An Explanation of the Increasing Age Premium

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ABSTRACT

The study examines the reason for the significant increase in the 'age premium' over the period 1981-94. The age premium refers to the percentage difference in hourly earnings between 'younger' (25-34) and 'older' (45-54) workers. In 1994, the hourly rate of older males was 32.4% higher than that of younger males. The corresponding age premium among females was 15.5%. Over the period 1981-94, the age premium increased by 15.7 percentage points among males and 19.5 percentage points among females.

Evidence based on analysis of the Survey of Consumer Finances (SCF) public use microdata shows that, while there has been a trend toward non-standard employment, this so far has affected mostly workers under age 25 and cannot explain the rise in the age premium between ages 25-to-34 and 45-to-54, which is the focus of this study.

A more likely explanation identified by the study is the dramatic improvement in the level of education of older workers over the last 14 years. For example, from 1981 to 1994 the percentage of older male workers with grade 10 education or less declined from 41.9% to 19.6%, while the percentage with post-secondary diplomas and degrees increased from 32.1% to 51.7%. The education level of younger male workers also improved over the same period, but the rate of improvement was smaller and, by 1994, there was virtually no difference in the incidence of post-secondary diplomas and degrees between younger and older workers. Similar trends took place among female workers. Shift-share analysis shows that the narrowing of the education gap between older and younger workers explains 44% of the age premium rise among male employees and 50% of the age premium rise among female employees.

Thus, this study provides the following likely explanation for a significant part of the increase in the age premium over the period 1981-94: Fourteen years ago younger workers had to compete for jobs with older workers who had more experience but less education. Now, they have to compete with older workers who still have more experience but, on the average, have comparable education to younger workers. As a result, employers are willing to pay a higher premium than in the past for older workers who combine experience with higher education.

Keywords: wage inequality, education and wages, age premium.

I. INTRODUCTION

This study examines the so-called 'age' or 'experience' premium -- defined here as the difference in hourly wage rates between 'younger' and 'older' workers, expressed as a percentage of the hourly wage rate of 'younger' workers. 'Younger' workers are defined here as those aged 25 to 34. By age 25 most individuals have completed their formal education. 'Older' workers are defined as those aged 45 to 54. Employees in this age group enjoy higher earnings relative to the rest of the age groups.

The issue addressed is the sharp increase in the age premium over the last 14 years. From 1981 to 1994, the male age premium increase by 15.7 percentage points (from 16.7% to 32.4%), while the female age premium increased by 19.5 percentage points (from -4.0% to 15.5%). What is more disturbing is that, while the real hourly wage rates of older workers increased over the period (by 3.3% for males and 11.0% for females), they declined for both male and female younger workers (by 8.9% and 7.8% correspondingly).

The increase in the earnings differential is puzzling for at least two reasons: First, younger age cohorts are smaller than their predecessors. The resulting reduction of employees for entry-level positions should normally have improved the relative earnings of younger workers. Second, younger workers are better educated today than 15 years ago. Based on results by the Economic Council of Canada [1992] there is no evidence of deterioration of the quality of education over the last 15 years.

The above developments are not unique to Canada. They have led to at least two competing hypotheses. One hypothesis suggested in the literature [Davis, 1992; Mincer, 1991] is that the value-added of experience has increased and this is reflected in a relatively higher wage rates for older, more experienced workers. If this is true then, from an economic point of view, the increase in the age premium is a relatively benign development: today's younger workers will be able in the future, as they age, to also enjoy the same higher age premium.

An alternative hypothesis is that the increasing age premium is the result of an increase in non-standard employment -- meaning part-time jobs, temporary/contract jobs, and self-employment -- something that has been documented by several researchers [Betcherman, 1995; Heisz, 1995; Schellenberg and Clark 1996]. Since non-standard employment tends to pay less and since trends in non-standard employment impact disproportionately new labour force entrants, the increase in the age premium could be blamed on the rise in non-standard employment. A more disturbing version of this view is that younger workers are the harbinger of future labour market conditions. What is happening to them today, may be a precursor of the 'End of Work' -- i.e. a future of low-paying, non-standard employment for a growing share of the labour force [Rifkin, 1995].

Evidence based on analysis of the Survey of Consumer Finances (SCF) public use microdata shows that, while there has been a trend toward non-standard employment, this so far has affected mostly workers under age 25 and cannot explain the rise in the age premium between ages 25-to-34 and 45-to-54, which is the focus of this study.

