Catalogue no. 11F0019MIE — No. 301
ISSN: 1205-9153
ISBN: 978-0-662-46217-0

Research Paper

Analytical Studies Branch Research Paper Series

Has Higher Education among Young Women Substantially Reduced the Gender Gap in Employment and Earnings?

by Marc Frenette and Simon Coulombe

Business and Labour Market Analysis Division
24-I, R.H. Coats Building, 100 Tunney's Pasture Driveway, Ottawa K1A 0T6

Telephone: 1-800-263-1136

Statistics Canada Statistique Canada

Canada

Has Higher Education among Young Women Substantially Reduced the Gender Gap in Employment and Earnings?

by

Marc Frenette and Simon Coulombe

11F0019 No. 301
ISSN: 1205-9153
ISBN: 978-0-662-46217-0

Statistics Canada
Business and Labour Market Analysis
24-I, R.H. Coats Building, 100 Tunney's Pasture Driveway, Ottawa K1A 0T6

How to obtain more information:
National inquiries line: 1-800-263-1136
E-Mail inquiries: infostats@statcan.ca

June 2007

The authors gratefully acknowledge helpful comments by Garnett Picot, René Morissette and Ted Wannell. All remaining errors are the responsibility of the authors.

La version française de cette publication est disponible (n° 11F0019MIF au catalogue, n°301).

Note of appreciation:
Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

Table of contents

Abstract

Young women have gained considerable ground on young men in terms of educational attainment in the 1990s. The objective of this study is to assess the role of rapidly rising educational attainment among young women in raising their relative position in the labour market. The findings suggest that the educational trends have not contributed towards a decline in the full-time employment gap. Nevertheless, they have contributed towards a decline in the gender earnings gap, especially in the 1990s. However, university-educated women have lost ground to university-educated men. This is likely due to the fact that men and women continued to choose traditional disciplines during the 1990s, but only male-dominated disciplines saw improvements in average earnings.

Keywords: gender gap, earnings, employment, educational attainment.

Executive summary

It has been well documented that young women have been gaining ground on young men in terms of educational attainment. In 1981, 16.2% of women and 15.5% of men aged 25 to 29 who were in the labour force held a university degree. The gap only widened moderately by 1991, as 19.1% of young women and 16.1% of young men held a university degree. By 2001, the gap had increased dramatically: 31.3% of young women and 21.6% of young men held a university degree.

The objective of this study is to assess the role of rapidly rising educational attainment of young women in explaining trends in the gender gap in labour market outcomes, such as obtaining full-time employment and earnings. Census data are used to examine these issues.

The gender gap in the probability of full-time employment (among labour force participants) declined in the 1980s, and this has largely been associated with changing family composition of young men and women, as well as unexplained factors. Young men increasingly became more likely to remain single than young women, and single people are generally less likely to be employed full-time. Educational factors played little or no role in helping to reduce the gap. In contrast, there was essentially no change in the gap in the 1990s.

In terms of the log earnings gap (among full-year, full-time workers), we note a large decline in the 1980s, which was mainly associated with changing family characteristics and unexplained factors. Unlike the gap in the probability of full-time employment, however, educational attainment did play a (smaller) role in reducing the earnings gap over this period.

In contrast, education was the main driving force behind a (smaller) reduction in the gap in the 1990s. In fact, education almost fully explained the declining gap over the decade. Unlike the 1980s, however, other characteristics generally did not contribute towards reducing the gap, and there was virtually no unexplained reduction in the gap. The lack of an unexplained reduction in the gap was, in fact, the most important factor behind the slowing convergence in the earnings gap in the 1990s. In the United States, Blau and Kahn (2004) examined the issue of slowing convergence in the gender wage gap. They too find that the largest factor contributing towards the slowing wage convergence is the "unexplained gap". Specifically, they find evidence that changes in labour force selectivity, changes in gender differences in unmeasured abilities and labour market discrimination, and changes in the relative advantage of supply and demand shifts all played a part in explaining the slowing convergence of the gender wage gap.

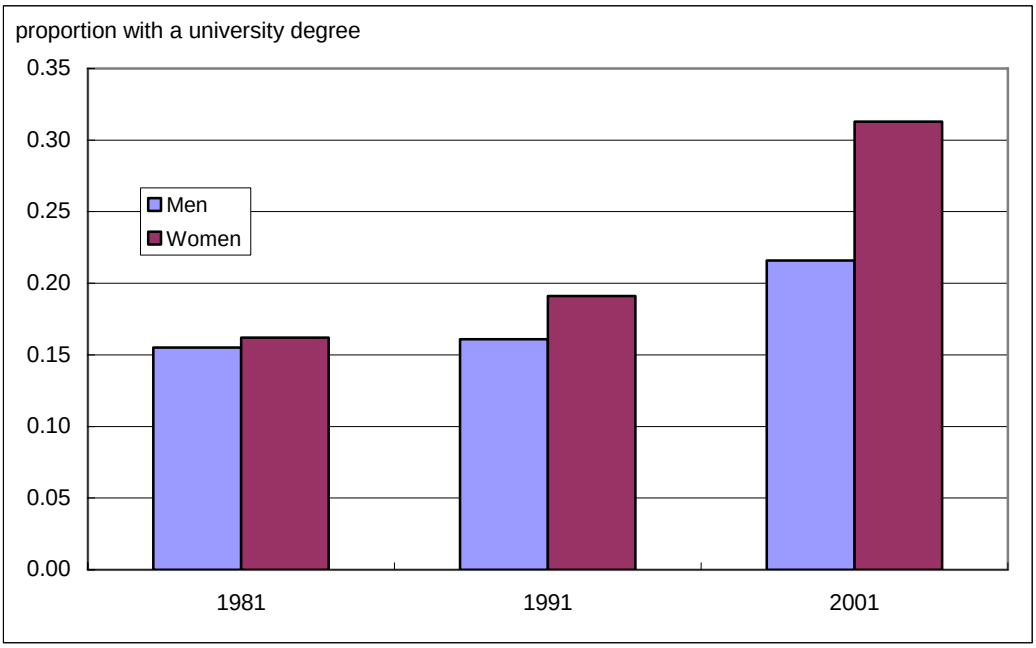
The earnings gap in the 1990s actually *rose* moderately at the university level, but remained unchanged at the college level. The relative stability in the disciplines men and women continued to take in university may have prevented the earnings gap from further declining in the 1990s. It may, in fact, have contributed towards increasing the gap. Public spending cuts were felt by health and education graduates (female-dominated fields) and the high tech boom helped engineering and other technology graduates (male-dominated fields). Alternatively, the rapid rise in the number of women in universities may have extended further down the distribution of unobserved earnings-related characteristics, which may explain why the unexplained component is so prominent. The academic discipline was not available in the U.S. data used by Blau and Kahn (2004). However, it is possible that it too was a factor in their findings.

