of low earnings started between 1976 and 1992 by men aged 25-34
Definition of low earnings : earnings less than $21,073 (in 1993 constant dollars)

The dependent variable equals :
0 for 42919 spell-years
1 for 13777 spell-years
2 for 16758 spell-years
Sample size = 73454 spell-years
Y=0 means the individual did not leave the bottom of the earnings distribution next year
Y=1 means the individual left the bottom of the earnings distribution next year by moving down
Y=2 means the individual left the bottom of the earnings distribution next year by moving up

Maximum Likelihood Estimates
Log likelihood function   -65079.49
Restricted log likelihood   -70884.99
Chi-squared   11611.01
Significance level   0.0000000

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X

Coefficients for Y = 1 :

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X
Constant	-1.5497	0.38324E-01	-40.437	0.00000	
URATE	-0.16641E-01	0.39980E-02	-4.162	0.00003	7.445
STRUC	-0.58081E-01	0.21119E-01	-2.750	0.00596	0.5957
ATL	-0.46467	0.41741E-01	-11.132	0.00000	0.1046
QUE	-0.12886	0.29427E-01	-4.379	0.00001	0.2757
PRA	-0.90667E-01	0.29275E-01	-3.097	0.00195	0.1783
BRI	0.26117E-01	0.34606E-01	0.755	0.45044	0.1231
YEAR2	-0.30284	0.25707E-01	-11.781	0.00000	0.2170
YEAR3	-0.47223	0.33309E-01	-14.177	0.00000	0.1174
YEAR4	-0.56101	0.42758E-01	-13.121	0.00000	0.6802E-01
YEAR5	-0.71973	0.55227E-01	-13.032	0.00000	0.4237E-01
YEAR6	-0.78449	0.68903E-01	-11.385	0.00000	0.2811E-01
YEAR7	-0.86482	0.85248E-01	-10.145	0.00000	0.1899E-01
YEAR8	-0.79291	0.99742E-01	-7.950	0.00000	0.1297E-01
YEAR9	-0.83093	0.12335	-6.737	0.00000	0.8849E-02
YEAR10	-1.0681	0.95369E-01	-11.200	0.00000	0.1789E-01
DISTANCE	0.88703E-04	0.20578E-05	43.106	0.00000	9049.

Coefficients for Y = 2 :

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X
Constant	0.76261	0.32241E-01	23.654	0.00000	
URATE	-0.34602E-01	0.38184E-02	-9.062	0.00000	7.445
STRUC	-0.11406	0.20099E-01	-5.675	0.00000	0.5957
ATL	-0.42614	0.40244E-01	-10.589	0.00000	0.1046
QUE	-0.18869	0.28022E-01	-6.734	0.00000	0.2757
PRA	-0.17159	0.28023E-01	-6.123	0.00000	0.1783
BRI	0.98404E-01	0.32821E-01	2.998	0.00272	0.1231
YEAR2	-0.37897	0.24295E-01	-15.599	0.00000	0.2170
YEAR3	-0.65804	0.32112E-01	-20.492	0.00000	0.1174
YEAR4	-0.86334	0.42695E-01	-20.221	0.00000	0.6802E-01
YEAR5	-1.0947	0.56405E-01	-19.408	0.00000	0.4237E-01
YEAR6	-1.1768	0.69926E-01	-16.830	0.00000	0.2811E-01
YEAR7	-1.3238	0.88564E-01	-14.947	0.00000	0.1899E-01
YEAR8	-1.4574	0.11249	-12.957	0.00000	0.1297E-01
YEAR9	-1.7216	0.14822	-11.615	0.00000	0.8849E-02
YEAR10	-1.9595	0.11645	-16.826	0.00000	0.1789E-01
DISTANCE	-0.11757E-03	0.19350E-05	-60.759	0.00000	9049.

*See the first page of Appendix 2 for the definition of the explanatory variables.