A more likely explanation identified by the study is the dramatic improvement in the level of education of older workers over the last 14 years. For example, from 1981 to 1994 the percentage of older male workers with grade 10 education or less declined from 41.9% to 19.6%, while the percentage with post-secondary diplomas and degrees increased from 32.1% to 51.7%. The education level of younger male workers also improved over the same period, but the rate of improvement was smaller and, by 1994, there was virtually no difference in the incidence of post-secondary diplomas and degrees between younger and older workers. Similar trends took place among female workers.

Shift-share analysis shows that the narrowing of the education gap between older and younger workers explains 44% of the age premium rise among male employees and 50% of the age premium rise among female employees.

Thus, this study provides the following likely explanation for a significant part of the increase in the age premium over the period 1981-94: Fourteen years ago younger workers had to compete for jobs with older workers who had more experience but less education. Now, they have to compete with older workers who still have more experience but, on the average, have comparable education to younger workers. As a result, employers are willing to pay a higher premium than in the past for older workers who combine experience with higher education.

This is a more benign explanation than the hypothesis that the new jobs created by the economy are sub-standard and that eventually much of the labour force will end up working in low-paying, short-term jobs. It also suggest that, with the education gap practically eliminated, one would expect at least a slow-down in the increase in the age premium over the next decade.

In what follows, Section II describes the trends in real annual earnings, annual hours of work, and real hourly wage rates over the period 1981-94. Section III explores trends in non-standard employment and their potential effect on the age premium. Section IV looks at education trends and their potential impact on the age premium. Section V concludes the study.

II. AGE AND EARNINGS

1. Background

The results of this study are based on the SCF public use microdata. The following sample was used for the analysis: paid employees with no self-employment, excluding students working full time.[1]

This section compares trends in annual earnings, annual hours of work and hourly wage rates between younger and older workers over the period 1981-1994.[2] Earnings are expressed in constant 1986 dollars. The SCF does not contain direct information on hourly wage rates. For the purpose of this study, they were estimated by dividing annual wages and salaries by the annual hours of work. The

[1] Analysis of wage earnings inequality typically focus on paid workers only. This is due in part to the fact that self-employment earnings are more difficult to measure (for example, net self-employment earnings can be negative).

[2] The choice of the period was dictated by the availability of SCF public use microdata. In addition to 1981 and 1994, selective between years are shown so that the reader can assess the stability of the trends or the effect of the cycle.

latter is estimated by multiplying the annual weeks of work by the usual weekly hours of work at the most recent job.[3]

The decline in the relative earnings of younger workers has been well documented in the economic literature, although no conclusive evidence has been found of the underlying causes. Betcherman and Morissette (1994) found that "During the 1980s, relative annual earnings of young workers fell. This decline occurred in conjunction with a decrease in relative hourly wages. The fall in relative hourly wages, which had earlier been documented for the 1981-86 period, still held in 1989, suggesting that it was not simply a response to cyclical conditions."

The above study is, however, rather inconclusive in terms of what are the causes of increasing inequality, simply observing that "Decreasing relative hourly wages for young workers were widespread in the 1980s; they occurred within all educational, major industrial, and occupational groups."

The above results were confirmed by a follow up study by Morissette (1995). He concludes that "the rise in inequality is not solely due to the 1981-83 recession" (page i). The key underlying factor is "real hourly wages of young workers fell substantially between 1981 and 1986 and never returned to their pre-recession level afterwards" (p. 20). As for the likely causes of increasing inequality, the Morissette study like the Betcherman and Morissette study is again inconclusive.

2. Evidence

The evidence presented here shows that there has been a significant decline in the annual earnings of younger workers relative to older workers. It is further shown that this is primarily due to changes in hourly wage rates, rather than annual hours of work. All tables refer to paid employees, full-time and part-time.

a) Real Annual Earnings

The SCF data reveal that there has been a significant decline in the annual earnings of younger workers relative to older workers over the period 1981-1994 (Table 1). For example:

- Among men, the real annual earnings of older workers increased by 4.7%, while those of younger workers declined by 9.5% -- leading to a 18.8 percentage point increase in the real annual earnings gap between younger and older workers.

[3] The estimation of hourly wage rates from the SCF data is not a very accurate one, primarily because hours come from the job held at the time of the survey, and weeks worked and annual earnings from the previous year. For example, in the case of individuals who changed jobs during the year from a full-time job to a part-time job, or vice versa, the above measure biases part-time wage rates upwards and full-time wage rates downwards. Estimates of hourly wage rates for full-time workers tend to be more accurate. The analysis presented here was repeated for employees working full-time (30 or more hours per week) as well as full-time workers (30 or more hours per week and a minimum 49 weeks annually). It was also repeated using weekly rather than hourly earnings. In all cases, the results were similar, showing that a significant portion of the increase in the age premium can be explained by the narrowing of the inter-generational education gap.