1. Introduction

The large differences in labour market outcomes that exist between men and women have been the focus of countless studies by Canadian labour economists (e.g., Christofides and Swidinsky, 1994; Baker et al., 1995; Gunderson, 1998; Drolet, 2001; Finnie and Wannell, 2004). The issue is important for several reasons, not the least of which is equity concerns. Also, the pay that women can expect to receive in the labour market may have strong implications for public finances. Lone mothers in particular may be incited to work rather than collect public transfers if they can find a job and earn enough to comfortably cover the cost of childcare and other expenses. Of equal importance, if husband and wife can expect to earn the same pay as one another, many families would have the financial flexibility of placing their children in their father's care while their mother works outside of the home.

The issue of gender employment and pay equity has gained importance in recent years given the rapidly rising educational attainment of women. The rise was particularly acute for young women in the 1990s (Figure 1). In 1981, 16.2% of women and 15.5% of men aged 25 to 29 years old who were in the labour force held a university degree. The gap only widened moderately by 1991, as 19.1% of young women and 16.1% of young men held a university degree. By 2001, the gap had increased dramatically: 31.3% of young women and 21.6% of young men held a university degree.

Figure 1 Proportion of men and women with a university degree



Note: The sample consists of 25 to 29 year-old men and women.
Source: Statistics Canada, Census of Population.

Despite the rapid rise in educational attainment among young women in the 1990s, very little ground has been gained in terms of gender earnings equality. In fact, the earnings of both young men and women (25 to 29 year-old) who worked full-year, full-time in a paid job were relatively stagnant throughout the 1990s.

We will attempt to shed light on this issue by exploring the role of education in explaining the evolution of the gender earnings gap among young men and women (i.e., 25 to 29 years old) over the 1980s and 1990s. We will also examine the relative success of young women in locating employment over the period. No study has investigated these issues in detail since the early 1990s.[1]

We already know that girls perform better than boys on standardized tests in grade school, and that young women are more likely to become university-educated than young men. However, men and women choose very different disciplines in college and university despite several scholarships geared towards women in non-traditional disciplines. Perhaps women are deterred from entering male-dominated fields of study because of social norms and customs. In this study, we will attempt to disentangle the relative roles of educational attainment and field of study (among postsecondary graduates) from other factors in the evolution of gender differences in labour market outcomes.

Studying the relative position of *young* women in the labour market is important not only because of recent developments in their educational attainment. First, any study of gender differences in labour market success should be based on a good measure of labour market experience. Since the only consistent data source available to study the evolution of labour market success is the Census, we are left with no such measure.[2] Using the common proxy 'age minus years of schooling minus 5' would do little to account for differences in labour market experience between the sexes (or how this difference has evolved over time). By focusing on men and women between the ages of 25 and 29, we are essentially restricting the analysis to new entrants in the 'mature' labour market, and thus, differences in labour market experience are less likely to matter.

Second, in studying the evolution of the earnings gap, it is important to distinguish between stocks and flows. Most studies only consider how earnings among all working age men and women have evolved (i.e., the stock). The earnings gap between older men and women may largely reflect old hiring and pay practices, as well as antiquated societal norms and views. Specifically, these older practices may have limited the starting wages of women many years ago, and the earnings profile of these women may have been negatively affected as a result.[3] If factors such as employment equity laws, changing educational choices, and declining minimum wages have resulted in a change in the earnings gap, we may see its biggest impact on new labour market entrants (i.e., the flow).

The study proceeds as follows. The next section describes the data and methods used in the analysis. This is followed by the results section, in which we begin by mapping out the socio-economic characteristics of young men and women between 1981 and 2001. Next, we describe the evolution of their employment rates and earnings over the same period. Finally, we decompose the levels and trends of the full-time employment and earnings gaps between young men and women into a component that is 'explained' (i.e., due to changing characteristics) and a component that is 'unexplained' (i.e., due to changing labour market valuation and/or changing unobserved heterogeneity). The study is then summarized in the conclusion.

1. Finnie and Wannell (2004) investigate the gender earnings gap among recent bachelor's level university graduates, but the data they use end in 1995.

2. One could also combine the Survey of Consumer Finances (SCF) and the Survey of Labour and Income Dynamics (SLID), but the SCF also contains no measure of labour market experience.

3. Murphy and Welch (1990) find that a substantial portion of lifetime earnings growth occurs during the first years after graduation.

2. Methodology

The data used in the study are the Census of Population 20% micro data files for the years 1981, 1991, and 2001. Two labour market outcomes are examined: the probability of locating employment (any employment or full-time employment) and earnings (among full-year, full-time workers). We look at yearly earnings rather than weekly earnings since a large portion of the decline in the gender pay gap has been due to an increase in the number of weeks worked. Although earnings are recovered for the previous year in the census, for consistency, we will make reference to the years 1981, 1991, and 2001 when looking at both employment and earnings.

The sample used to study employment outcomes consists of men and women between the ages of 25 and 29 years old who are in the labour force during the census reference week. The sample is further restricted to Canadian citizens residing in a private dwelling in one of the 10 Canadian provinces. The restriction on Canadian citizenship is required for consistency since non-permanent residents have been included in the census since 1991.

When we examine earnings, the sample is identical to the one described above with the exception of the employment condition. In this case, we look at young men and women who are employed full year, full-time (i.e., they worked at least 40 weeks in a paid job in the previous year, and were employed mainly full-time throughout the year, or 30 hours per week or more on average). Furthermore, we select workers with at least $5,000 (in 2000 constant dollars) in paid earnings in the previous year.[4] Self-employed workers—identified by the presence of non-zero net self-employment income—are dropped from the sample.

Traditional studies have decomposed the average earnings gap by using the Blinder-Oaxaca method (Blinder, 1973; Oaxaca, 1973) and we will follow this convention. Specifically, the gap in log earnings can be expressed as:

$$(1)\quad \overline{Y}^{M} - \overline{Y}^{F} = b^{M}\left(\overline{X}^{M} - \overline{X}^{F}\right) + \overline{X}^{F}\left(b^{M} - b^{F}\right).$$

The first term on the right-hand side represents the portion of the gap explained by differences in characteristics (i.e., the explained component), and the second term represents the portion of the gap related to differences in the market valuation of those characteristics or simply due to unobserved heterogeneity, or both (i.e., the unexplained component).[5] The explained (unexplained) component could also be evaluated using the female (male) coefficients (characteristics). Also, the first term is additively decomposable by specific characteristic.[6]

4. It would be very unusual for someone to earn less than $5,000 if they worked full-year/full-time. Assuming they worked the minimum implied number of hours (40 weeks times 30 hours per week = 1,200 hours), this would correspond to an hourly wage of only $4.17.

