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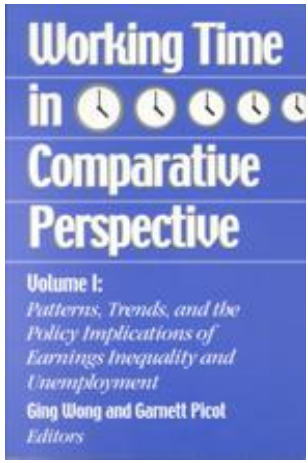

Garnett Picot
Statistics Canada

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Working Time, Wages, and Earnings Inequality among Men and Women in Canada, 1981–1993

Garnett Picot
Statistics Canada

The increasing polarization of employment earnings in Canada has been well documented (Myles, Picot, and Wannell 1988; The Economic Council of Canada 1991; Morissette, Myles, and Picot 1994; Burbidge, Magee, and Robb 1993; Beach and Slotsve 1996; Richardson 1994). Various dimensions of this rising polarization of earnings have also been explored, including the declining real and relative wages of young workers (Myles, Picot, and Wannell 1988; Davis 1992; Betcherman and Morissette 1994), and the relative stability of the education wage premium in Canada as compared to the United States. (Freeman and Needels 1991; Bar-Or et al. 1993; Morissette, Myles, and Picot 1994). In most of the work on rising earnings inequality, changes in the distribution of working time have been largely ignored. Yet the distribution of hours of work has changed significantly in the 1980s and early 1990s for a variety of reasons.

The shifts in labor demand often discussed in the earnings inequality literature could well be reflected through changes in hours of work, as well as through relative wages. Decreased demand for less-skilled workers due to the introduction of skill-biased technology, changes in trading patterns, or for any other reason could be reflected in declining relative wages for the less-skilled (a price response), declining relative hours of work (a quantity response), or both. Furthermore, if the demand shifts resulted in declining wages among the less-skilled, it could lead to a supply side response on the part of workers. They could withdraw some amount of labor at the lower wage rate, as has been suggested by Freeman (1994); Juhn, Murphy, and Topel (1991); and

Kuhn and Robb (1996). These possibilities would lead to declining hours of work among lower paid, less-skilled workers relative to the higher paid.

Such a possibility has been addressed in earlier work in Canada by Picot, Myles, and Wannell (1990); MacPhail (1993); Morissette, Myles, and Picot (1994); and Morissette (1995). They found that the polarization in hours worked did increase through the 1980s. More workers were working longer hours, more were working shorter hours, and fewer were working the number of hours one would expect to see in regular full-time jobs. Furthermore, they observed that the increasing polarization was such that it would tend to increase inequality in annual earnings; that is, the more highly paid were working relatively longer hours, and the less paid relatively shorter hours. There appears to be an association between a polarization in hours of work and that of annual earnings in Canada. This possibility has received less attention in the United States, where the rising inequality in employment earnings has if anything been greater than in Canada (Freeman 1994; Kuhn and Robb 1996). Earlier studies by Burtless (1990) and Moffitt (1990) concluded that the rise in earnings inequality in the United States are associated primarily with an increased dispersion in hourly wages, not hours of work.

The goal of this chapter is to extend this work in a number of ways. First, we update the earlier work, which focused exclusively on the 1980s, by using data from the new Survey of Labour and Income Dynamics (SLID) for 1993. This is the only data source in Canada with hourly wage rate data, a central variable for this analysis. Given the anecdotal stories related to the potential causes such as those listed above, the polarization in hours worked may be increasing in the 1990s. The second goal is to determine whether it is changes in weeks worked per year or hours per week that play the major role in the changing distribution of working time and its impact on earnings inequality. This has not been previously done.

The chapter finds that the rise in inequality among prime-age males and the decline among their female counterparts during the 1980s appears to be largely associated with changes in hours worked. Changes in the distribution of hourly wages played a much smaller role. This supports the earlier work that reached a similar conclusion. Changes in weeks worked (particularly for women) and, more impor-

tantly, in hours worked per week were both part of this phenomenon. Extending the analysis into the 1990s suggests that the same basic conclusion holds; the smaller observed change in annual earnings inequality is associated primarily with changes in hours of work, although changes in hourly wages do play a role. However, the rise in annual earnings inequality among males slowed over the 1984–1993 period compared with the 1981–1989 period. Annual earnings inequality among prime-age men and women *combined* is seen to change little over the past decade. Other work (OECD 1996; Zyblock 1996) also suggested that earnings inequality in Canada and a number of other countries stopped increasing during the 1990s. The exceptions are the United States and the United Kingdom, where rising inequality continues.

This chapter also asks to what extent changes in hours worked are associated with one of the more striking dimensions of earnings change in Canada, the declining real and relative earnings of young workers. Here, changing relative hours play a minor role.

Declining relative annual earnings among the young are associated with a decline in real and relative *hourly wages* among young males, and with both declining relative wages and declining relative weekly hours worked among young women. There has been a substantial downward adjustment in wage rates among younger workers in Canada during the 1980s and early 1990s.

THE DATA AND APPROACH

The Data

Two sets of data are employed. First, the Survey of Consumer Finances (SCF) for the period 1981 to 1993 is used to decompose the change in annual earnings inequality into that associated with changing weeks worked and changing weekly earnings. Ideally, one would use this source to assess the role of weekly hours worked and hourly wages as well, but such information is not available in the SCF for the reference year.

To further decompose changes in weekly earnings into that associated with hours worked per week and hourly wages, a series of special surveys are used. These are the Survey of Work History (SWH) for 1981, the Survey of Union Membership (SUM) for 1984, the Labour Market Activity Survey (LMAS) for 1986 and 1989, and the SLID for 1993. While the content of these surveys differs substantially, they all collect the variables in which we are primarily interested—hours worked per week and hourly wages—in a similar manner. More is said throughout the chapter regarding the similarities and differences among these surveys. The series of special surveys is the only source of comparable data over a reasonable period of time on hourly wages in Canada.

The Population

Since we are concerned with changes in hours worked and wages, we include workers who worked at any time during the year in the SCF sample. To maintain comparability with earlier studies, persons with self-employment earnings are excluded.[1] Other studies have restricted the population to full-time, full-year workers, but to do so would remove changes that have been taking place in weeks worked per year or in hours per week among much of the population. The analysis in the first section is restricted to prime-age workers (aged 25–54), however, to exclude possible events such as increasing part-time employment among students[2] and increasing early retirement rates among older workers. This chapter focuses on events occurring to workers in their prime working years.

As noted, we include only those persons who worked at some time during the year. Ideally the population should include everyone in the labor force, i.e., working or seeking work. Changes in hours of work should ideally include the increase or decrease in the number of persons working zero hours per year but wishing work. This is the group of workers unemployed all year, or unemployed for some portion of the year but not working during the year. These people have not been included in the sample because they do not have an observed wage rate. The significance of this omission depends upon the size of this group and whether it represents an increasing or declining share of the labor force.

In 1986, 1.4 percent of the male labor force were unemployed all year, and an additional 1.3 percent were unemployed part year but did not work. By 1989, these numbers had fallen to 0.7 percent and 0.9 percent as the economic expansion continued. In the recessionary period of 1993, they rose to 2.6 percent and 1.3 percent. Thus, the proportion of the labor force excluded from the sample that might have legitimately been included ranged from 1.8 percent to 3.9 percent, fairly small numbers. Most unemployed persons work at least part of a year, and hence are in our sample.[3]