- Among women, the real annual earnings of older workers increased by 25.8%, while those of younger workers increased by 0.9% -- leading to 23.1 percentage point increase in the real annual earnings gap between younger and older workers.
- The real annual earnings of male and female workers under age 25 declined fairly dramatically -- by 27.8% and 16.2% respectively.

Table 1: Annual Earnings (1986$)

	1981	1984	1986	1988	1989	1991	1994
MALE							
Under 25.....	17,254	13,901	13,956	14,754	14,962	13,704	12,464
25-34.....	27,951	25,928	25,954	26,048	25,601	25,187	25,305
35-44.....	33,693	32,264	32,789	33,944	33,818	32,821	32,721
45-54.....	33,461	33,147	34,323	35,080	34,568	35,380	35,042
55 plus.....	28,498	29,665	29,853	31,974	30,920	31,045	30,525
ALL.....	28,430	27,225	27,714	28,813	28,633	28,760	28,807
FEMALE							
Under 25.....	12,667	11,242	11,234	11,982	12,494	11,820	10,621
25-34.....	17,512	17,191	17,324	17,276	17,296	17,272	17,667
35-44.....	17,825	18,339	18,575	18,439	19,183	19,405	19,717
45-54.....	16,370	16,939	17,750	18,809	18,920	19,803	20,598
55 plus.....	15,955	15,812	16,562	16,633	16,435	16,576	16,578
ALL.....	16,137	16,123	16,593	16,997	17,375	17,683	18,129

b) Annual Hours

There has also been a corresponding increase in the annual hours of work gap in favour of older workers. However, the increase was much smaller than the increase in annual earnings: 1.6 percentage points among men and 3.0 percentage points among women (Table 2). This means that most of the increase in the earnings gaps between younger and older workers is due to a widening of the gap in hourly wage rates. A similar conclusion, using different type of data, was reached by Picot [1997].

Table 2: Annual Hours of Work

	1981	1984	1986	1988	1989	1991	1994
MALE							
Under 25.....	1,756	1,637	1,724	1,740	1,788	1,621	1,645
25-34.....	2,034	1,982	2,044	2,049	2,037	2,015	2,037
35-44.....	2,111	2,073	2,113	2,138	2,142	2,124	2,113
45-54.....	2,093	2,095	2,136	2,161	2,141	2,150	2,129
55 plus.....	2,023	2,011	2,032	2,008	2,031	1,997	2,044
ALL.....	2,013	1,972	2,027	2,046	2,052	2,029	2,041
FEMALE							
Under 25.....	1,582	1,514	1,597	1,600	1,655	1,589	1,486
25-34.....	1,650	1,655	1,693	1,711	1,729	1,699	1,729
35-44.....	1,637	1,654	1,681	1,685	1,714	1,701	1,711
45-54.....	1,621	1,632	1,672	1,697	1,743	1,747	1,750
55 plus.....	1,593	1,621	1,599	1,606	1,594	1,591	1,575
ALL.....	1,622	1,620	1,662	1,676	1,706	1,687	1,691

c) Real Hourly Wage Rates

Over the period 1981-94, the real hourly wage rates of older workers increased -- by 3.3% in the case of men, and 11.0% in the case of women. This led to a significant increase in the age premium among both men and women (Table 3):

- Among men, the age premium increased by 15.7 percentage points -- from 16.7% to 32.4%.

- Among women, the age premium increased by 19.5 percentage points -- from -4.0% (i.e. a premium in favour of younger workers) to 15.5% (in favour of older workers).

Table 3: Hourly Wage Rate (1986$)

	1981	1984	1986	1988	1989	1991	1994
MALE							
Under 25.....	10.19	8.98	9.27	8.95	8.67	9.42	8.21
25-34.....	14.12	13.41	13.15	12.92	13.23	12.89	12.87
35-44.....	16.39	15.97	15.92	16.26	16.13	15.74	15.86
45-54.....	16.48	16.42	17.11	16.44	16.69	16.88	17.04
55 plus.....	15.29	19.56	15.79	17.95	17.33	16.60	16.44
ALL.....	14.51	14.56	14.23	14.43	14.50	14.50	14.53
FEMALE							
Under 25.....	8.72	8.25	7.95	8.19	8.32	8.17	7.74
25-34.....	11.87	11.75	11.53	10.70	10.64	10.96	10.94
35-44.....	12.28	12.49	11.99	12.06	12.27	12.38	12.31
45-54.....	11.39	11.75	13.27	12.19	12.19	12.43	12.64
55 plus.....	11.64	10.97	11.70	12.12	12.52	12.26	14.34
ALL.....	11.13	11.16	11.31	11.06	11.20	11.43	11.66

III. NON-STANDARD EMPLOYMENT

1. Background

This section looks at trends in non-standard employment as a potential explanation of the decline in the relative earnings of younger Canadians. Non-standard employment generally refers to part-time employment and short-term or contract employment. Self-employment is also treated as a form of non-standard employment, although it is not relevant to this study since the focus is on paid workers and the self-employed are excluded.