5. The notation is standard: Y represents the outcome variable (log earnings in this case), while males and females are denoted by the superscripts M and F, respectively.

6. The ordering of the characteristics does not affect the value of each variable's contribution.

Baker et al. (1995) modify the Blinder-Oaxaca method to examine the evolution of the earnings gap, and we adopt a similar approach. The decomposition that results is shown below:

$$(2)\left(\overline{Y}_t^M - \overline{Y}_t^F\right) - \left(\overline{Y}_{t-10}^M - \overline{Y}_{t-10}^F\right) = \left[b_{t-10}^M\left(\overline{X}_t^M - \overline{X}_{t-10}^M\right) - b_{t-10}^F\left(\overline{X}_t^F - \overline{X}_{t-10}^F\right)\right] + \left[\overline{X}_t^M\left(b_t^M - b_{t-10}^M\right) - \overline{X}_t^F\left(b_t^F - b_{t-10}^F\right)\right].$$

The first term on the right-hand side represents the portion of the change in the gap explained by male-female differences in the change in their characteristics (i.e., the explained component), and the second term represents the portion of change in the gap related to male-female differences in the change in the market valuation of those characteristics or the change in unobserved heterogeneity, or both (i.e., the unexplained component).

We will also decompose differences in full-time employment rates, but these will follow from logit and probit models (given the dichotomous nature of the outcome). A critical assumption in the standard Blinder-Oaxaca decomposition technique is that $\overline{Y} = F(\overline{X}b)$. This assumption is violated in nonlinear models such as logits or probits. However, Fairlie (1999) has shown that the Blinder-Oaxaca decomposition is simply a special case of a more general decomposition, which can be applied when $\overline{Y} \neq F(\overline{X}b)$. We begin with the following identity:

$$(3)\ P_i = F(X_i b),$$

where P_i is the predicted probability of employment for person *i* with a set of characteristics X_i. By definition,

$$(4)\ \overline{\mathrm{P}} = \sum_{i=1}^{N} F(X_i b) \Big/ N,$$

where $\overline{\mathrm{P}}$ equals the average predicted employment rate for the entire sample.[7] Using simple algebra, we can decompose the average predicted gender gap as follows:

$$(5)\ \overline{P}^M - \overline{P}^F = \left[\sum_{i=1}^{N^M} F\left(X_i^M b^M\right) \Big/ N^M - \sum_{i=1}^{N^F} F\left(X_i^F b^M\right) \Big/ N^F\right] + \left[\sum_{i=1}^{N^F} F\left(X_i^F b^M\right) \Big/ N^F - \sum_{i=1}^{N^F} F\left(X_i^F b^F\right) \Big/ N^F\right].$$

The first term on the right-hand side represents the portion of the gap explained by differences in characteristics (i.e., the explained component), and the second term represents the portion of the gap related to differences in the market valuation of those characteristics or simply due to unobserved heterogeneity, or both (i.e., the unexplained component). As in the Blinder-Oaxaca decomposition, the explained (unexplained) component could also be evaluated using the female (male) coefficients (characteristics). Again, the first term is additively decomposable by specific characteristic.[8]

7. In the logit model, this is identical to the overall sample probability. In practice, it is usually very close to the overall sample probability in a probit model. To be sure, we regenerated all results from a set of linear probability models and applied the Blinder-Oaxaca decomposition. This exercise yielded qualitatively similar findings.

8. In this case, the ordering of the characteristics matters. Consequently, we will verify the robustness of all results by switching the order of variables.

The contribution of one particular characteristic (say X_1 in a two-variable model) is slightly more involved. First, one must estimate separate male and female regressions in each period. Assuming that $N_t^M = N_t^F$, and that there exists a natural one-to-one matching of males and females, then the independent contribution of X_1 is:[9]

$$(6)\ \frac{1}{N_t^F}\left[\sum_{i=1}^{N_t^F} F\left(X_{1,i,t}^M b_{1,t}^F + X_{2,i,t}^F b_{2,t}^F\right) - F\left(X_{1,i,t}^F b_{1,t}^F + X_{2,i,t}^F b_{2,t}^F\right)\right].$$

In other words, the contribution of X_1 is equal to the change in the average predicted outcome from replacing the distribution of females in period *t* with the distribution of males in period *t*. Again, we could also evaluate the contribution of X_1 by using the male coefficients rather than the female coefficients. Of course, the sample sizes of males and females are likely different, and a one-to-one matching is needed. To address these issues, we take a random sub-sample of males to match the sample size of females (assuming $N_t^M \succ N_t^F$). We then generate predicted outcomes from the pooled regression coefficients for each observation in the sample. Next, we rank all males and females separately and match them by their respective rankings. This approach matches males and females with a similar bundle of characteristics yielding similar predicted outcomes.[10]

Now, equation (5) can be easily modified to analyze changes in the gender earnings gap over time, as Baker et al. (1995) have done with the Blinder-Oaxaca decomposition. We apply a similar approach to Fairlie's method. Specifically, the change in the gender earnings gap between period *t* and *t*-10 can be expressed as follows:

$$\left(\overline{P}_t^M - \overline{P}_t^F\right) - \left(\overline{P}_{t-10}^M - \overline{P}_{t-10}^F\right) =$$

$$(7)\ \left\{\left[\sum_{i=1}^{N_t^M} F\left(X_{i,t}^M b_{t-10}^M\right) \Big/ N_t^M - \sum_{i=1}^{N_{t-10}^M} F\left(X_{i,t-10}^M b_{t-10}^M\right) \Big/ N_{t-10}^M\right] - \left[\sum_{i=1}^{N_t^F} F\left(X_{i,t}^F b_{t-10}^F\right) \Big/ N_t^F - \sum_{i=1}^{N_{t-10}^F} F\left(X_{i,t-10}^F b_{t-10}^F\right) \Big/ N_{t-10}^F\right]\right\} +$$

$$\left\{\left[\sum_{i=1}^{N_t^M} F\left(X_{i,t}^M b_t^M\right) \Big/ N_t^M - \sum_{i=1}^{N_t^M} F\left(X_{i,t}^M b_{t-10}^M\right) \Big/ N_{t-10}^M\right] - \left[\sum_{i=1}^{N_t^F} F\left(X_{i,t}^F b_t^F\right) \Big/ N_t^F - \sum_{i=1}^{N_t^F} F\left(X_{i,t}^F b_{t-10}^F\right) \Big/ N_{t-10}^F\right]\right\}.$$

The first term on the right-hand side represents the portion of the change in the gap explained by male-female differences in the change in characteristics (i.e., the explained component), and the second term represents the portion of change in the gap related to male-female differences in the change in the market valuation of those characteristics or the change in unobserved heterogeneity, or both (i.e., the unexplained component). Once again, the explained (unexplained) component could also be evaluated using the coefficients (characteristics) in period *t* (*t*-10).