The Time Frame

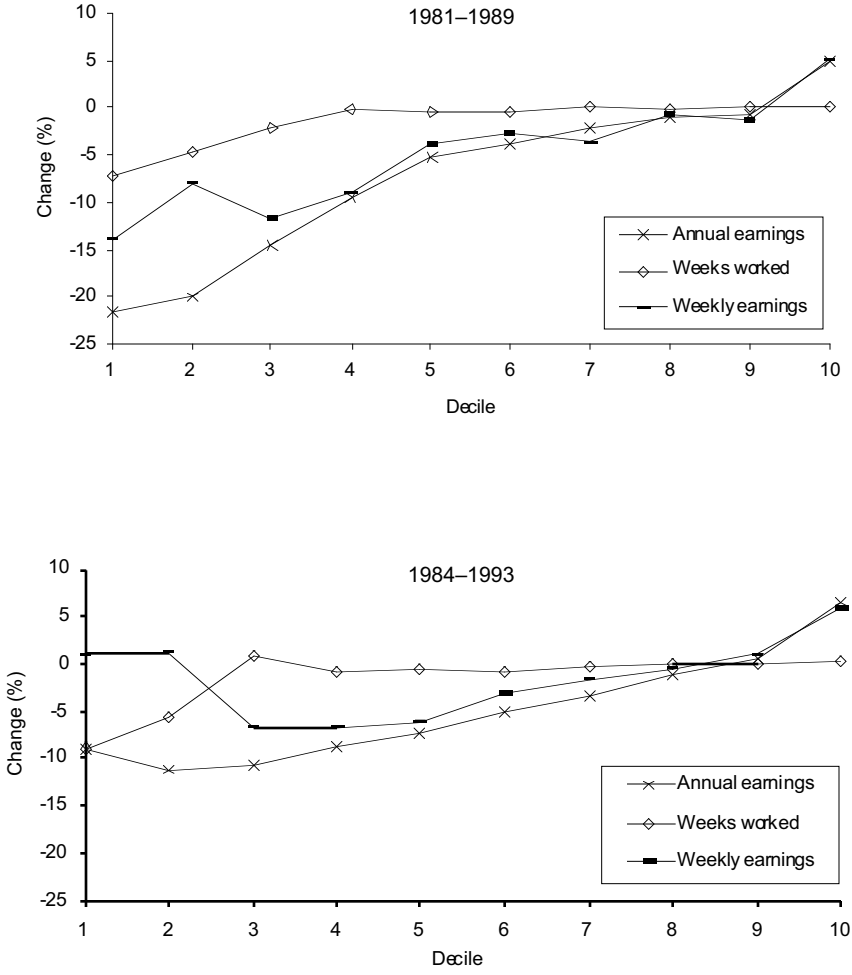
The dispersion of wages, hours, and earnings all vary significantly over the business cycle. Hence, years were selected that had comparable unemployment rates. The results are presented for two periods, 1981–1989 and 1984–1993. In terms of unemployment, these pairs of years are almost identical. Unemployment was at 7.6 percent and 7.5 percent respectively in the 1981–1989 period, and at 11.3 percent and 11.2 percent, respectively, in 1984 and 1993. Years prior to 1981 are excluded because data comparable to that from the special surveys are not available for the earlier years. However, other studies have shown that most of the increasing polarization in earnings occurred following 1981 (e.g., Morissette, Myles, and Picot 1994), so we are focusing on the period of most change.

HOURS, WAGES, AND INEQUALITY AMONG PRIME-AGE MALE WORKERS

The Rising Inequality of Annual Earnings: Associated with Changes in Weeks Worked per Year or Weekly Earnings?

The familiar increase in the earnings gap between the low and high earners is evident in the SCF data. Between 1981 and 1989, among 25- to 54-year-old prime-age males, real average annual earnings in the bottom three deciles fell 15 percent to 22 percent while rising 5 percent in the top decile (Figure 1). The gap in real earnings between high and low prime-age male earners opened considerably over this period.

Figure 1 Percent Change in Annual Earnings, Weeks Worked, and Weekly Earnings, by Decile,[a] Men, 25–54



SOURCE: Survey of Consumer Finances.

[a] Deciles based on annual earnings; in Canadian dollars.

The majority of the change in earnings was associated with changes in weekly earnings, less was related to changes in weeks worked. This can be seen in Figure 1, as the percentage change in annual earnings for different deciles between 1981 and 1989 largely reflects the change in weekly earnings. For example, workers at the bottom of the annual earnings distribution worked an average of 31 weeks per year in 1981 and 28.7 weeks by 1989, a decrease of 7 percent. However, weekly earnings among this lowest earning group fell fully 14 percent. The decline in these two variables resulted in the overall drop of 22 percent in real annual earnings. The number of weeks worked changed little in the middle and upper deciles; all of the change was in weekly earnings.[4]

Thus, among prime-age males during the 1980s, both changes in weeks worked and weekly earnings were associated with the rising gap between the bottom and the top of the earnings distribution, although changes in weekly earnings tended to dominate.

An alternative means of demonstrating this is to turn to a summary measure of the degree of inequality or dispersion in a distribution, the variance of the logarithm. The advantage of this measure is that it is decomposable. Annual earnings is a product of weeks worked and weekly earnings. The total dispersion in the distribution of annual earnings can be decomposed into that due to the dispersion in weeks worked, that due to the inequality in weekly earnings, and a term indicating the covariance between these two factors.

Among prime-age male earners, the variance of the log of annual earnings rose almost 30 percent between 1981 and 1989 (Table 1)—a very significant increase in inequality. Fifty-three percent of this rise was due to the increased dispersion in weekly earnings, and another 23 percent to the increasing covariance between weekly earnings and weeks worked. The tendency for full-year workers to have higher weekly earnings and part-year workers to have lower weekly earnings increased during the 1980s. Only 23 percent of the rise in earnings inequality was due to an increasing dispersion of weeks worked.

Thus, over the 1980s, for prime-age males, the considerable increase in polarization in earnings was largely associated with changes in weekly earnings rather than weeks worked per year.

Table 1 Change in Variance of the Log of Annual Earnings, Weekly Earnings, and Weeks Worked, Prime-Age Men[a]

					Change	
Variable	1981	1984	1989	1993	1981–89	1984–93
Annual earnings	0.468	0.702	0.605	0.771	0.137	0.069
Weeks worked	0.119	0.199	0.151	0.249	0.032 (23%)[b]	0.050 (72%)
Weekly earnings	0.297	0.379	0.370	0.400	0.073 (53%)	0.021 (30%)
2 × covariance	0.052	0.124	0.084	0.122	0.032 (23%)	–0.002 (–3%)

SOURCE: Survey of Consumer Finances.
[a] In Canadian dollars.
[b] The number in parentheses indicates the percent distribution.

The 1984–1993 period tells a somewhat different story.[5] Inequality in annual earnings increased relatively little among prime-age males. The variance of the log rose by about 10 percent (0.069 points), compared to the 30 percent increase between 1981 and 1989, the business cycle peaks. The major rise in earnings inequality, and the associated decline in earnings of lower paid workers (see Figure 1), occurred largely in the very early 1980s. Other evidence suggests that the upward trend in earnings inequality may have ceased in the 1990s, at least among full-time full-year workers (OECD 1996; Zyblock 1996).

The slower rise in annual earnings inequality between 1984 and 1993 is associated with a slowdown in the growth of inequality in *weekly* earnings. Inequality in this variable rose only 6 percent, compared to 25 percent over the 1981–1989 period. The rise in inequality in weeks worked was about the same in the two periods, roughly 25 percent as measured by the variance of the logs. Thus, changes in inequality in weekly earnings played a dominant role in annual earnings inequality among prime-age males.

The Rising Polarization in Weekly Earnings: Associated with Changes in Hours per Week or Hourly Wages?

Weekly earnings can be thought of as a function of two factors: hours worked per week and hourly wage rate. To try to decompose the observed changes in weekly earnings, we turn to new data sources. The Survey of Consumer Finances, used in the previous section, does

not include data on hours per week or hourly wages for the reference year. Thus we turn to a series of special data sources[6] that collected information on wages and hours worked per week. Weekly earnings are computed for these data sets simply by multiplying hourly wages by hours per week. The hours and earnings data refer to the major job held by the worker in December, as this was the only information available on the 1984 survey.[7]

This same question—"Is the rise in weekly earnings inequality associated with changes in hours per week or hourly wages?"—was addressed by Morissette, Myles, and Picot (1994) and Morissette (1995) for the 1980s. Both studies concluded that most of the change in weekly earnings during that decade was associated with changes in hours per week, and increasing covariance between hours worked and wages. We revisit that question and extend the analysis to the early 1990s.