An increase in non-standard employment would normally impact disproportionately new labour force entrants and, consequently, may contribute to a decline in their earnings relative to older workers. It was already shown in the previous section that the decline in annual earnings of younger workers relative to older workers was primarily due to changes in hourly wage rates, rather than hours of work. However, a trend toward non-standard employment could be a contributing factor since non-standard employment generally pays less than standard employment.

One of the concerns that has been voiced in the economic literature is that the economy is not generating enough "standard" jobs. "In Canada, non-standard employment has been a major source of job creation during the past decade, while in some European countries it has accounted for virtually all new employment growth" (Economic Council of Canada, 1991: 71).

While non-standard employment provides more flexibility to employers and meets the needs of students and parents of small children seeking part-time work, it is generally perceived as a negative trend from the employees' perspective because of the "inferior compensation, security, and career advancement opportunities that typically characterize nonstandard employment."

2. Evidence

The evidence presented in this section shows that, while there has been a trend toward non-standard employment, this so far has affected mostly workers under age 25 and cannot explain the rise in the age premium between ages 25-to-34 and 45-to-54, which are the focus of this study.

a) Part-Time Employment

"Part-time employment is the largest of non-standard employment forms." "Between 1980 and 1989, the number of part-time workers increased by almost 500,000; this represents over one quarter of the net employment creation in Canada during the decade. About one third of this growth in part-time jobs was 'involuntary'; that is, the workers would have preferred to work full time" (Economic Council of Canada, 1991: 72).

The main issue with part-time work is lower earnings (both because of fewer hours and lower hourly wage rates). It also raises concerns with respect to other employment aspects, such as opportunities for training, opportunities for career ladders, and limited access to fringe benefits.

The evidence presented here shows that the increase in part-time employment over the period 1981-94 has concentrated primarily among workers under age 25 (Table 4). In particular,

- For most male workers age 25 and over full time is still the norm and the increase in part-time employment has been limited: from 1.5% to 3.6% among younger workers, and from 1.5% to 2.7% among older workers.

- The story is somewhat different among female workers. Part-time employment is more common than among males. However, there has been virtually no increase in part-time employment among younger workers (it went from 18.6% to 18.8%) and among older workers there has actually been a significant decline in part-time employment (from 26.6% to 19.6%).

- When one concentrates on involuntary part-time employment, then picture is more similar among men and women. The female part-time rate is still higher than the male part-time rate but the difference is considerably less. Also, the part-time rate increased somewhat for both genders and both age groups (Table 5).

Table 4: Percentage Who Usually Worked Less than 30 Hours per Week
For Any Reason

	1981	1984	1986	1988	1989	1991	1994
MALE							
Under 25.....	6.1%	10.9%	12.6%	9.5%	10.8%	16.4%	17.4%
25-34.....	1.5%	2.3%	2.6%	2.3%	3.0%	3.2%	3.6%
35-44.....	1.7%	1.9%	1.8%	1.4%	1.4%	2.0%	2.2%
45-54.....	1.5%	1.8%	1.7%	1.0%	1.7%	1.9%	2.7%
55 plus.....	6.0%	6.6%	5.7%	7.8%	8.2%	8.1%	8.7%
ALL.....	2.9%	4.0%	4.1%	3.4%	3.9%	4.5%	4.9%
FEMALE							
Under 25.....	14.0%	16.8%	18.9%	19.0%	17.1%	23.0%	29.6%
25-34.....	18.6%	19.1%	18.1%	17.3%	17.1%	18.4%	18.8%
35-44.....	23.9%	22.5%	23.1%	22.8%	21.9%	22.3%	21.5%
45-54.....	26.6%	25.0%	23.6%	22.9%	21.5%	20.9%	19.6%
55 plus.....	28.8%	27.2%	30.4%	27.9%	32.7%	31.9%	33.8%
ALL.....	20.8%	21.1%	21.4%	20.8%	20.5%	21.7%	22.0%