9. The formula can be easily extended to accommodate three variables. In fact, we do so later to examine the contribution of three sets of variables towards the full-time employment gap.

10. Since we must take a random sample of males, the global explained component in equation (5) may differ slightly from the sum of explained sub-components from equation (6). To ensure equality, we generate both the global explained component and the sum of explained sub-components by taking their average values over 100 random samples.

As before, the contribution of one particular characteristic (say X_1 in a two-variable model) is slightly more involved. First, one must estimate separate male and female regressions in each period. Assuming that $N_t^M = N_{t-10}^M$ and $N_t^F = N_{t-10}^F$, and that there exists a natural one-to-one matching of males in both periods and females in both periods, then the independent contribution of X_1 is:[11]

$$\frac{1}{N_{t-10}^M}\left[\sum_{i=1}^{N_{t-10}^M} F\left(X_{1,i,t}^M b_{1,t-10}^M + X_{2,i,t-10}^M b_{2,t-10}^M\right) - F\left(X_{1,i,t-10}^M b_{1,t-10}^M + X_{2,i,t-10}^M b_{2,t-10}^M\right)\right] - \tag{8}$$
$$\frac{1}{N_{t-10}^F}\left[\sum_{i=1}^{N_{t-10}^F} F\left(X_{1,i,t}^F b_{1,t-10}^F + X_{2,i,t-10}^F b_{2,t-10}^F\right) - F\left(X_{1,i,t-10}^F b_{1,t-10}^F + X_{2,i,t-10}^F b_{2,t-10}^F\right)\right].$$

In other words, the contribution of X_1 is equal to the change in the average predicted outcome from replacing the distribution of males (females) in period *t* with the distribution of males (females) in period *t*-10. Again, we could also evaluate the contribution of X_1 by using the coefficients in period *t*. Since the sample sizes of males and females likely change over time and a one-to-one matching is needed, we take random sub-samples for each sex in period *t* to match the sample size in period *t*-10 (assuming $N_t > N_{t-10}$). We then generate predicted outcomes from the pooled regression coefficients for each observation in the sample. Next, we rank all observations in each period and match them by their respective rankings. This approach matches males (females) in both periods with a similar bundle of characteristics yielding similar predicted outcomes.[12]

3. Results

Composition

We begin the results section by describing the composition of young men and women over the period 1981 to 2001. Recall that two samples are used throughout the study, which means that two sets of characteristics are described. For the most part, the characteristics are almost identical in both samples.

In Table 1, the means of the explanatory variables used in the analysis are displayed. As discussed in the introduction, young women have always been more likely to hold a university degree than young men since the early 1980s. However, the gap widened dramatically over the 1990s. In both samples, about one young woman in five held a university degree in 1991. By 2001, about one young woman in three held a degree. Over the same 10-year period, the proportion of young men who held a university degree rose from about one in six to one in five.

11. Again, the formula can be easily extended to accommodate three variables. We do so later to examine the contribution of three sets of variables towards the reduction in the full-time employment gap.

12. Once again, we generate both the global explained component (equation [7]) and the sum of explained sub-components (equation [8]) by taking their average values over 100 random samples.

Table 1 Means of compositional variables

	Males			Females		
	1981	1991	2001	1981	1991	2001
Employment sample[1]						
No high school diploma	0.266	0.224	0.157	0.213	0.152	0.091
High school diploma	0.277	0.281	0.274	0.315	0.286	0.213
Non-university postsecondary certificate	0.302	0.334	0.353	0.311	0.371	0.383
University degree	0.155	0.161	0.216	0.162	0.191	0.313
Married	0.657	0.535	0.472	0.675	0.639	0.567
Single	0.302	0.437	0.508	0.251	0.313	0.397
Widowed, separated or divorced	0.041	0.028	0.020	0.075	0.048	0.036
Number of children in economic family	0.865	0.498	0.431	0.863	0.659	0.596
Atlantic Provinces	0.085	0.082	0.071	0.082	0.083	0.074
Quebec	0.267	0.251	0.235	0.259	0.246	0.232
Ontario	0.336	0.382	0.387	0.368	0.387	0.394
Prairie Provinces	0.078	0.071	0.067	0.073	0.071	0.065
Alberta	0.120	0.102	0.118	0.104	0.100	0.108
British Columbia	0.115	0.113	0.122	0.114	0.113	0.127
Rural area	0.221	0.193	0.153	0.183	0.183	0.144
Urban area: <30,000	0.154	0.129	0.117	0.138	0.125	0.115
Urban area: 30,000 to 99,999	0.082	0.089	0.080	0.081	0.090	0.077
Urban area: 100,000 to 499,999	0.106	0.114	0.133	0.114	0.115	0.135
Urban area: 500,000 (except Mtl/Tor/Van)	0.164	0.162	0.174	0.173	0.164	0.170
Montréal	0.108	0.112	0.115	0.114	0.113	0.116
Toronto	0.116	0.146	0.163	0.142	0.153	0.173
Vancouver	0.049	0.056	0.065	0.056	0.058	0.070
Log earnings sample[2]						
No high school diploma	0.242	0.193	0.140	0.174	0.119	0.071
High school diploma	0.291	0.287	0.276	0.336	0.287	0.197
Non-university postsecondary certificate	0.320	0.358	0.371	0.321	0.389	0.394
University degree	0.149	0.163	0.214	0.170	0.205	0.338
Weeks	50.22	50.41	50.29	50.34	50.61	50.18
Married	0.698	0.579	0.512	0.632	0.615	0.561
Single	0.261	0.393	0.468	0.294	0.341	0.407
Widowed, separated or divorced	0.041	0.028	0.020	0.075	0.044	0.032
Number of children in economic family	0.868	0.504	0.434	0.627	0.446	0.430
Atlantic Provinces	0.076	0.069	0.061	0.071	0.070	0.067
Quebec	0.258	0.240	0.231	0.263	0.240	0.225
Ontario	0.358	0.410	0.410	0.386	0.424	0.419
Prairie Provinces	0.071	0.066	0.063	0.070	0.066	0.062
Alberta	0.122	0.104	0.124	0.105	0.097	0.109
British Columbia	0.115	0.112	0.112	0.106	0.104	0.117
Rural area	0.183	0.163	0.136	0.143	0.146	0.120
Urban area: <30,000	0.161	0.132	0.121	0.123	0.111	0.105
Urban area: 30,000 to 99,999	0.086	0.092	0.082	0.079	0.086	0.073
Urban area: 100,000 to 499,999	0.109	0.118	0.137	0.114	0.117	0.135
Urban area: 500,000 (except Mtl/Tor/Van)	0.174	0.169	0.182	0.192	0.178	0.183
Montréal	0.110	0.111	0.113	0.124	0.119	0.120
Toronto	0.128	0.159	0.168	0.166	0.183	0.194
Vancouver	0.049	0.056	0.061	0.058	0.060	0.071

1. The sample consists of 25 to 29 year-old men and women who were in the labour force during the census reference week.
2. The sample consists of 25 to 29 year-old men and women who were employed full-year, full-time in the year prior to the census, with at least $5,000 in earnings and zero net self-employment income.