First, hours worked. There was a substantial increase in the polarization of hours worked per week over the 1980s. Labour Force Survey (LFS) data suggest that between 1981 and 1989, for example, the proportion of men working 35–40 hour weeks in their main jobs fell from 77 percent to about 73 percent and continued to fall to around 69 percent by 1993.[8] The proportion working longer hours (more than 40) increased from 18 percent in 1981 to 22 percent in 1989, and 24 percent in 1993.[9] The proportion working shorter hours (under 35) also rose, from 4 percent in 1981 to 5 percent in 1989, reaching 8 percent by 1993. Thus, fewer men were working regular 35–40 hour weeks, and more were working both shorter and longer hours. These trends are presented in more detail in Morissette and Sunter (1994).

The distribution of prime-age male workers by hourly wage,[10] the other major determinant of weekly earnings, presents a very different story. There has been relatively little change in this distribution over the 1980s and early 1990s. The distribution of workers by their hourly wage, in constant 1993 dollars, is shown in Table 2. The change in the distribution between 1981 and 1989 shows no systematic shift toward the top or bottom. The same is observed for the 1984–1993 period.

The variance of the log is used to decompose the rise in the inequality in weekly earnings (Table 3). The results for prime-age males over the 1980s suggests that the majority of the rise in inequality in weekly earnings was associated with the rise in inequality in hours

Table 2 Distribution of Prime-Age Men, by Hourly Wage in Their Jobs[a] (%)

Hourly wage[b] ($)	1981	1984	1989	1993	Change 1981–89	Change 1984–93
0–7.00	5.1	3.2	3.6	4.5	–1.5	+1.3
7.01–8.80	5.2	4.3	4.3	4.4	–0.9	+0.1
8.81–10.80	8.2	6.6	6.9	5.8	–1.3	–0.8
10.81–12.90	8.9	9.5	10.2	9.2	+1.3	–0.3
12.91–14.90	10.7	12.1	12.1	10.0	+1.4	–2.1
14.91–16.90	12.3	9.8	11.0	10.6	–1.3	+0.8
16.91–19.10	12.9	13.6	12.3	12.3	–0.6	–1.3
19.11– 21.90	12.3	14.4	12.7	15.4	+0.4	+1.0
21.91–27.60	14.6	17.2	16.0	16.4	+1.4	–0.8
> 27.60	9.7	9.3	10.8	11.6	+1.1	+2.3

SOURCE: Survey of Work History (1981); Survey of Union Membership (1984); Labour Market Activity Survey (1986, 1989); Survey of Labour and Income Dynamics (1993).

[a] Major job held in December.

[b] In constant 1993 Canadian dollars.

Table 3 Change in the Variance of the Log of Weekly Earnings, Hours Per Week, and Hourly Wages, Prime-Age Men[a]

Variable	1981	1984	1989	1993	Change 1981–89	Change 1984–93
Weekly earnings	0.250	0.258	0.287	0.310	0.037	0.052
Hours per week	0.054	0.064	0.086	0.099	0.032	0.035
Hourly wage	0.222	0.194	0.214	0.198	-0.008	0.004
2 × covariance	–0.026	0.000	–0.012	0.013	0.014	0.013

SOURCE: Survey of Work History (1981); Survey of Union Membership (1984); Labour Market Activity Survey (1986, 1989); Survey of Labour and Income Dynamics (1993).

[a] In Canadian dollars.

worked per week (0.032 of a total increase of 0.37 in the variance of the log), while hourly wages played little or no role.[11] The findings are similar for the 1984–1993 period. Among prime-age males, weekly earnings inequality rose 20 percent, and of this increase, two-thirds was related to changes in the distribution of hours worked per week; hourly wages played only a minor role.

Thus, the data from the special surveys suggest that inequality in hourly wages has risen only marginally when comparable points in the business cycle are used. Changes in the inequality of weekly earnings appear to be largely associated with changes in hours worked per week. This result was observed in earlier studies for the 1980s, and it would seem that it holds for the 1984–1993 period as well.[12,13]

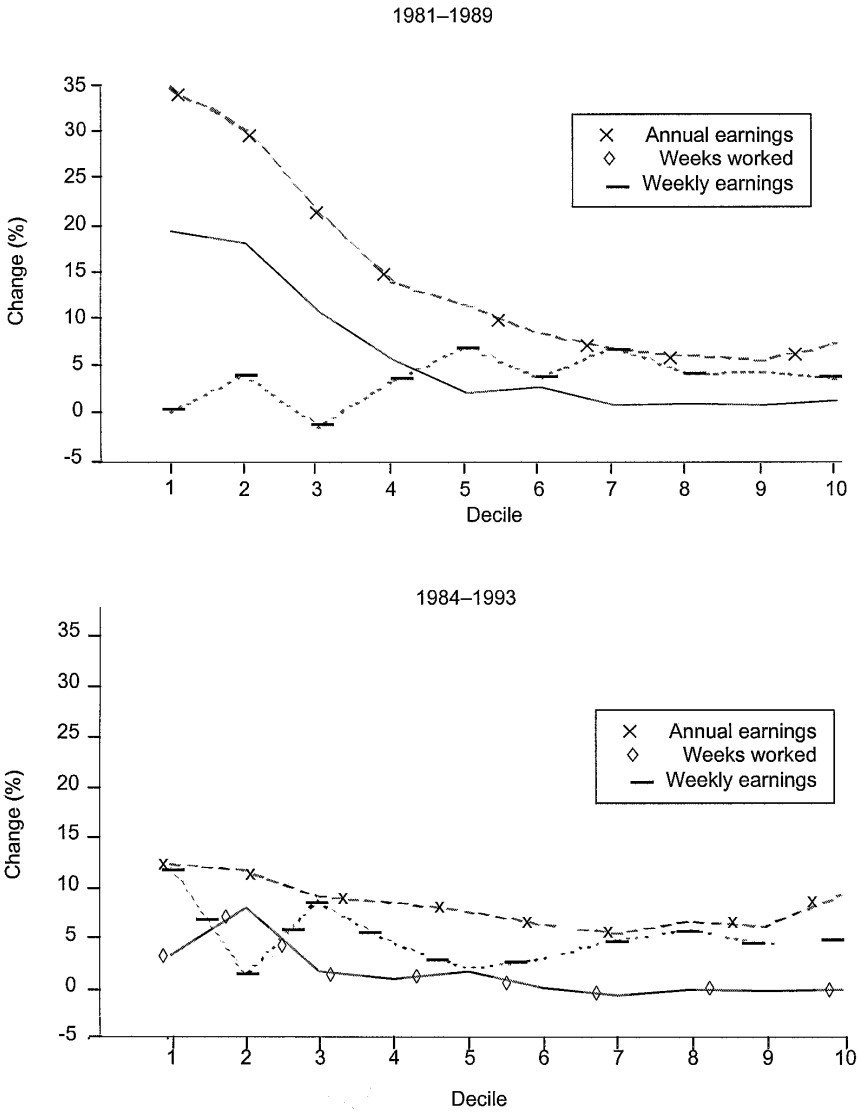
HOURS, WAGES, AND INEQUALITY AMONG PRIME-AGE FEMALE WORKERS

Polarization of Annual Earnings: Associated with Changes in Weeks Worked per Year or Weekly Earnings?

Not surprisingly, the trends are very different for men than for women, since their underlying employment and earnings trends are very different. The earnings gap between men and women has been closing in Canada, and an increasing share of women are working, whereas among men the share working has been falling.[14]

Annual earnings have not fallen among women at the bottom of the earnings distribution as they have among men. In fact, they have increased quite dramatically. Between 1981 and 1989, annual earnings among the lowest paid women rose 35 percent, largely because they were working more weeks per year in 1989 than in 1981. Weeks worked rose 19 percent among this group, whereas average weekly earnings did not change at all (Figure 2).

Figure 2 Percent Change in Annual Earnings, Weeks Worked, and Weekly Earnings, by Decile,[a] Women, 25–54



[a] Deciles based on annual earnings, in Canadian dollars.

With such a large rise in earnings among low paid women, not surprisingly annual earnings inequality declined among prime-age females during both the 1981–1989 period (declining 0.154 as measured by the variance of the log); and the 1984–1993 period (declining 0.037) (Table 4). In both cases this was associated with a decline in the inequality of weeks worked (i.e., lower paid women working relatively more weeks per year). During 1981–1989, two thirds of the decline in annual earnings inequality was associated with a decline in the inequality of weeks worked; during 1984–1993 it was 59 percent. There was little change in the inequality of weekly earnings. This is in contrast to men, where there was relatively little change in weeks worked, but a rise in inequality of weekly earnings.