Number of spells censored   = 3868
Number of spells ending with the individual moving down = 13777
Number of spells ending with the individual moving up   = 16758
Total number of spells started between 1976 and 1992   = 34403

APPENDIX 2 : RESULTS OF MULTINOMIAL LOGIT MODEL

TABLE A6 :

Sample : new spells of low earnings started between 1976 and 1992 by men aged 35-50
Definition of low earnings : earnings less than $21,073 (in 1993 constant dollars)

The dependent variable equals :
0 for 33859 spell-years
1 for 12436 spell-years
2 for 12505 spell-years
Sample size = 58800 spell-years
Y=0 means the individual did not leave the bottom of the earnings distribution next year
Y=1 means the individual left the bottom of the earnings distribution next year by moving down
Y=2 means the individual left the bottom of the earnings distribution next year by moving up

Maximum Likelihood Estimates
Log likelihood function   -52252.77
Restricted log likelihood   -57365.84
Chi-squared   10226.15
Significance level   0.0000000

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X

Coefficients for Y = 1 :

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X
Constant	-1.4249	0.40846E-01	-34.886	0.00000	
URATE	-0.14905E-01	0.61265E-02	-2.433	0.01498	5.555
STRUC	-0.90879E-03	0.22865E-01	-0.040	0.96830	0.6023
ATL	-0.37801	0.44369E-01	-8.520	0.00000	0.1044
QUE	-0.19857	0.32800E-01	-6.054	0.00000	0.2812
PRA	-0.15159	0.32562E-01	-4.655	0.00000	0.1652
BRI	0.50287E-01	0.36859E-01	1.364	0.17247	0.1294
YEAR2	-0.38156	0.27960E-01	-13.647	0.00000	0.2075
YEAR3	-0.66527	0.37026E-01	-17.968	0.00000	0.1088
YEAR4	-0.79926	0.47668E-01	-16.767	0.00000	0.6563E-01
YEAR5	-0.98771	0.61354E-01	-16.098	0.00000	0.4224E-01
YEAR6	-0.99992	0.74234E-01	-13.470	0.00000	0.2850E-01
YEAR7	-1.1445	0.93634E-01	-12.223	0.00000	0.1959E-01
YEAR8	-1.2589	0.11371	-11.071	0.00000	0.1418E-01
YEAR9	-1.2186	0.13111	-9.294	0.00000	0.1034E-01
YEAR10	-1.2692	0.88850E-01	-14.285	0.00000	0.2405E-01
DISTANCE	0.94611E-04	0.21713E-05	43.574	0.00000	8936.

Coefficients for Y = 2 :

Variable	Coefficient	Standard Error	z=b/s.e.	P[Z=z]	Mean of X
Constant	0.58070	0.36787E-01	15.785	0.00000	
URATE	-0.42007E-01	0.62139E-02	-6.760	0.00000	5.555
STRUC	-0.39111E-01	0.23023E-01	-1.699	0.08937	0.6023
ATL	-0.34896	0.46262E-01	-7.543	0.00000	0.1044
QUE	-0.13904	0.32768E-01	-4.243	0.00002	0.2812
PRA	-0.17175	0.33237E-01	-5.167	0.00000	0.1652
BRI	0.11024	0.37439E-01	2.945	0.00323	0.1294
YEAR2	-0.48283	0.27860E-01	-17.331	0.00000	0.2075
YEAR3	-1.0016	0.39833E-01	-25.146	0.00000	0.1088
YEAR4	-1.2103	0.52463E-01	-23.070	0.00000	0.6563E-01
YEAR5	-1.3621	0.67539E-01	-20.167	0.00000	0.4224E-01
YEAR6	-1.5733	0.87887E-01	-17.901	0.00000	0.2850E-01
YEAR7	-1.6982	0.11005	-15.430	0.00000	0.1959E-01
YEAR8	-1.8333	0.13495	-13.585	0.00000	0.1418E-01
YEAR9	-2.2071	0.18423	-11.980	0.00000	0.1034E-01
YEAR10	-2.3788	0.13229	-17.981	0.00000	0.2405E-01
DISTANCE	-0.10126E-03	0.22044E-05	-45.937	0.00000	8936.