Source: Statistics Canada, Census of Population, 1981, 1991 and 2001.

The trends in the other characteristics were more or less similar for young men and women. The average number of weeks worked among full-year, full-time workers remained steady between 50 and 51 for both sexes. The proportion of young married men and women declined steadily over the 20-year period, albeit somewhat more for men. Similarly, the average number of children within the economic family declined slightly more among young men than among young women.

The remaining variables pertain to geographic characteristics. More young men and women now find themselves in Ontario than before, although the increase occurred primarily in the 1980s. Declines were registered in all other parts of the country, with the exception of British Columbia in the employment sample—a moderate increase was registered over the 1990s. The population of young men and women in rural and small urban areas has been in decline throughout most of the period. The decline has been more pronounced among young men. Among large urban centers, Toronto has gained far more young men and women than Vancouver, while Montréal saw no gain over the period.

In Table 2, the distribution of disciplines chosen by postsecondary graduates is shown. At the university level, women are relatively more likely than men to choose education, arts, humanities, social sciences, life sciences, and health. The gaps in education, humanities, and health are particularly large. For example, 20.6% of young women with a university degree had specialized in education, compared to only 9.4% of young men (2001 employment sample).

Table 2 The distribution of disciplines

	Males				Females			
	NUPC[1]		University degree		NUPC[1]		University degree	
	1991	2001	1991	2001	1991	2001	1991	2001
Employment sample[2]								
Education	0.015	0.023	0.077	0.094	0.064	0.101	0.201	0.206
Arts	0.041	0.046	0.020	0.023	0.125	0.114	0.035	0.033
Humanities	0.028	0.039	0.086	0.094	0.033	0.042	0.121	0.120
Social sciences	0.046	0.070	0.197	0.183	0.059	0.096	0.223	0.238
Commerce	0.126	0.138	0.218	0.197	0.408	0.338	0.161	0.143
Life sciences	0.058	0.052	0.047	0.047	0.045	0.040	0.060	0.059
Engineering	0.643	0.583	0.184	0.184	0.080	0.089	0.032	0.043
Health	0.026	0.032	0.051	0.049	0.173	0.168	0.111	0.105
Math./comp. sc./phys. sc.[4]	0.014	0.015	0.120	0.126	0.010	0.010	0.056	0.052
Log earnings sample[3]								
Education	0.013	0.021	0.070	0.090	0.063	0.101	0.196	0.206
Arts	0.035	0.039	0.013	0.014	0.103	0.095	0.026	0.024
Humanities	0.024	0.034	0.067	0.080	0.032	0.040	0.115	0.112
Social sciences	0.049	0.073	0.188	0.180	0.059	0.095	0.215	0.238
Commerce	0.137	0.145	0.245	0.226	0.450	0.376	0.189	0.167
Life sciences	0.050	0.048	0.041	0.043	0.036	0.037	0.057	0.055
Engineering	0.649	0.597	0.208	0.199	0.086	0.091	0.033	0.045
Health	0.026	0.030	0.038	0.039	0.160	0.153	0.107	0.100
Math./comp. sc./phys. sc.[4]	0.013	0.013	0.129	0.127	0.011	0.010	0.061	0.052

1. Non-university postsecondary certificate.
2. The sample consists of 25 to 29 year-old men and women who were in the labour force during the census reference week.
3. The sample consists of 25 to 29 year-old men and women who were employed full-year, full-time in the year prior to the census, with at least $5,000 in earnings and zero net self-employment income.
4. Mathematics/computer science/physical sciences.

Source: Statistics Canada, Census of Population, 1991 and 2001.

Men are more likely to choose commerce, engineering, and mathematics/computer science/physical sciences. For example, 18.4% of young men with the university degree had specialized in engineering, compared to only 4.3% of young women (2001 employment sample).

At the college level, the gender divide is qualitatively similar for the most part. However, there are two important differences. First, almost two-thirds of college-educated men choose engineering, compared to about one in five university-educated men. The proportion of women choosing engineering at the college level is only slightly higher than at the university level (both below 1 in 10). Second, women are relatively more likely to choose commerce programs than men at the college level. In fact, between one-third and one-half of college-educated women choose commerce.

Despite the large increase in the proportion of young university-educated women (Table 1), the gender differences in university disciplines chosen have remained remarkably stable throughout the 1990s. A slight increase in the proportion of women choosing engineering should be noted, mainly at the expense of women choosing commerce or mathematics/computer science/physical sciences. At the college level, the field choices remained relatively stable as well, although education and social sciences became more popular choices for women over the 1990s, largely at the expense of commerce programs.

Labour market outcomes

We now turn to gender differences in labour market outcomes. These include employment rates, full-time employment rates, and mean earnings. Recall that the employment and full-time employment rates are calculated among a sample of labour force participants, while mean earnings are calculated among a sample of full-year, full-time workers.

Beginning with employment rates, we note very little difference between young men and women (Table 3). In 1981, 93.4% of young men in the labour force were employed compared to 91.4% of young women. Employment rates fell for both sexes in 1991 because of the recession, although young women were slightly more likely to be employed than young men at that point. This gap persisted even as the economy was closer to a peak in 2001. These trends generally hold when we break down the results by education level. Given these very minor changes in employment rates for both sexes, the decomposition section will focus exclusively on full-time employment rates and mean earnings, which display far more interesting patterns, and to which we now turn.

Not surprisingly, young men are far more likely to be employed on a full-time basis than young women. In 1981, the gap stood at 19.1%. Over the next 10 years, the gap narrowed considerably, reaching 15.0% by 1991. Further declines were registered over the 1990s, as the gap stood at 13.5% in 2001. Interestingly, the gap remained remarkably stable among young men and women without postsecondary qualifications. Among university and non-university postsecondary graduates, the gap in full-time employment declined considerably over the 20-year period (mostly in the 1980s).