Changes in Hours Worked per Week and Hourly Wages among Women

Like men, a smaller share of women are working a regular 35–40 hour week. According to the Labour Force Survey, the proportion of women working 35–40 hours per week fell from 68 percent in 1981 to 65 percent in 1989, and 61 percent in 1993 (Morissette and Sunter 1994).[15] There are slightly more working fewer hours (the share working under 20 rose from 20 percent in 1981 to 22 percent in 1993), and more working longer hours (over 40 hours rose from 5 percent to 8 percent). Thus, there has been an increase in the polarization of hours

Table 4 Change in Variance of the Log of Annual Earnings, Weekly Earnings, and Weeks Worked, Prime-Age Women[a,b]

					Change	
	1981	1984	1989	1993	1981–89	1984–93
Women 25–54						
Annual earnings	1.077	1.057	0.923	1.020	–0.154	–0.037
Weeks worked	0.362	0.340	0.262	0.319	–0.100 (65%)	–0.022 (59%)
Weekly earnings	0.571	0.552	0.530	0.552	–0.041 (26%)	0.000 (0%)
2 × covariance	0.144	0.164	0.132	0.150	–0.012 (8%)	–0.015 (41%)

SOURCE: The Survey of Consumer Finances.

[a] In Canadian dollars.

[b] The numbers in parentheses indicates the percent distribution.

worked among women, just as there has been among men. Such a polarization in hours worked does not necessarily lead to increased polarization of earnings, however, since it depends upon whether high or low wage earners are increasing their hours of work.

Unlike for men, the hourly wage distribution has changed quite significantly among prime-age women (Table 5). A larger share of women are earning higher hourly wages. For example, the proportion of women earning over $17.00 per hour rose from 24.6 percent in 1984 to 31.2 percent in 1993. Among men there was virtually no change, although a larger share of men than women still earned over $17.00 per hour in 1993 (55.7 percent against 31.2 percent). Among women there was a corresponding decline in the proportion earning low hourly wages.

Table 5 Distribution of Prime-Age Women, by Hourly Wage in Their Jobs[a] (%)

Hourly wage[b] ($)	1981	1984	1989	1993	Change 1981–89	Change 1984–93
$ 0–7.00	14.0	11.6	11.8	11.3	–2.2	–0.3
7.01–8.80	12.1	12.9	10.5	8.6	–1.6	–4.3
8.81–10.80	14.6	13.3	13.3	10.7	–1.3	–2.6
10.81–12.90	14.2	15.9	16.7	14.3	+2.5	–1.6
12.91–14.90	12.7	13.5	13.3	13.1	+0.6	–0.4
14.91–16.90	9.0	8.3	8.7	10.9	–0.3	+2.6
16.91–19.10	7.1	7.9	7.9	8.0	+0.8	+0.1
19.11–21.90	6.3	7.4	7.0	9.0	+0.7	+1.6
21.91–27.60	6.0	6.5	6.4	8.8	+0.4	+2.3
> 27.60	3.9	2.8	4.3	5.4	+0.4	+2.6

SOURCE: Survey of Work History (1981); Survey of Union Membership (1984); Labour Market Activity Survey (1986, 1989); Survey of Labour and Income Dynamics (1993).

[a] Major job held in December.

[b] In constant 1993 Canadian dollars.

The decomposition of the variance of the log displays the association between these changes and weekly earnings inequality among prime-age women (Table 6). Overall, the story is one of little change. Weekly earnings inequality among prime-age women has changed little, as noted earlier, particularly during the 1981–1989 period. During the 1984–1993 period, where inequality does rise marginally according to the special surveys data (but with no change registered in the SCF data), this is largely driven by the changing distribution of hours worked. Thus, overall there is little change in weekly earnings inequality, and where it is observed, it is related to changes in hours worked.

Inequality in Earnings, Hours, and Wage for All Prime-Age Workers

Different trends among men and women begs the question of whether the labor market has been redistributing earnings to prime-age workers as a whole in a fundamentally different manner in the late 1980s and early 1990s compared to earlier periods. And if so, what is the role of changes in working time and hourly wages.

Based on the variance of the log, annual earnings inequality among prime-age men and women combined has changed relatively little over the 1980s or early 1990s (Table 7). If anything, these data suggest that

Table 6 Change in the Variance of Log of Weekly Earnings, Hours Per Week, and Hourly Wages, Prime-Age Women[a]

					Change	
Variable	1981	1984	1989	1993	1981–89	1984–93
Weekly earnings	0.470	0.471	0.472	0.526	0.002	0.055
Hours per week	0.229	0.224	0.206	0.290	–0.023	0.066
Hourly wage	0.250	0.228	0.241	0.220	–0.009	–0.008
2 × covariance	–0.009	0.020	0.026	0.016	0.035	–0.004

SOURCE: Survey of Work History (1981); Survey of Union Membership (1984); Labour Market Activity Survey (1986, 1989); Survey of Labour and Income Dynamics (1993).

[a] In Canadian dollars.

Table 7 Change in the Variance of the Log of Annual Earnings, Weekly Earnings and Weeks Worked, All Prime-Age Workers[a]

					Change	
Variable	1981	1984	1989	1993	1981–89	1984–93
Annual earnings	0.910	0.969	0.855	0.956	–0.055	–0.013
Weeks worked	0.233	0.264	0.206	0.283	–0.027	0.019
Weekly earnings	0.529	0.540	0.523	0.531	–0.006	–0.009
2 × covariance	0.148	0.165	0.125	0.142	–0.023	–0.023

SOURCE: Survey of Consumer Finances.
[a] In Canadian dollars.

earnings inequality declined slightly between 1981 and 1989 (6 percent), as well as between 1984 and 1993 (1 percent). These are, however, relatively small changes.

As noted before, the two sets of data, SCF and the special surveys, provide somewhat different results regarding the change in inequality in *weekly* earning. There is little change in the SCF, and a small increase in the special surveys (from 7 percent to 10 percent). In the special surveys this increase is due to changes in the inequality in hours worked per week, or the increasing covariance between hours and wages.[16] The inequality in hourly wages changes little over either period for prime-age workers (Table 8).

Table 8 Change in the Variance of the Log of Weekly Earnings, Hours Per Week, and Hourly Wages, All Prime-Age Workers[a]

					Change	
Variable	1981	1984	1989	1993	1981–89	1984–93
Weekly earnings	0.416	0.432	0.444	0.478	+0.028	+0.046
Hours per week	0.144	0.149	0.156	0.209	+0.012	+0.060
Hourly wage	0.254	0.235	0.248	0.223	–0.006	–0.012
2 × covariance	0.017	0.048	0.040	0.046	+0.023	–0.002

SOURCE: Survey of Work History (1981); Survey of Union Membership (1984); Labour Market Activity Survey (1986, 1989); Survey of Labour and Income Dynamics (1993).
[a] In Canadian dollars.

Given this relative stability in inequality among prime-age workers, what has happened to the real earnings of workers earning lower wages? Basically, the annual earnings of prime-age workers at the bottom of the distribution have risen in both periods because of the tendency of women to work more weeks per year during the 1980s. There have been significant declines in the annual earnings of workers in the middle of the distribution over both periods, with small increases at the top.

SUMMARY OF THE ROLES OF HOURS WORKED AND WAGES IN EARNINGS INEQUALITY

Overall, most of the significant changes in earnings inequality among both men and women were associated with changes in working time, either weeks worked per year or hours per week, rather than changes in hourly wages. More specifically:

1) Inequality in annual earnings among prime-age males rose significantly between 1981–1989 (29 percent), and less so over 1984–1993 (10 percent). Other work (OECD 1996) indicates that among full-time, full-year workers annual earnings inequality fell slightly during the 1990s in Canada and numerous other countries, after having increased substantially in the 1980s. Annual earnings inequality among prime-age women fell during both periods.[17]

2) During both periods, the increase in male annual earnings inequality was associated with rising inequality in hours worked per week and weeks per year. Little of the rise was associated with rising inequality or polarization in hourly wages. Similarly, during both periods the decline in earnings inequality among women was largely associated with increasing weeks worked among women with low annual incomes.