Table 5: Percentage Who Usually Worked Less than 30 Hours per Week
Because They Could Not Find Full-Time Work

	1981	1984	1986	1988	1989	1991	1994
MALE							
Under 25.....	3.0%	6.0%	3.8%	3.2%	2.8%	8.3%	7.3%
25-34.....	.6%	1.6%	.9%	.6%	1.3%	1.4%	2.1%
35-44.....	.4%	1.2%	.7%	.4%	.5%	.7%	1.1%
45-54.....	.3%	1.2%	.8%	.4%	.5%	.8%	1.1%
55 plus.....	.8%	1.0%	1.0%	1.3%	.4%	1.9%	2.5%
ALL.....	.9%	2.1%	1.3%	.9%	1.1%	1.9%	2.1%
FEMALE							
Under 25.....	7.0%	10.0%	8.0%	5.7%	5.7%	10.0%	14.2%
25-34.....	3.5%	5.4%	4.3%	3.6%	3.5%	5.7%	6.7%
35-44.....	4.1%	5.9%	4.6%	4.5%	4.7%	6.4%	7.4%
45-54.....	4.9%	6.4%	6.3%	5.4%	4.1%	6.0%	6.8%
55 plus.....	2.4%	4.5%	5.0%	4.5%	4.0%	5.4%	8.6%
ALL.....	4.5%	6.5%	5.4%	4.6%	4.3%	6.4%	7.8%

b) Job Tenure

There is general agreement that long-term jobs are better than short-term jobs. For example, “a worker has a better chance to build up skill, reach a higher wage and access career advancement opportunities. Short jobs expose workers to more spells of unemployment, make it more difficult to accumulate a pension, and increase the need for mid-career retraining” (Heisz, 1995: 1).

According to a preliminary exploration of the 1994 International Adult Literacy Survey (IALS), 20% of employees reported having a temporary job. And, while 29% of those with permanent jobs reported employer supported training in 1994, the incidence among temporary workers was 21%.[4]

[4] Preliminary calculations by the author based on the IALS public use microdata.

Non-permanent jobs have been identified in the literature as a growing issue. “Too many workers today are unable to string together enough temporary jobs in a year to provide them with an adequate income security... In short, temporary employment in some of its current forms is eroding the economic security of Canadian families” (Shellenberg and Clark, 1996: 4).

Typically, the permanency of jobs is measured by the length of tenure, for which there are historical series from the LFS and SCF. One definition of temporary jobs is tenure under 7 months.[5] There is some evidence in the literature of an increase in short-tenure jobs.

A recent study, based on estimated job “survival” rates using retention rates, concluded that “While the proportion of new jobs which lasted beyond 6 months declined over the period [1981-94], the proportion of 6 month old jobs which lasted longer than 5 years increased from an average of 37 percent between 1981 and 1984 to an average of 42 percent between 1991 and 1994. These changes are consistent with the argument that firms are increasingly using a core of long-term skilled employees and hire contingent workers when demand rises. Workers with more than one year of job seniority are enjoying increasing stability, while at the same time the ranks of stable job holders is becoming more difficult to join” (Heisz, 1995:7-8).

However, a simple examination of the distribution of workers by job tenure with their most recent employer shows no significant change over the period 1981-94 (Table 6). While the evidence presented here is crude, it is rather unlikely that trends in job permanency, as measured by job tenure, have been a factor behind the increase in the age premium.

[5] See Economic Council of Canada, 1991; and Betcherman, 1995.