Table 3 Employment rates and mean earnings

	Males			Females			Percentage Gap		
	1981	1991	2001	1981	1991	2001	1981	1991	2001
Employment rate[1]	0.934	0.878	0.917	0.914	0.887	0.923	2.1	-1.0	-0.6
No high school	0.903	0.815	0.864	0.873	0.808	0.847	3.4	0.9	2.0
High school	0.940	0.878	0.914	0.915	0.878	0.905	2.7	-0.1	1.0
NUPC[4]	0.945	0.897	0.930	0.929	0.904	0.933	1.7	-0.7	-0.4
University	0.953	0.926	0.941	0.940	0.931	0.944	1.3	-0.6	-0.3
Full-time employment rate[2]	0.851	0.788	0.828	0.688	0.670	0.716	19.1	15.0	13.5
No high school	0.810	0.718	0.771	0.625	0.560	0.603	22.8	22.0	21.7
High school	0.860	0.780	0.816	0.698	0.648	0.662	18.9	17.0	18.9
NUPC[4]	0.872	0.818	0.851	0.697	0.689	0.725	20.1	15.8	14.8
University	0.863	0.834	0.848	0.735	0.752	0.775	14.8	9.8	8.6
Mean earnings (2000 constant dollars)[3]	40,131	36,405	36,536	29,744	29,211	29,995	25.9	19.8	17.9
No high school	36,603	32,022	30,478	23,993	22,835	22,019	34.5	28.7	27.8
High school	38,929	34,227	32,804	27,793	26,451	25,506	28.6	22.7	22.2
NUPC[4]	41,789	37,871	36,688	30,695	29,062	27,861	26.5	23.3	24.1
University	44,652	42,219	45,054	37,684	37,066	36,782	15.6	12.2	18.4

1. The sample consists of 25 to 29 year-old men and women who were in the labour force during the census reference week.
2. The sample consists of 25 to 29 year-old men and women who were employed during the census reference week.
3. The sample consists of 25 to 29 year-old men and women who were employed full-year, full-time in the year prior to the census, with at least $5,000 in earnings and zero net self-employment income.
4. NUPC = Non-university post-secondary certificate.

Source: Statistics Canada, Census of Population, 1981, 1991 and 2001.

The trend in the overall gap in mean earnings was very similar. It went from 25.9% in 1981 to 17.9% in 2001. Again, most of this decline occurred in the 1980s. What is different about the decline in the mean earnings gap is that it was far more prevalent among non-postsecondary graduates. In fact, the gap in mean earnings actually increased among university graduates, and only declined slightly among non-university postsecondary graduates. However, the earnings patterns among young women were very similar for all education groups—a slight decline was registered in each case over the 20-year period. What explains the trends in the earnings gaps are the interesting earnings patterns among young men. Essentially, earnings declined quite dramatically among young men with no postsecondary qualifications—roughly $6,000 over the period—far outpacing the declines registered among young women. Even among young men with non-university postsecondary qualifications, earnings declined by about $5,000, which was still greater than that decline among young women with similar qualifications (about $3,000). At the university level, young men actually saw a slight increase in earnings. In fact, they are the only gender-education group who saw an increase in earnings over the period. In contrast, young university-educated women registered a slight decrease in earnings over the same period.

In Table 4, we see labour market outcomes by disciplines. Two key points are worth mentioning. First, the economy began to rebound from a prolonged period of stagnation in the latter part of the decade. More specifically, the high-tech sector saw tremendous growth at this time. As a result, mean earnings among men in engineering, commerce, and mathematics/computer science/physical sciences rose substantially throughout the 1990s. Second, mean earnings of women in education and health actually declined during the period, likely as a result of public sector wage freezes or

rollbacks. These results are interesting in light of the fact that men and women continued to choose these traditional fields during the 1990s (see Table 2).

Table 4 Employment rates, full-time employment rates, and mean earnings by discipline

	Males				Females			
	NUPC[1]		University degree		NUPC[1]		University degree	
	1991	2001	1991	2001	1991	2001	1991	2001
Employment sample[2]								
Education	0.872	0.942	0.948	0.966	0.902	0.943	0.946	0.965
Arts	0.883	0.926	0.896	0.924	0.889	0.935	0.901	0.937
Humanities	0.872	0.914	0.882	0.916	0.883	0.930	0.916	0.928
Social sciences	0.929	0.946	0.909	0.933	0.902	0.937	0.927	0.942
Commerce	0.926	0.944	0.935	0.949	0.901	0.931	0.934	0.944
Life sciences	0.918	0.943	0.909	0.928	0.874	0.916	0.918	0.931
Engineering	0.889	0.923	0.935	0.949	0.885	0.904	0.893	0.925
Health	0.947	0.951	0.944	0.944	0.944	0.950	0.954	0.956
Math./comp. sc./phys. sc.[5]	0.870	0.938	0.940	0.933	0.918	0.922	0.918	0.916
Full time employment rate[3]								
Education	0.750	0.802	0.792	0.832	0.667	0.713	0.718	0.760
Arts	0.765	0.807	0.701	0.711	0.647	0.699	0.643	0.680
Humanities	0.752	0.779	0.723	0.775	0.661	0.696	0.728	0.740
Social sciences	0.837	0.858	0.809	0.827	0.693	0.729	0.759	0.771
Commerce	0.854	0.867	0.870	0.894	0.723	0.763	0.813	0.843
Life sciences	0.842	0.865	0.822	0.834	0.638	0.706	0.755	0.767
Engineering	0.816	0.857	0.884	0.890	0.725	0.745	0.781	0.823
Health	0.828	0.826	0.836	0.813	0.645	0.674	0.754	0.769
Math./comp. sc./phys. sc.[5]	0.782	0.834	0.863	0.852	0.728	0.731	0.772	0.783
Mean earnings (in 2000 constant dollars)[4]								
Education	32,571	30,534	37,528	35,552	26,980	25,757	36,039	33,877
Arts	33,287	30,827	31,616	34,529	23,970	23,928	28,743	29,524
Humanities	32,699	31,331	34,432	36,420	27,830	27,544	32,723	33,214
Social sciences	41,884	36,928	40,199	41,684	29,350	28,561	35,375	35,133
Commerce	36,515	36,058	43,648	47,967	28,250	27,842	38,925	40,191
Life sciences	31,793	29,903	36,333	36,354	24,696	24,054	33,846	33,076
Engineering	38,865	38,255	46,370	52,067	32,214	30,504	43,652	44,867
Health	38,210	36,689	49,685	46,907	34,684	30,507	43,871	42,841
Math./comp. sc./phys. sc.[5]	38,988	37,150	43,126	49,534	32,596	32,278	39,969	41,301

1. Non-university post-secondary certificate.
2. The sample consists of 25 to 29 year-old men and women who were in the labour force during the census reference week.
3. The sample consists of 25 to 29 year-old men and women who were employed during the census reference week.
4. The sample consists of 25 to 29 year-old men and women who were employed full-year, full-time in the year prior to the census, with at least $5,000 in earnings and zero net self-employment income.
5. Mathematics/computer science/physical sciences.

Source: Statistics Canada, Census of Population, 1991 and 2001.

Decompositions

In this section, we attempt to explain the levels and trends in gender differences in full-time employment and earnings. We begin by estimating logit and probit models of full-time employment and log earnings ordinary least squares models for each sex and year. In these models, the explanatory variables included correspond to those described in Table 1. Additional models were estimated on university graduates and non-university postsecondary graduates. In these models, the

variables are similar to those described in Table 1, except that the educational level variables are replaced with the field of study variables (described in Table 2). Since the main focus will be on the decompositions, we do not present the results of the regression estimations. They are, however, available upon request.