3) Prime-age male workers at the bottom end (bottom three deciles) of the earnings distribution saw their annual earnings fall dramatically over the 1981–1989 period. This was associated with a decline in both weeks worked per year, and weekly earnings. The

change in the latter was largely associated with changes in hours worked per week. Prime-age women at the bottom of the earnings distribution saw their annual earnings rise, largely because they were working more weeks per year.

During the 1984–1993 period annual earnings fell among male workers in the bottom three deciles, but not so dramatically. This was largely due to a decline in weeks worked, as weekly earnings fell only marginally. Women at the bottom of the distribution saw their annual earnings rise as a result of working more weeks per year, but again the increase was not as dramatic as during the earlier period.

4) Both prime-age men and women at the top of the earnings distribution (top three deciles) saw their annual earnings rise during both periods due to an increase in weekly earnings, which was in turn associated with a substantial increase in hours worked per week, and some increase in hourly wages.

5) Among all prime-age workers (men and women combined), inequality in annual earnings, weeks worked, weekly earnings, and hourly wages has been quite stable over both periods, and where there have been changes, they are relatively small. Inequality in annual earnings and hourly wages has changed little.

Thus, changes in working time, primarily hours per week but also weeks per year, have been associated with the rise in earnings inequality among prime-age males and a decline among prime-age women[18] over both periods, although the change was much larger in the first than the second period. The best available data on wages (from the special surveys) suggest that while changes in hourly wages have played some role in the rise in earnings inequality, it is in no way dominant.

THE RISING EARNINGS DIFFERENTIAL BETWEEN THE YOUNG AND THE OLD—IS IT WAGES- OR HOURS-BASED?

A major dimension of the rising inequality story has been the increasing gap in annual earnings between younger and older workers,

particularly among men. This has been largely due to declines in real earnings among young workers and has been well documented in Canada (Myles, Picot, and Wannell 1988; Betcherman and Morissette 1994; Morissette, Myles, and Picot 1994; Beaudry and Green 1996), and for other industrialized countries (Davis 1992). Our goal is to determine the extent to which this rising gap is associated with changes in hourly wages on one hand, or hours worked (either changes in weeks per year or hours per week) on the other. We focus on all workers, including part-time and full-time. This is necessary if one is to capture all the changes taking place in patterns of working time.

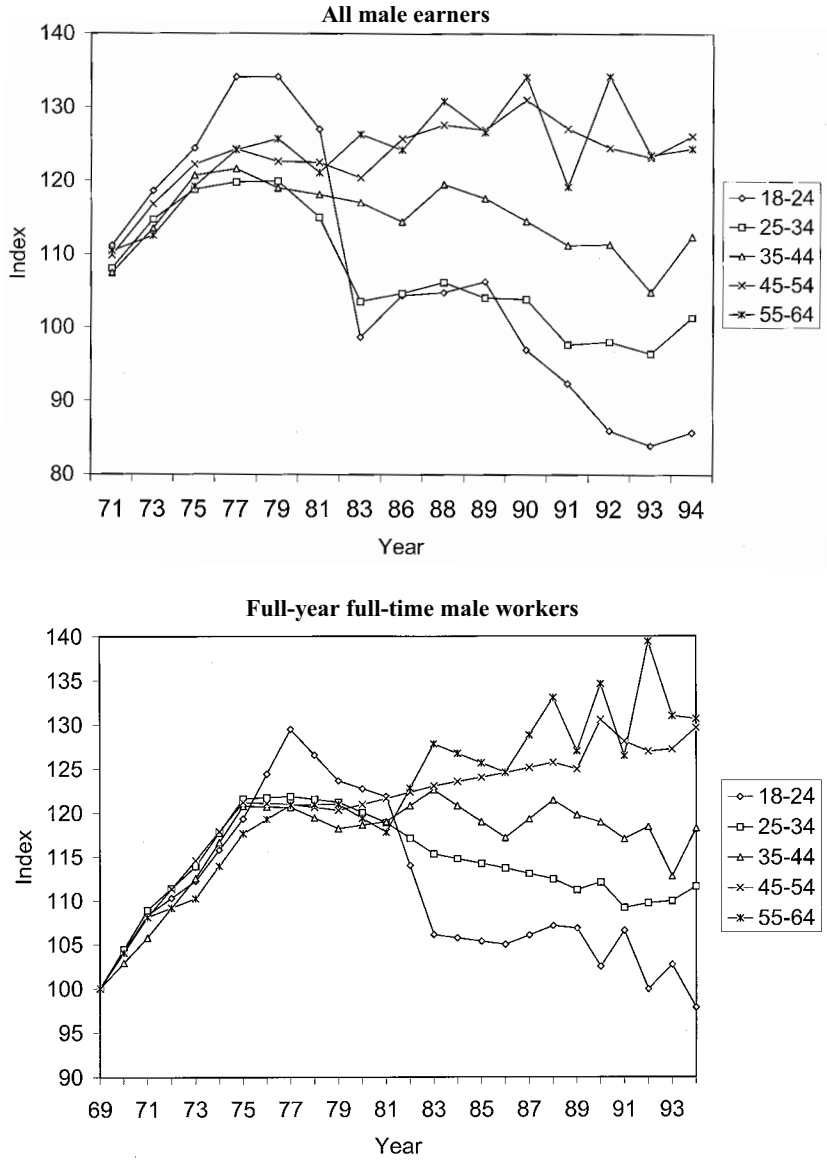
Changing Annual Earnings among Young Males

The much discussed decline in real average annual earnings among very young males (aged 18–24) occurred largely in the early 1980s, between 1981 and 1983 (Figure 3). Of the 36 percent drop in earnings between 1979 and the early 1990s, over 70 percent of it occurred in and around the 1981–1982 recession. There was little recovery during the late 1980s, and a subsequent smaller decline during the recession of the 1990s. Among 25- to 34-year-olds, whose earnings have fallen about 14 percent since 1979, most of the decline was in the 1980s recession, again with no recovery through the 1980s. These results included all young workers, full- and part-time. There have been significant changes in the number of young people working part-time over this period. However, the same general pattern is observed for full-time, full-year workers (Figure 3).

The approach here is to simply examine the relative values of four variables: annual earnings, annual weeks worked, hours per week, and hourly wage rate. The ratios computed are the average value of the variable for younger workers (under 35) relative to those for older workers (over 35). The change in these relative values over time will inform us as to which variables are associated with the decline in relative annual earnings among young male workers.

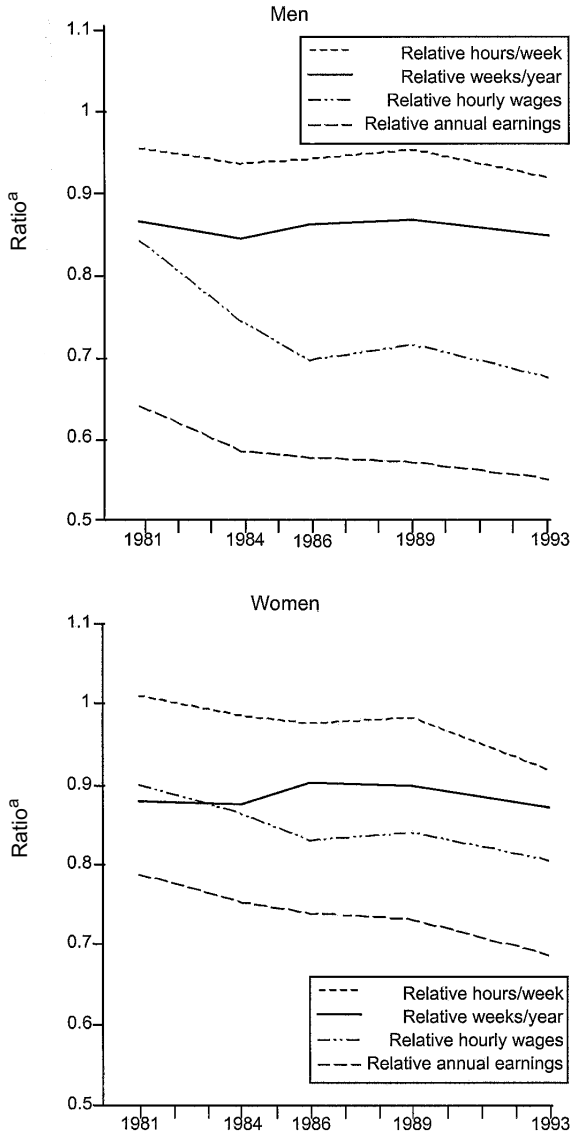
For men, the ratio of the average annual earnings of workers under 35 to those of workers over 35 fell from 0.64 in 1981 to 0.57 in 1989, and 0.55 in 1993 (Figure 4). Was this decline associated with a fall in relative weeks worked, hours per week, or hourly wages? The answer appears to be hourly wages. Relative weeks worked changed little over

Figure 3 Indexed Real Annual Wages and Salaries of Male Earners, 1969–1994 (1969=100)



SOURCE: Survey of Consumer Finances.