Table 6: Percentage Distribution by Tenure With Current Employer

	1981	1984	1986	1988	1989	1991	1994
MALE							
25-34							
JOB TENURE							
'Under 7mts'	10.3%	11.9%	14.2%	14.0%	14.1%	14.6%	12.1%
'7-12 mths'.	10.2%	9.4%	9.7%	11.4%	11.1%	8.7%	9.8%
'1-5 yrs'...	40.2%	35.8%	33.7%	37.3%	41.5%	41.2%	37.9%
'6-10 yrs'..	27.8%	30.1%	26.4%	24.0%	20.3%	22.5%	29.3%
'11+ yrs'...	11.6%	12.8%	16.0%	13.3%	13.0%	13.1%	10.9%
ALL.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
45-54							
JOB TENURE							
'Under 7mts'	5.1%	6.3%	5.9%	6.0%	6.2%	5.5%	5.0%
'7-12 mths'.	3.8%	3.6%	3.5%	3.2%	4.6%	3.6%	4.1%
'1-5 yrs'...	16.2%	15.1%	16.0%	16.8%	17.4%	15.9%	16.1%
'6-10 yrs'..	16.0%	16.6%	15.4%	13.8%	14.3%	13.1%	15.6%
'11+ yrs'...	59.0%	58.4%	59.1%	60.2%	57.5%	62.0%	59.2%
ALL.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
FEMALE							
25-34							
JOB TENURE							
'Under 7mts'	10.4%	10.9%	13.0%	13.6%	12.5%	11.5%	9.7%
'7-12 mths'.	13.0%	11.4%	12.0%	12.6%	12.9%	11.3%	10.9%
'1-5 yrs'...	42.7%	38.8%	36.2%	38.8%	43.4%	46.2%	39.3%
'6-10 yrs'..	25.5%	27.1%	27.1%	24.1%	19.7%	19.4%	29.4%
'11+ yrs'...	8.4%	11.8%	11.7%	10.9%	11.5%	11.5%	10.7%
ALL.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
45-54							
JOB TENURE							
'Under 7mts'	5.7%	6.4%	11.5%	7.0%	6.1%	5.8%	6.3%
'7-12 mths'.	6.8%	6.2%	4.9%	7.2%	6.4%	5.2%	5.1%
'1-5 yrs'...	28.4%	23.3%	22.9%	24.2%	26.7%	28.0%	21.5%
'6-10 yrs'..	24.5%	24.6%	21.3%	18.2%	20.5%	17.1%	22.6%
'11+ yrs'...	34.6%	39.5%	39.5%	43.4%	40.3%	43.9%	44.5%
ALL.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

IV. THE IMPACT OF EDUCATION TRENDS

1. Education Trends

A more likely explanation for the increase in the age premium identified by this study is the dramatic improvement in the level of education of older workers over the last 14 years. Over the period 1981-94, there has been a dramatic narrowing in the educational gap between younger and older workers. Thus, although younger workers have now a higher level of education than younger workers in the past, they have a smaller educational advantage over older workers than was the case in the past (Table 7).[6]

The inter-generational narrowing in the education gap is most startling in the case of males. For example:

- From 1981 to 1994 the percentage of older male workers with grade 10 education or less declined from 41.9% to 19.6%, while the percentage with post-secondary diplomas and degrees increased from 32.1% to 51.7%.

- Over the same period similar changes took place among older female workers: the percentage with grade 10 education or less declined from 34.7% to 15.5%, while the percentage with post-secondary diplomas or degrees increase from 26.7% to 48.3%.

- The education level of both male and female younger workers also improved over the same period, but the rate of improvement was smaller. As a result, by 1994 there was virtually no difference in the incidence of post-secondary diplomas and degrees between male younger and older workers, and only a small difference between female younger and older workers, in favour of younger workers.

[6] The education question in the LFS was modified extensively in 1990. As a result, the incidence of post-secondary diplomas as measured in the LFS increased by about 10 percentage points from 1989 to 1990. Since education in the SCF refers to the year of the survey rather than the preceding year for which information on work and income is collected, the questionnaire modification affected the SCFs for 1988 and 1989. To correct for this effect, the education distribution for the years prior to 1989 were scaled so that the adjusted education distribution in 1988 is identical to that in 1989. The only possibility for bias is if in the single year period (1988-89) the education trend was significantly different by age group. For a detailed discussion of the impact of the change in the SCF question on education see Gower (1993).

Table 7: Percentage Distribution by Level of Education
(Education distribution adjusted to reflect 1990 change in LFS definition)