Static decompositions

We now turn to the decomposition results, beginning with static gender differences (i.e., gender differences at various points in time). These refer to equations (1), (5), and (6) in the methodology section. In Table 5, the gap in the probability of full-time employment is decomposed into an explained component (X) and an unexplained component (b).[13] The results suggest that the vast majority of the gap is unexplained. In fact, compositional differences appear to play no role whatsoever. The gap is considerably smaller among university graduates, but again, most of it remains unexplained. However, the explained portion of the gap is larger among university graduates, and this is due to differences in their educational characteristics (which in this case refers to fields of study). In other words, the different disciplines men and women take in university contribute towards the gap in the probability of full-time employment. Although there is some evidence to this effect at the college level, it is not as compelling.

13. Note that the results presented here were drawn from the probit models; however, the results from the logit and linear probability models are very similar.

Table 5 Static decompositions of the full-time employment probability gap[1,2]

	1981			1991			2001		
	Gap	X[6]	b[7]	Gap	X[6]	b[7]	Gap	X[6]	b[7]
Method 1[3]									
All	0.1631	-0.0050	0.1681	0.1146	-0.0160	0.1306	0.1039	-0.0133	0.1171
Education	…	-0.0034	…	…	-0.0096	…	…	-0.0086	…
Family	…	-0.0005	…	…	-0.0070	…	…	-0.0061	…
Geography	…	-0.0011	…	…	0.0006	…	…	0.0014	…
University	…	…	…	0.0831	0.0151	0.0680	0.0756	0.0096	0.0660
Education	…	…	…	…	0.0208	…	…	0.0132	…
Family	…	…	…	…	-0.0066	…	…	-0.0058	…
Geography	…	…	…	…	0.0010	…	…	0.0023	…
NUPC[5]	…	…	…	0.1282	-0.0108	0.1390	0.1182	0.0094	0.1088
Education	…	…	…	…	-0.0071	…	…	0.0112	…
Family	…	…	…	…	-0.0040	…	…	-0.0035	…
Geography	…	…	…	…	0.0003	…	…	0.0017	…
Method 2[4]									
All	0.1631	-0.0060	0.1690	0.1146	0.0142	0.1005	0.1039	0.0084	0.0954
Education	…	-0.0017	…	…	-0.0055	…	…	-0.0076	…
Family	…	-0.0009	…	…	0.0208	…	…	0.0162	…
Geography	…	-0.0034	…	…	-0.0012	…	…	-0.0001	…
University	…	…	…	0.0831	0.0161	0.0671	0.0756	0.0204	0.0552
Education	…	…	…	…	0.0097	…	…	0.0090	…
Family	…	…	…	…	0.0060	…	…	0.0086	…
Geography	…	…	…	…	0.0004	…	…	0.0027	…
NUPC[5]	…	…	…	0.1849	0.0856	0.0993	0.1182	0.0267	0.0916
Education	…	…	…	…	0.0120	…	…	0.0059	…
Family	…	…	…	…	0.0274	…	…	0.0203	…
Geography	…	…	…	…	0.0462	…	…	0.0005	…

… not applicable

1. Results were generated from probit models of full-time employment (in the census reference week). Logit models yielded qualitatively similar results and are available upon request.
2. The sample consists of 25 to 29 year-old men and women who were in the labour force during the census reference week.
3. The explained portion of the gap is evaluated using the male coefficients and the unexplained portion of the gap is evaluated using the female characteristics.
4. The explained portion of the gap is evaluated using the female coefficients and the unexplained portion of the gap is evaluated using the male characteristics.
5. NUPC = Non-university post-secondary certificate.
6. X = Explained component of the gap.
7. b = Unexplained component of the gap.

Source: Statistics Canada, Census of Population, 1981, 1991 and 2001.

The story is somewhat different when we decompose the gap in log earnings (Table 6). Once again, most of the gap is unexplained; however, compositional differences contribute negatively towards the gap in 1991 and 2001, largely due to differences in educational levels. In other words, the fact that women are more likely to be university educated than men appears to be associated with a reduction in the earnings gap.

Table 6 Static decompositions of the gender log earnings gap[1,2]

	1981			1991			2001		
	Gap	X[6]	b[7]	Gap	X[6]	b[7]	Gap	X[6]	b[7]
Method 1[3]									
All	0.2952	0.0057	0.2895	0.2196	-0.0293	0.2489	0.1843	-0.0496	0.2339
Education	…	-0.0078	…	…	-0.0178	…	…	-0.0450	…
Family	…	0.0129	…	…	-0.0065	…	…	-0.0082	…
Geography	…	0.0034	…	…	-0.0002	…	…	0.0011	…
Weeks	…	-0.0029	…	…	-0.0048	…	…	0.0025	…
University	…	…	…	0.1158	0.0385	0.0773	0.1608	0.0666	0.0941
Education	…	…	…	…	0.0452	…	…	0.0564	…
Family	…	…	…	…	-0.0053	…	…	-0.0111	…
Geography	…	…	…	…	-0.0030	…	…	0.0055	…
Weeks	…	…	…	…	0.0016	…	…	0.0158	…
NUPC[5]	…	…	…	0.2615	0.0415	0.2201	0.2625	0.0481	0.2144
Education	…	…	…	…	0.0462	…	…	0.0543	…
Family	…	…	…	…	-0.0017	…	…	-0.0055	…
Geography	…	…	…	…	0.0003	…	…	0.0001	…
Weeks	…	…	…	…	-0.0034	…	…	-0.0008	…
Method 2[4]									
All	0.2952	-0.0299	0.3251	0.2196	-0.0442	0.2639	0.1843	-0.0633	0.2476
Education	…	-0.0154	…	…	-0.0268	…	…	-0.0563	…
Family	…	-0.0081	…	…	-0.0059	…	…	-0.0046	…
Geography	…	-0.0028	…	…	-0.0060	…	…	-0.0047	…
Weeks	…	-0.0036	…	…	-0.0055	…	…	0.0023	…
University	…	…	…	0.1158	0.0250	0.0908	0.1608	0.0435	0.1173
Education	…	…	…	…	0.0334	…	…	0.0370	…
Family	…	…	…	…	-0.0081	…	…	-0.0081	…
Geography	…	…	…	…	-0.0017	…	…	0.0047	...
Weeks	…	…	…	…	0.0013	…	…	0.0099	…
NUPC[5]	…	…	…	0.2615	0.0329	0.2286	0.2625	0.0313	0.2313
Education	…	…	…	…	0.0482	…	…	0.0388	…
Family	…	…	…	…	-0.0061	…	…	-0.0007	…
Geography	…	…	…	…	-0.0054	…	…	-0.0061	…
Weeks	…	…	…	…	-0.0038	…	…	-0.0008	…

… not applicable

1. Results were generated from Ordinary Least-Squares (OLS) models of log earnings (in the year prior to the census).
2. The sample consists of 25 to 29 year-old men and women who were employed full-year, full-time in the year prior to the census, with at least $5,000 in earnings and zero net self-employment income.
3. The explained portion of the gap is evaluated using the male coefficients and the unexplained portion of the gap is evaluated using the female characteristics.
4. The explained portion of the gap is evaluated using the female coefficients and the unexplained portion of the gap is evaluated using the male characteristics.
5. NUPC = Non-university post-secondary certificate.
6. X = Explained component of the gap.
7. b = Unexplained component of the gap.