Figure 4 Relative Measures of Earnings and Hours: Workers under 35 Relative to Those over 35



[a] For example, for annual earnings this is the ratio of average annual earnings among 17- to 34-year-olds to the earnings of 35- to 64-year-olds.

the period (at around 0.87), as did relative hours worked per week (at 0.95). Relative hourly wages, however, fell from 0.84 in 1981 to 0.71 in 1989, and to 0.67 in 1993. This would suggest that virtually all of the decline in relative annual earnings among the young between 1981 and 1989 was associated with falling relative hourly wages.

To ensure that this result is not specific to this particular way of grouping younger and older workers, this same approach is used for other combinations of workers, and results compared for two periods, 1981–1989 and 1984–1993. Two separate younger age groups, 17–24 and 25–35, are compared with the central age group of older workers, those 45–54 (Table 9). Generally speaking, changing relative wages dominate the other variables.[19] Overall, however, the decline in relative (and real) annual earnings among the young appears to be associated with changing relative hourly wages, not changing relative hours worked per year.

Changing Annual Earnings among Young Women

As with the men, the real annual earnings of young women fell between 1977 and 1983 (about 21 percent), recovered somewhat during the 1980s, and fell again in the 1990s recession and beyond. The fall between the late 1970s and the mid 1990s was 29 percent. This was for all workers. Among women working full-time, full-year, the story was one of a decline in the early 1980s, followed by recovery in the late 1980s and early 1990s, so that there was little change overall during the entire period (Figure 5). Average earnings among older women (over 24) rose in all age categories, but more so among the older than younger workers, so that the relative annual earnings of 25-34-year-olds fell from 0.8 in 1981 to 0.7 in 1993. The relative decline was greater among full-time, full-year workers.

Were these declines in the relative earnings associated with declining relative wages or working time? The answer is both. Relative hourly wages have fallen among women under 35 (relative to those over 35), from 0.9 in 1981 to 0.8 in 1993. But relative hours worked per week have fallen as well, from 1 to 0.9. Thus, both have contributed to the decline in relative annual earnings. This is true for other populations as well (Table 10).

Table 9 Earnings and Hours Ratios of Younger Relative to Older Male Workers, Selected Years[a]

Age groups	Annual earnings[b]	Weeks worked[b]	Hours per week[c]	Hourly wages[c]
17–34 relative to 35–64				
1981	0.638	0.865	0.955	0.843
1984	0.584	0.845	0.937	0.743
1989	0.571	0.867	0.954	0.713
1993	0.550	0.849	0.919	0.673
Change 1981–89	–0.067	0.002	–0.001	–0.130
Change 1984–93	–0.034	0.004	–0.018	–0.070
17–24 relative to 45–54				
1981	0.392	0.743	0.871	0.703
1984	0.320	0.711	0.840	0.540
1989	0.316	0.731	0.840	0.508
1993	0.255	0.697	0.742	0.441
Change 1981–89	–0.076	–0.012	–0.031	–0.195
Change 1984–93	–0.065	–0.014	–0.098	–0.099
25–34 relative to 45–54				
1981	0.827	0.971	01.003	0.966
1984	0.764	0.944	0.992	0.851
1989	0.712	0.942	1.016	0.812
1993	0.682	0.935	0.987	0.741
Change 1981–89	–0.115	–0.029	+0.013	–0.154
Change 1984–93	–0.082	–0.009	–0.005	–0.110

[a] In Canadian dollars.
[b] Survey of Consumer Finances.
[c] Survey of Work History (1981); Survey of Union Membership (1984); Labour Market Activity Survey (1986, 1989); Survey of Labour and Income Dynamics (1993).

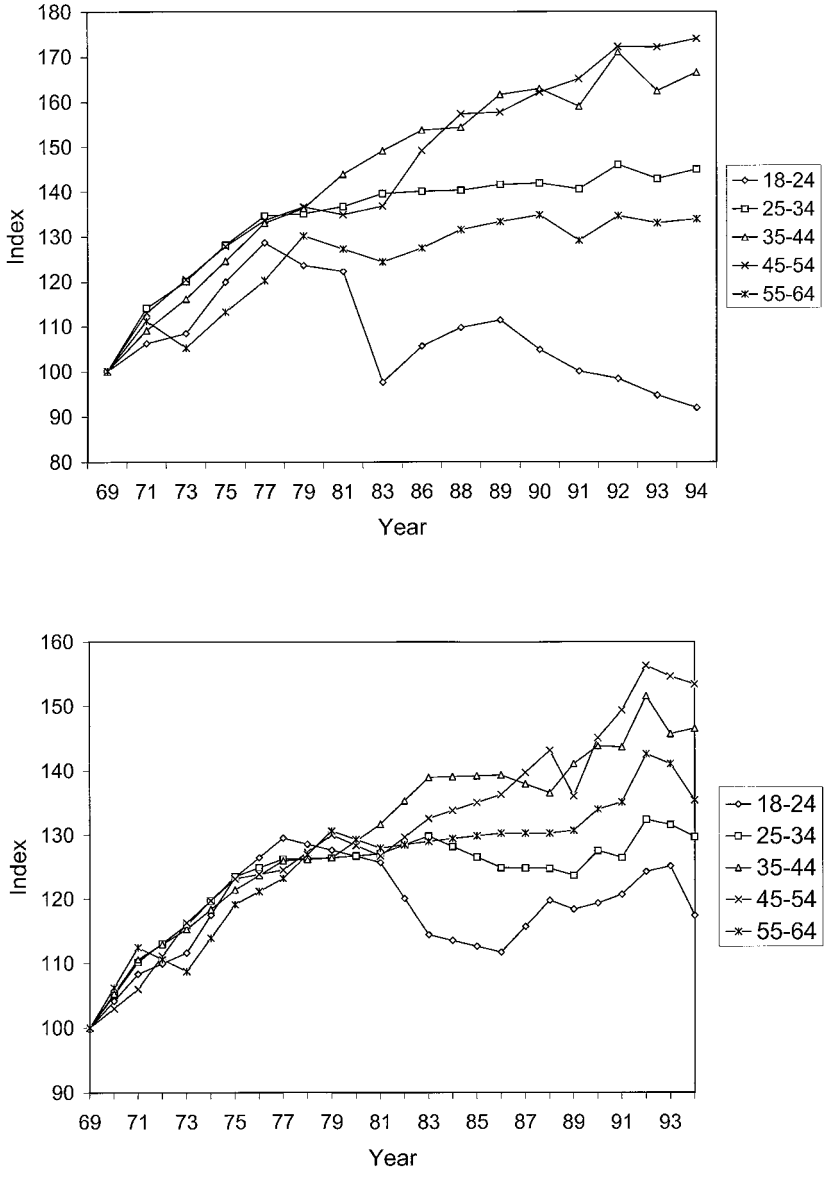
Table 10 Earnings and Hours Ratios of Younger Relative to Older Female Workers,[a] Selected Years