	1981	1984	1986	1988	1989	1991	1994
MALE							
25-34							
None-Grade 8	5.5%	4.4%	3.2%	2.9%	2.9%	2.8%	2.1%
Grade 9-10	10.9%	11.0%	11.1%	9.2%	9.2%	7.7%	6.4%
Grade 11-13	29.5%	30.2%	31.8%	30.3%	30.3%	31.6%	27.2%
Some PostSec	9.6%	9.9%	8.0%	9.8%	9.8%	8.5%	9.1%
PostSec Dipl	27.8%	28.0%	29.5%	32.0%	32.0%	30.6%	34.1%
Univ. Degree	16.7%	16.5%	16.4%	15.8%	15.8%	18.8%	21.1%
ALL.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
45-54							
None-Grade 8	22.6%	22.6%	17.5%	14.3%	14.3%	10.1%	8.3%
Grade 9-10	19.3%	15.7%	16.5%	15.1%	15.1%	11.0%	11.3%
Grade 11-13	20.8%	22.5%	20.0%	23.0%	23.0%	22.3%	22.7%
Some PostSec	5.2%	4.8%	5.6%	6.3%	6.3%	7.0%	6.0%
PostSec Dipl	21.8%	21.6%	23.9%	25.7%	25.7%	27.5%	29.0%
Univ. Degree	10.3%	12.8%	16.4%	15.6%	15.6%	22.3%	22.7%
ALL.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
FEMALE							
25-34							
None-Grade 8	3.4%	1.6%	2.3%	1.7%	1.7%	1.6%	1.5%
Grade 9-10	7.0%	5.6%	6.6%	6.3%	6.3%	5.4%	3.9%
Grade 11-13	33.9%	35.2%	35.3%	33.2%	33.2%	30.1%	25.8%
Some PostSec	9.1%	10.7%	9.3%	9.1%	9.1%	11.0%	9.0%
PostSec Dipl	31.1%	30.3%	30.0%	33.0%	33.0%	34.6%	37.8%
Univ. Degree	15.5%	16.6%	16.6%	16.7%	16.7%	17.4%	22.0%
ALL.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
45-54							
None-Grade 8	18.7%	16.6%	10.5%	11.4%	11.4%	9.7%	7.1%
Grade 9-10	16.0%	13.0%	13.1%	13.4%	13.4%	8.6%	8.7%
Grade 11-13	31.2%	32.5%	32.9%	30.4%	30.4%	31.7%	30.3%
Some PostSec	7.5%	6.4%	8.3%	7.8%	7.8%	7.0%	5.6%
PostSec Dipl	22.5%	23.7%	27.3%	26.5%	26.5%	28.9%	31.0%
Univ. Degree	4.2%	7.8%	8.0%	10.6%	10.6%	14.1%	17.3%
ALL.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

2. Shift-Share Analysis

The narrowing of the education gap between older and younger workers explains much of the increase in the age premium. Shift-share analysis shows that the education trends explain 44% of the age premium rise among male employees and 50% of the age premium rise among female employees (Table 8).

The shift-share analysis was conducted by simply applying the 1994 education distribution to the 1981 hourly wage rates by education level and estimating what the hourly wage rates would have been in 1994 if the hourly wage rates had remained unchanged, while education levels changed.

Thus, this study provides the following likely explanation for a significant part of the increase in the age premium over the period 1981-94: Fourteen years ago younger workers had to compete for jobs with older workers who had more experience but less education. Now, they have to compete with older workers who still have more experience but, on the average, have comparable education to younger workers. As a result, employers are willing to pay a higher premium than in the past for older workers who combine experience with higher education.

Table 8
Shift-Share Analysis of the Effect of Education Trends on the Age Premium

Male Workers						
	Actual Rates			Predicted Rates (*)		
	Hourly Real Wage Rates		Age	Hourly Real Wage Rates		Age
	Age 25-34	Age 45-54	Premium	Age 25-34	Age 45-54	Premium
1981	14.12	16.48	16.7%	14.12	16.48	16.7%
1994	12.87	17.04	32.4%	14.47	17.89	23.7%
Change	-1.25	0.56	15.7%	0.35	1.41	7.0%
Explanation: Education trends explain 44.3% (7.0/15.7) of the increase in the age premium						

Female Workers						
	Actual Rates			Predicted Rates (*)		
	Hourly Real Wage Rates		Age	Hourly Real Wage Rates		Age
	Age 25-34	Age 45-54	Premium	Age 25-34	Age 45-54	Premium
1981	11.87	11.39	-4.0%	11.87	11.39	-4.0%
1994	10.94	12.64	15.5%	12.36	13.07	5.7%
Change	-0.93	1.25	19.6%	0.49	1.68	9.8%
Explanation: Education trends explain 50.1% (9.8/19.6) of the increase in the age premium.						

(*) Estimated by applying the 1981 wage rates by level of education to the 1994 education distribution.

While education trends appear to have had a significant effect on the age premium, there were certainly other factors at play. One indication of this is the fact that real hourly wage rates within the same level of education generally declined more among younger workers than older workers (Table 9). A number of other factors may explain part of the increase in the age premium. For example:[7]

- Occupational Trends: Over the last 14 years there has been a "crowding out" of younger employees from professional/managerial occupations. The share of professional/managerial positions among younger male and female employees declined, while that of older employees increased over the period 1981-94. Shift-share analysis suggests that occupational trends have contributed to the increase in the age premium but to a lesser extent than education trends.

- Industry Trends: Industry trends have also contributed to the increase in the age premium, but to a much lesser extent than either education or occupational trends. Basically, industry trends have affected all age groups in a fairly similar way: mostly a shift from primary/manufacturing industries to services.