*See the first page of Appendix 2 for the definition of the explanatory variables.

Number of spells censored   = 3232
Number of spells ending with the individual moving down = 12436
Number of spells ending with the individual moving up   = 12505
Total number of spells started between 1976 and 1992   = 28173

APPENDIX 3 : REAL EARNINGS RECEIVED WHILE GOING THROUGH A NEW SPELL OF LOW EARNINGS

TABLE A1 :
Sample : new spells of low earnings started by men aged 18-24
Definition of low earnings : earnings less than $13,509 (in 1993 constant dollars)

Ordinary least squares regression.
Dependent Variable = EARNINGS
Observations   = 76506
Adjusted R-squared = 0.1076E-01
F(15,76490)   = 56.47
Durbin-Watson stat.= 1.71

Variable	Coefficient	Std. Error	t-ratio	Prob|t|òx	Mean of X	Std.Dev.of X
Constant	7328.4	45.59	160.739	0.00000		
URATE	-59.857	2.979	-20.091	0.00000	12.900	5.3972
STRUC	-332.07	27.29	-12.169	0.00000	0.55713	0.49673
ATL	1.4272	50.12	0.028	0.97728	0.11552	0.31965
QUE	277.32	37.06	7.483	0.00000	0.26968	0.44380
PRA	107.51	39.37	2.731	0.00632	0.17329	0.37850
BRI	125.97	46.46	2.711	0.00670	0.11407	0.31790
YEAR2	190.69	33.48	5.695	0.00000	0.23252	0.42244
YEAR3	286.67	42.04	6.818	0.00000	0.12640	0.33230
YEAR4	321.40	53.40	6.019	0.00000	0.71681E-01	0.25796
YEAR5	364.10	68.31	5.330	0.00000	0.41395E-01	0.19920
YEAR6	441.74	89.05	4.960	0.00000	0.23488E-01	0.15145
YEAR7	368.79	113.2	3.259	0.00112	0.14339E-01	0.11888
YEAR8	380.77	147.0	2.590	0.00961	0.83131E-02	0.90797E-01
YEAR9	728.73	181.2	4.021	0.00006	0.54113E-02	0.73363E-01
YEAR10	610.20	138.7	4.399	0.00001	0.94895E-02	0.96951E-01

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TABLE A2 :
Sample : new spells of low earnings started by men aged 25-34
Definition of low earnings : earnings less than $13,509 (in 1993 constant dollars)

Ordinary least squares regression.
Dependent Variable = EARNINGS
Observations   = 56354
Adjusted R-squared = 0.1875E-02
F(15, 56338)   = 8.06
Durbin-Watson stat.= 1.77

Variable	Coefficient	Std. Error	t-ratio	Prob|t|òx	Mean of X	Std.Dev.of X
Constant	7142.2	49.66	143.820	0.00000		
URATE	-36.705	6.165	-5.953	0.00000	7.8282	3.1773
STRUC	-14.097	34.03	-0.414	0.67865	0.62184	0.48493
ATL	161.76	60.28	2.684	0.00728	0.11571	0.31989
QUE	351.70	45.91	7.661	0.00000	0.27116	0.44456
PRA	38.629	47.27	0.817	0.41379	0.17429	0.37936
BRI	-24.024	54.84	-0.438	0.66134	0.12400	0.32959
YEAR2	-88.464	40.12	-2.205	0.02744	0.21321	0.40958
YEAR3	-117.90	54.62	-2.159	0.03089	0.98485E-01	0.29797
YEAR4	-288.74	74.40	-3.881	0.00010	0.49242E-01	0.21638
YEAR5	-109.70	100.0	-1.097	0.27271	0.26227E-01	0.15981
YEAR6	-331.82	129.7	-2.559	0.01051	0.15296E-01	0.12273
YEAR7	-242.83	163.6	-1.485	0.13766	0.95113E-02	0.97062E-01
YEAR8	-245.45	198.9	-1.234	0.21707	0.64059E-02	0.79781E-01
YEAR9	45.293	247.5	0.183	0.85482	0.41168E-02	0.64031E-01
YEAR10	174.25	181.7	0.959	0.33759	0.77546E-02	0.87719E-01