Age groups	Annual earnings[b]	Weeks worked[b]	Hours per week[c]	Hourly wages[c]
17–34 Relative to 35–64				
1981	0.787	0.878	1.009	0.900
1984	0.751	0.874	0.983	0.863
1989	0.729	0.898	0.982	0.838
1993	0.686	0.870	0.917	0.803
Change 1981–89	–0.058	0.020	–0.027	–0.062
Change 1984–93	–0.065	–0.004	–0.066	–0.060
17–24 Relative to 45–54				
1981	0.621	0.802	0.972	0.815
1984	0.540	0.780	0.919	0.700
1989	0.492	0.780	0.899	0.662
1993	0.382	0.741	0.759	0.572
Change 1981–89	–0.129	–0.022	–0.073	–0.153
Change 1984–93	–.0158	–0.039	–0.016	–0.128
25–34 Relative to 45–54				
1981	1.009	0.947	1.028	1.069
1984	0.983	0.949	1.029	1.042
1989	0.902	0.959	1.038	0.997
1993	0.836	0.933	0.979	0.909
Change 1981–89	–0.107	0.012	0.010	–0.072
Change 1984–93	–0.147	–0.016	–0.050	–0.133

[a] In Canadian dollars.
[b] Survey of Consumer Finances.
[c] Survey of Work History (1981); Survey of Union Membership (1984); Labour Market Activity Survey (1986, 1989); Survey of Labour and Income Dynamics (1993).

Overall, the decline in annual earnings of the young appear to have more to do with changes in relative wages than in working time. This is unlike the story for changing inequality as a whole, where changes in working time play a major role. We address possible reasons for this in the concluding remarks.

Figure 5 Indexed Real Annual Wages and Salaries of Female Workers, 1969–1994 (1969=100)



DISCUSSION

The Association between Hours and Earnings

For hourly paid workers, the association between hours worked and annual earnings is direct; one works an extra hour and one's annual earnings rise accordingly. A rise (or fall) in hours of work causes a change in annual earnings. This may apply to approximately one-half of all paid workers. Other workers are paid on some other basis, such as an annual salary. How does one interpret an apparent association between changing hours of work and changing annual earnings for these workers. Changing hours of work do not necessarily cause a change in annual earnings among, say, managers or professionals, although over the long run there is an observed association in the changes between the two. It may be that the same economic forces that cause the relative annual earnings of these workers to rise also cause their relative hours worked to increase. If they move together, relative hourly wages would not change. Thus, for some workers it is not that changes in hours worked directly cause a change in annual earnings, but rather that forces are brought to bear on the two variables so that they move in the same direction.

Interpreting the Results in a Supply/Demand Framework, and Differences with the United States

These observations suggest that the labor market adjustments to economic forces that led to rising earnings inequality have been at least as much through a quantity (hours worked) as through the price (wages paid) adjustment; probably the quantity adjustment has dominated. This seems to be true for the early 1990s as well as the 1980s, although increases in earnings inequality do not appear to be as significant in the 1990s as the 1980s.

Forces on both the supply and demand side of the labor market can contribute to the change in earnings inequality. In their study of rising earnings inequality in a number of countries, Freeman and Katz (1994) conclude that "changes in the supply and demand for labour skills substantially alter wages and employment of different groups of workers in the manner predicted by economist's supply and demand market clear-

ing model." That is, the supply–demand model works. They go on to note, however, that supply and demand factors by themselves cannot explain all of the differing changes in inequality among advanced countries. They note that demand factors are probably more or less the same in the developed countries, as they compete in the same global market with the same technologies. Supply factors may differ somewhat more, as demographics may be different and the development of the education and training systems may vary across countries.

They also argue, however, that something beyond supply and demand is needed to understand significant changes in labor markets. Knowledge of labor market institutions, which vary across countries, is also necessary. They note that "the stronger the role of institutions in wage determination, the smaller the effect of shifts in relative wages and, as a consequence, the greater will be their effect on relative employment." Earlier studies have noted that the evidence that is available suggests that in the United States, the rise in earnings inequality was associated more with changing relative wages than hours worked. In Canada, changing hours appear to dominate. This may be related to the larger role played by institutions in the Canadian labor market.

Unionization of the U.S labor force fell significantly during the period of interest here, while the change was much less significant in Canada (Card and Freeman 1994; Riddell 1993). Lemieux (1993) found that the difference in the unionization trends were associated with the lower rate of increase of labor market inequality in Canada than the United States. These same trends may also be associated with the tendency for changes in hours to play a more important role in Canada. Pressures for adjustment to changes in relative demand for labor may be reflected more through a redistribution of hours worked rather than hourly wages in a relatively stronger unionized setting.

But hours worked and wages paid respond to supply side influences as well. As noted in Freeman and Katz (1994), more generous income maintenance or unemployment insurance benefits may allow workers to be more rigid in the face of potential wage cuts, and reduce their willingness to take lower wages to obtain work, thus reducing supply-side pressures for wage cuts. This could contribute to the result that the adjustment is more on the hours than wage dimension.

In a related work, Kuhn and Robb (1996), when looking for an explanation of the rising unemployment gap between Canada and the

United States, noted that over the 1977–1992 period, the work behavior (in terms of weeks worked among prime-age males) changed very differently in the two countries. They observed that over this period work behavior changed such that Canadian men reduced their weeks of work, while Americans increased theirs. Some of this difference may be due to the fact that the 1990–1992 recession was much more severe in Canada than the United States, but it may also be reflective of differences in the changes in working time in the two countries.

In a simple supply–demand model, if labor demand for, say, lower paid and skilled workers decreases, shifting the demand curve to the left, one might expect to see an adjustment in both hourly wages paid and hours worked. The extent to which such a demand shift is reflected in one or the other would depend in part on the institutional arrangements in the country, as noted above. If there was a shift to the right in the demand for more highly skilled and paid workers, one would expect to see both their hours and wages rise. Data presented here suggest that both may have occurred, with the emphasis on changes in hours worked.

Other Factors Influencing Hours of Work

But aside from institutional arrangements, it may not be too surprising that the effects of decreases in demand for labor for, say, less-skilled and lower paid workers are reflected in changing relative hours of work. Economists have noted the reluctance of wages to adjust downward for some time. Hall (1995) talks about the unwillingness of employers to renegotiate wages of their workers to save jobs (or hours of work). He refers to work by Benley (1994) that documents the absence of renegotiation of wages in a depressed local labor market. By far the most common reason given by employers for this practice is that lowering wages would reduce morale, and hence presumably productivity. The notion that wages do not easily adjust downward, requiring a quantity response, is not new.

There are other incentives that employers may have for adjusting hours of work. For example, there is much talk of the desire for increased flexibility of employment levels in the face of changing product demand. Employers may use more part-time, contract or temporary workers, which would allow employment (and hours) levels to be

more easily adjusted when the company faces a downturn, thereby reducing labor costs. This would influence weeks or hours worked, and earnings of many workers, increasing polarization of the hours variables. While it is not known to what extent this is actually occurring, it could be part of the explanation of these findings. Another often discussed incentive relates to the impact of fringe benefits and payroll taxes on hiring practices. At higher wage rates, the marginal cost to the firm in terms of UI or Q/CPP payroll taxes of longer hours of work is zero. However, engaging a new employee or extending the hours of lower paid employees does have a cost. Similarly, extending hours of work (and annual earnings) does not increase the cost of many fringe benefits, and this may be particularly important among the more highly paid. These possibilities may also encourage employers to adjust hours worked.

The Declining Relative Wages among the Young

While changing hours may play an important role in rising inequality in general, it does not do so for one particular dimension of the inequality story, the declining real and relative annual earnings among younger workers. This does not mean that there were not significant changes in hours worked among the young men. It means that changes in hours worked were very similar among younger and older workers, and hence relative values did not change. But relative wage rates did decline among younger workers.

Why would changing working time play a significant role in rising earnings inequality in general, but hourly wages dominate the increasing earnings gap between younger and older workers? We are discussing changes in relative earnings (or inequality) *among* groups, in this case by age. Changing relative earnings among age groups is one part, but only a small part, of the overall rise in earnings inequality. Increasing disparity *within* groups (defined in various ways) plays a larger role (Levy and Murnane 1992; Morissette, Myles, and Picot 1994; Richardson 1994).