[7] A more detailed accounting of the contribution of various factors to the increasing age premium is part of a forthcoming study by Kapsalis, et. al. (1997). The results of that study confirm that education explains a major portion of the increase in the age premium, although when multivariate analysis is used the importance of education is somewhat lower than found here.

- Private-Public Sector Trends: The percentage of older male and female workers working in the public sector remained practically constant from 1981 to 1994. By contrast, there was a significant decline among younger employees, particularly younger male employees. This also accounts for a small part of the increase in the age premium.[8]

Table 9: Hourly Wage Rate (1986$) by Level of Education

	1981	1984	1986	1988	1989	1991	1994
MALE							
25-34							
None-Grade 8	10.82	10.87	9.77	10.88	13.13	9.98	12.29
Grade 9-10	12.55	11.75	11.09	11.77	11.31	11.55	11.19
Grade 11-13	13.73	12.77	12.33	12.46	12.62	11.75	11.68
Some PostSec	13.82	13.70	14.54	12.88	12.64	12.28	11.47
PostSec Dipl	14.97	13.76	13.54	13.79	13.03	13.56	13.33
Univ. Degree	16.38	16.02	15.85	13.98	16.30	14.96	14.81
ALL.....	14.12	13.41	13.15	12.92	13.23	12.89	12.87
45-54							
None-Grade 8	14.09	14.11	12.59	12.80	13.27	12.23	13.01
Grade 9-10	14.91	14.70	14.91	14.41	13.78	14.43	15.47
Grade 11-13	15.98	15.54	16.23	15.63	16.75	15.42	15.21
Some PostSec	17.61	18.29	23.80	18.08	19.59	16.18	17.75
PostSec Dipl	17.28	16.80	16.86	17.96	16.11	16.72	16.33
Univ. Degree	23.69	22.90	23.17	21.29	22.33	22.07	21.84
ALL.....	16.48	16.42	17.11	16.44	16.69	16.88	17.04
FEMALE							
25-34							
None-Grade 8	7.58	7.14	7.08	7.11	6.57	7.83	8.44
Grade 9-10	8.53	9.78	10.78	7.87	8.37	8.16	10.25
Grade 11-13	11.36	10.25	10.17	9.82	9.75	9.54	9.94
Some PostSec	10.84	10.92	12.95	10.79	9.99	11.42	9.99
PostSec Dipl	12.76	14.48	12.26	11.43	10.94	11.39	11.04
Univ. Degree	15.09	13.85	13.92	13.11	13.43	13.40	12.64
ALL.....	11.87	11.75	11.53	10.70	10.64	10.96	10.94
45-54							
None-Grade 8	9.31	8.66	9.03	8.75	8.03	9.18	9.60
Grade 9-10	10.07	9.58	9.87	10.95	8.96	9.34	9.46
Grade 11-13	10.66	10.38	11.70	11.14	13.06	11.61	11.49
Some PostSec	11.49	15.59	20.29	13.19	12.54	10.44	12.35
PostSec Dipl	13.32	15.63	16.88	12.98	12.58	13.45	13.06
Univ. Degree	20.49	17.64	17.68	18.10	17.09	17.28	16.82
ALL.....	11.39	11.75	13.27	12.19	12.19	12.43	12.64

[8] Public sector trends are closely related to industry trends. In addition to public administration, the public sector includes public education, public health, social services, and crown corporations.

V. CONCLUSION

The study concludes that the narrowing of the educational gap between older and younger workers is an important reason why the age premium has increased over the period 1981-1994. Other factors, such as occupational trends and public sector employment trends have also contributed, although to a lesser extent. On the other hand, the study concludes that trends in non-standard employment cannot explain the widening earnings gap between the two age groups examined here (25-to-34 and 45-to-54), although they appear to have had a negative effect on workers under age 25.

The finding that education trends explain a big part of the increase in the age premium could benefit from further investigation. At the narrow technical level, it will be useful to undertake a more complete age premium decomposition using multivariate analysis, as well as alternative data sources (such as the Labour Market Activity Survey and the Survey of Labour Market and Income Dynamics).

Also, it is important to explore more fully the effects of education trends on the age premium. For example, the narrowing of the educational gap does not only contribute directly to the rise in the age premium, but it may also do this indirectly by, for example, widening occupational differences between younger and older workers (particularly with respect to managerial positions). This impact could be further compounded through its effect on younger workers' career paths and opportunities for lifelong learning through training and practical experience. The analysis could benefit from the study of more detailed educational surveys, such as the 1994 General Social Survey.

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