APPENDIX 3 : REAL EARNINGS RECEIVED WHILE GOING THROUGH A NEW SPELL OF LOW EARNINGS

TABLE A3 :
Sample : new spells of low earnings started by men aged 35-50
Definition of low earnings : earnings less than $13,509 (in 1993 constant dollars)

Ordinary   least squares regression.
Dependent Variable = EARNINGS
Observations   = 43,107
Adjusted R-squared = 0.1994E-02
F(15,43091)   = 6.74
Durbin-Watson stat.= 1.70

Variable	Coefficient	Std. Error	t-ratio	Prob|t|òx	Mean of X	Std.Dev.of X
Constant	6826.8	56.63	120.546	0.00000		
URATE	-8.4637	9.907	-0.854	0.39295	5.8046	2.3587
STRUC	-17.780	39.86	-0.446	0.65552	0.63495	0.48145
ATL	371.09	69.44	5.344	0.00000	0.11924	0.32407
QUE	410.42	54.74	7.498	0.00000	0.26849	0.44318
PRA	86.349	55.62	1.552	0.12055	0.16510	0.37128
BRI	18.995	62.54	0.304	0.76135	0.12928	0.33552
YEAR2	-88.179	47.27	-1.865	0.06214	0.20240	0.40180
YEAR3	-136.10	65.35	-2.083	0.03729	0.90983E-01	0.28759
YEAR4	-169.74	88.18	-1.925	0.05424	0.46744E-01	0.21109
YEAR5	-153.16	113.5	-1.349	0.17740	0.27327E-01	0.16304
YEAR6	-111.11	142.3	-0.781	0.43476	0.17097E-01	0.12963
YEAR7	116.07	178.1	0.652	0.51451	0.10787E-01	0.10330
YEAR8	127.71	214.0	0.597	0.55072	0.74234E-02	0.85840E-01
YEAR9	163.58	258.8	0.632	0.52730	0.50572E-02	0.70935E-01
YEAR10	-124.12	169.3	-0.733	0.46353	0.12086E-01	0.10927

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TABLE A4 :
Sample : new spells of low earnings started by men aged 18-24
Definition of low earnings : earnings less than $21,073 (in 1993 constant dollars)

Ordinary   least squares regression.
Dependent Variable = EARNINGS
Observations   = 94696
Adjusted R-squared = 0.4013E-01
F(15, 94680)   = 264.95
Durbin-Watson stat.= 1.46

Variable	Coefficient	Std. Error	t-ratio	Prob|t|òx	Mean of X	Std.Dev.of X
Constant	10809.	67.08	161.131	0.00000		
URATE	-143.71	4.347	-33.061	0.00000	12.264	5.3141
STRUC	-940.44	39.95	-23.538	0.00000	0.58295	0.49307
ATL	-296.74	72.85	-4.073	0.00005	0.10920	0.31189
QUE	433.65	52.95	8.189	0.00000	0.27137	0.44467
PRA	96.081	56.00	1.716	0.08620	0.17526	0.38019
BRI	397.35	66.27	5.996	0.00000	0.11493	0.31893
YEAR2	834.71	51.54	16.197	0.00000	0.21723	0.41236
YEAR3	1339.6	59.77	22.411	0.00000	0.14139	0.34842
YEAR4	1614.1	69.64	23.177	0.00000	0.95411E-01	0.29378
YEAR5	1950.1	81.74	23.858	0.00000	0.65040E-01	0.24660
YEAR6	2140.5	97.48	21.958	0.00000	0.43655E-01	0.20433
YEAR7	2056.0	117.0	17.579	0.00000	0.29568E-01	0.16939
YEAR8	2162.3	139.9	15.458	0.00000	0.19895E-01	0.13964
YEAR9	2099.9	167.3	12.549	0.00000	0.13549E-01	0.11561
YEAR10	2416.2	130.7	18.484	0.00000	0.23655E-01	0.15197