These results indicate that there is real wage adjustment taking place in the Canadian economy. It may be observed more among young workers than elsewhere for a number of reasons. The first relates to relative education levels. Traditionally the young have

enjoyed much higher levels of education than older workers. Recently this advantage has largely disappeared, as the educational attainment of older workers has risen quite rapidly. This is a result of the aging of the more highly educated "baby boom" generation. This decline in relative educational level among the young (relating to older workers) seems to account for around 30 percent of the earnings gap between the young and the old (Kapsalis, Morissette, and Picot 1997). Falling relative education levels would be associated with decline in wages.

A second reason relates to where labor market adjustment takes place. Adjustment of almost any type is typically more concentrated among younger workers. This includes migration, adjusting to changing regional economic circumstances, changes in skill acquisition in the face of changing demand, and wage adjustment. Among workers in general, the reluctance of wages to adjust downward was noted. This unwillingness on the part of both employees and employers to see wages adjust downward would be particularly strong among older employees, where an implicit contract with no expectations of downward wage adjustment may have developed over many years between the employee and the employer. Seniority provisions may also make such adjustment more difficult. And if downward wage adjustment, when it does occur, takes place in the open labor market (as opposed to internal labor markets in a company), this would have more impact on the young, as they are more frequently exposed to the pressures of the open labor market as they separate from firms more frequently.

It is likely easier for companies to adjust the wages of entry- (or near entry) level jobs downward in the face of decreased labor demand than it is to adjust the wages in jobs filled by experienced workers for reasons given above. This would influence the wages of predominantly younger workers.

For all these reasons, older workers are likely to be relatively immune to the downward adjustment of wages, at least relative to younger workers. Thus, when confronted with decreased labor demand for some particular group (say, less-skilled workers), companies may choose in general to adjust hours of work (and wages to a lesser extent) for a variety of reasons. These might include institutional factors, efficiency wage arguments, and the desire not to reduce moral and productivity, and the desire to have more flexibility in working time to keep labor costs low in the face of decreased product

demand, and possibly incentives associated with the structure of payroll taxes. But some wage adjustment obviously takes place, and it appears to be concentrated among the young.

Notes

The author thanks Wendy Pyper for her usual excellent research assistance in preparing this paper.

1. Calculations were made with the self-employed who have employment earnings left in the sample, and the influence on the results were minimal.
2. Students could not be excluded from all of the data sets.
3. Since we do not have data for comparable points in the business cycle, we do not know if the excluded population is increasing in size. If it were, we would be underestimating the *change* in the distribution of hours worked. The increase in the share of labor force members at the bottom of the hours worked distribution would be underestimated, as would the impact of changes in hours worked on earnings inequality. Given the magnitude of the estimated population, however, we do not believe including this group would significantly change the findings.
4. In the upper deciles there can, of course, be little increase in weeks worked, as the average is very close to 52 weeks. Any increase in hours worked per year must come through increases in hours per week, not weeks per year. No decline in weeks worked was observed in the upper deciles.
5. Any difference in observed patterns between this period (1984–1993) and the earlier 1981–1989 period really reflects differences in the patterns of inequality in trends in the two recessions. This is because the expansionary period, 1984–1989, is common to both periods.
6. See the earlier section "The Data" for a listing of these surveys.
7. The major job is that with the most hours per week in the month of December. Data on weekly earnings, hours per week, and hourly wages were also computed using all jobs held during the year, weighted according to the number of hours worked in each job (for all years except 1984). A comparison was made between the distributions and the change in the distributions observed using only the December job and all jobs held during the year, and the trends were the same for both approaches.
8. This is usual hours worked per week on the LFS, which includes unpaid overtime, and overtime worked on a regular basis. Similar data are obtained from the special surveys used here, including the SWH, SUM, LMAS, and SLID. In these surveys, usual hours worked as also collected (in SLID and LMAS the reference is paid usual hours). Data are collected for usual hours per day, and days per week, except for the 1993 SLID survey, which collects data on the usual hours per week directly. These surveys also show a decline in the proportion of males

working regular (35–40) hours, from 75 percent in 1981, 72 percent (84), 71 percent (86), 67 percent (89), and 66 percent (93).

9. This increase in the share of men working longer hours was not observed in the LMAS/SLID data. This is likely due to the differences in the manner in which people reported hours worked in the two surveys. The LFS is a consistent source and likely more reliable.
10. When a respondent is asked, "What was your usual wage of salary before taxes and other deductions from this employer," they can respond in terms of wages per hour, week, month, or year. In the special surveys, from 36 percent (SWH) to 53 percent (SUM) reported hourly wage directly. For the remainder, hourly wage is computed by dividing earnings over the period (for example per week or per year) by the usual hours worked.
11. Among all males, the result is not quite as striking. Inequality in weekly earnings rose 14 percent between 1981 and 1989, according to these data, and 37 percent of this increase was associated with the change in hours per week, an additional 53 percent by the covariance term, which implies that the tendency of higher paid workers to work longer hours increased over the period.
12. It should be noted, however, that the rise in the inequality of weekly earnings observed in these data sets for this 1984–1993 period is not reflected in the SCF data, where weekly earnings inequality does not increase significantly over the 1984–1993 period. In the SCF data, inequality in weekly earnings, after increasing 25 percent among males in the 1981–1988 period, is seen to rise little over the 1984–1993 period. This leveling is not observed in the special surveys data. Weekly earning inequality rises around 15 percent during the 1980s (comparable to the SCF results), but 15–20 percent over the 1984–1993 period, which is much higher than in SCF, where virtually no increase was observed. As a time-series measure of weekly earnings, the SCF has a major advantage, it is a consistent series of measures from the same survey vehicle. The special surveys, which are similar in the way in which they treat hours and wages, do differ in some ways. This is particularly true for the 1993 observation from SLID. Hours per week are measured in a slightly different manner (SLID measures usual hours per week directly, while the previous survey measured usual hours per day and days per week). It seems likely that the consistent series from the SCF would be a more reliable source of trends in weekly earnings than that observed in the special surveys.
13. Trends in the change in average weekly earnings were somewhat different from the two sources. The decline in average weekly earnings at the bottom end of the distribution observed for the 1981–1989 period in SCF (Tables 2 and 5) is evident in the data from the special surveys for all males, but not for prime-age males. The change in the *distribution* of weekly earnings is similar to the two sources (both show rising inequality), but the change in the *level* is different. This is probably because the level of weekly earnings in the 1981 SWH appear to be low relative to the other special surveys. This would cause the growth to be overestimated between 1981 and 1989. Average weekly earnings from the special surveys were

compared with those from SCH. For all males, for example, the ratio of weekly earnings in the special surveys compared to those in SCF was in the 97 percent to 101 percent range for all years (84, 86, 89, 93) except 1981, when it was 93 percent. A similar pattern was observed for prime-age males. Average weekly earnings appear to be underestimated in the 1981 SWH.

14. For example, among men 25–44, the employment/population ratio fell from 90.4 percent in 1981 to 88.2 percent in 1989, and 83.3 percent in 1995. Among women of the same age, the trend was up through the 1980s from 60.8 percent in 1981, to 70.8 percent in 1989, to 70.6 percent in 1995.
15. The special surveys data also show a decline in the share of prime-age women working a regular 35–40 hour week, from 65 percent in 1981, to 63 percent in 1989, and 60 percent in 1993.
16. That is, those with lower wages are increasingly working shorter hours, and those with higher wages are increasingly working longer hours.
17. Earlier work shows that among full-time, full-year, female workers, earnings inequality rose in the 1980s, and declined somewhat in the 1990s (Morissette, Myles, and Picot 1994; OECD 1996).
18. Earlier work for the 1980s showed that among women working full-time, full-year earnings inequality rose, but when part-year and part-time working women are included, it fell (Morissette, Miles, and Picot 1994).
19. The one exception is among the 17- to 24-year-olds during the 1984–1993 period, where relative hours worked per week (relative to 45- to 54-year-olds) decline 12 percent compared to a decline in hourly wages of 18 percent.

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Ging Wong
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W.E. Upjohn Institute for Employment Research
Kalamazoo, Michigan

W.E. Upjohn Institute for Employment Research
300 S. Westnedge Avenue
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