APPENDIX 3 : REAL EARNINGS RECEIVED WHILE GOING THROUGH A NEW SPELL OF LOW EARNINGS

TABLE A5 :
Sample : new spells of low earnings started by men aged 25-34
Definition of low earnings : earnings less than $21,073 (in 1993 constant dollars)
Ordinary least squares regression.
Dependent Variable = EARNINGS
Observations   = 79626
Adjusted R-squared = 0.3719E-02
F(15, 79610)   = 20.82
Durbin-Watson stat.= 1.60

Variable	Coefficient	Std. Error	t-ratio	Prob|t|òx	Mean of X	Std.Dev.of X
Constant	11320.	68.58	165.068	0.00000		
URATE	-75.340	8.448	-8.918	0.00000	7.6788	3.1307
STRUC	-246.58	46.69	-5.281	0.00000	0.62703	0.48360
ATL	-229.18	84.27	-2.720	0.00654	0.10426	0.30560
QUE	501.33	62.16	8.065	0.00000	0.27532	0.44668
PRA	-116.88	63.86	-1.830	0.06720	0.17654	0.38128
BRI	-124.44	74.44	-1.672	0.09458	0.12377	0.32932
YEAR2	-120.12	56.01	-2.145	0.03199	0.21622	0.41167
YEAR3	46.345	70.06	0.662	0.50827	0.11869	0.32343
YEAR4	103.10	87.24	1.182	0.23729	0.70304E-01	0.25566
YEAR5	162.58	108.8	1.495	0.13493	0.43001E-01	0.20286
YEAR6	394.00	131.8	2.989	0.00280	0.28471E-01	0.16631
YEAR7	480.97	158.5	3.035	0.00241	0.19315E-01	0.13763
YEAR8	407.97	188.9	2.160	0.03080	0.13438E-01	0.11514
YEAR9	673.88	226.9	2.970	0.00298	0.92307E-02	0.95632E-01
YEAR10	618.67	156.6	3.950	0.00008	0.20333E-01	0.14114

TABLE A6 :
Sample : new spells of low earnings started by men aged 35-50
Definition of low earnings : earnings less than $21,073 (in 1993 constant dollars)

Ordinary   least squares regression.
Dependent Variable = EARNINGS
Observations   = 64348
Adjusted R-squared = 0.4518E-02
F(15, 64332)   = 20.47
Durbin-Watson stat.= 1.54

Variable	Coefficient	Std. Error	t-ratio	Prob|t|òx	Mean of X	Std.Dev.of X
Constant	11278.	75.42	149.542	0.00000		
URATE	-78.346	13.01	-6.022	0.00000	5.7858	2.3477
STRUC	-330.99	52.54	-6.300	0.00000	0.63663	0.48097
ATL	-51.091	94.79	-0.539	0.58990	0.10384	0.30506
QUE	776.63	71.21	10.906	0.00000	0.28231	0.45013
PRA	-79.412	73.03	-1.087	0.27689	0.16487	0.37107
BRI	-50.140	82.26	-0.610	0.54216	0.12967	0.33594
YEAR2	-168.82	63.54	-2.657	0.00788	0.20538	0.40398
YEAR3	-71.083	80.50	-0.883	0.37721	0.11032	0.31329
YEAR4	144.37	99.30	1.454	0.14598	0.67228E-01	0.25042
YEAR5	94.135	121.6	0.774	0.43887	0.42845E-01	0.20251
YEAR6	242.08	145.9	1.659	0.09711	0.28983E-01	0.16776
YEAR7	408.63	173.7	2.352	0.01866	0.20078E-01	0.14027
YEAR8	510.42	204.8	2.492	0.01271	0.14266E-01	0.11859
YEAR9	644.19	237.2	2.716	0.00660	0.10568E-01	0.10225
YEAR10	622.29	153.8	4.047	0.00005	0.26512E-01	0.16065

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