Source: Statistics Canada, Census of Population, 1981, 1991 and 2001.

In contrast, compositional differences contribute towards the gap among university and non-university postsecondary graduates. Once again, this is due to differences in the disciplines men and women take in their postsecondary studies. The evidence in this case is far more compelling than it was in Table 5, where we examined the gap in the probability of full-time employment.

Dynamic decompositions

We now turn to the main purpose of the study, which is to examine the *evolution* of the gaps in the probability of full-time employment and log earnings. To this end, we turn to dynamic decompositions, which are described in equations (2), (7), and (8) in the methodology section.

We begin with the evolving gap in the probability of full-time employment (Table 7). The gap declined by about 5 percentage points in the 1980s, which was primarily explained by changing composition. It is worth noting that unexplained factors accounted for a substantial portion of the decline as well. Although there was no change in the gap in the 1990s, changing composition again contributed towards a decline in the gap, albeit less so than in the 1980s.

Table 7 Dynamic decompositions of the full-time employment probability gap[1,2]

	1981 to 1991			1991 to 2001		
	ΔGap	ΔX[6]	Δb[7]	ΔGap	ΔX[6]	Δb[7]
Method 1[3]						
All	-0.0508	-0.0294	-0.0214	-0.0054	-0.0173	0.0118
Education	…	0.0048	…	…	0.0044	…
Family	…	-0.0348	…	…	-0.0136	…
Geography	…	0.0006	…	…	-0.0080	…
University	…	…	…	-0.0080	-0.0033	-0.0047
Education	…	…	…	…	0.0011	…
Family	…	…	…	…	-0.0046	…
Geography	…	…	…	…	0.0002	…
NUPC[5]	…	…	…	0.0029	-0.0002	0.0032
Education	…	…	…	…	0.0031	…
Family	…	…	…	…	-0.0032	…
Geography	…	…	…	…	-0.0001	…
Method 2[4]						
All	-0.0508	-0.0401	-0.0107	-0.0054	-0.0120	0.0065
Education	…	-0.0039	…	…	-0.0002	…
Family	…	-0.0346	…	…	-0.0103	…
Geography	…	-0.0015	…	…	-0.0015	…
University	…	…	…	-0.0080	-0.0023	-0.0057
Education	…	…	…	…	0.0005	…
Family	…	…	…	…	-0.0026	…
Geography	…	…	…	…	-0.0002	…
NUPC[5]	…	…	…	0.0029	-0.0015	0.0044
Education	…	…	…	…	0.0017	…
Family	…	…	…	…	-0.0021	…
Geography	…	…	…	…	-0.0011	…

… not applicable

1. Results were generated from probit models of full-time employment (in the census reference week). Logit models yielded qualitatively similar results and are available upon request.
2. The sample consists of 25 to 29 year-old men and women who were in the labour force during the census reference week.
3. The explained portion of the gap is evaluated using the coefficients in the earlier period and the unexplained portion of the gap is evaluated using the characteristics in the later period.
4. The explained portion of the gap is evaluated using the coefficients in the later period and the unexplained portion of the gap is evaluated using the characteristics in the earlier period.
5. NUPC = Non-university post-secondary certificate.
6. X = Explained component of the gap.
7. b = Unexplained component of the gap.

Notes: The sum of the contributions of all components does not equal the total contribution of all components as generated from methods 1 and 2. This is because the latter are evaluated using coefficients in the earlier or later period, whereas the former is evaluated using coefficients from a pooled model. See the methodology section for details.

Source: Statistics Canada, Census of Population, 1981, 1991 and 2001.

In both decades, the main factor behind the compositional contribution was changing family characteristics. Young men increasingly became more likely to remain single than young women, and single people are generally less likely to be employed full-time. Educational factors played little or no role in helping to reduce the gap.

In terms of the log earnings gap, we note a large decline in the 1980s, followed by a smaller decline in the 1990s (Table 8). Changing composition was the main factor behind the decline in both periods, but more so in the 1990s. In fact, virtually all of the change in the gap in 1990s was explained.

In the 1980s, family characteristics were the main compositional factor behind the declining gap and log earnings. Unlike the gap in the probability of full-time employment, however, educational attainment did play a (smaller) role in reducing the earnings gap. In contrast, education was the main driving force behind the reduction in the gap in the 1990s. In fact, education almost fully explained the declining gap over the decade. Unlike the 1980s, however, other characteristics generally did not contribute towards reducing the gap. Furthermore, there was virtually no unexplained reduction in the gap. This may suggest that market forces did not contribute towards reducing the gap, as it did in the 1980s. Alternatively, it may suggest that unobserved characteristics of men and women remained stable in the 1990s, as opposed to the situation in the 1980s. Whatever the case may be, the result is that the overall earnings gap only declined moderately over the 1990s despite rapidly rising educational attainment among young women.

The 1990s was also a period of diverging trends in the log earnings gap. Overall, it declined moderately over the period. At the college level, no change was registered over the period. In contrast, it *rose* moderately at the university level. The fact that men and women continued to select traditional fields of study may have prevented the gap from further declining in the 1990s. It may, in fact, have contributed towards increasing the gap. Women are far more likely to study health and education, two largely public sectors that saw substantial wage freezes and rollbacks in the 1990s. On the other hand, men are more likely to study engineering and other technology fields, which proved to be a lucrative choice during the high-tech boom of the late 1990s (see Table 4). Alternatively, the rapid rise in the number of women in universities may have extended further down the distribution of unobserved earnings-related characteristics, which may explain why the unexplained component is so prominent.

Table 8 Dynamic decompositions of the gender log earnings gap[1,2]

	1981 to 1991			1991 to 2001		
	ΔGap	ΔX[6]	Δb[7]	ΔGap	ΔX[6]	Δb[7]
Method 1[3]						
All	-0.0756	-0.0537	-0.0219	-0.0353	-0.0367	0.0013
Education	…	-0.0160	…	…	-0.0330	…
Family	…	-0.0337	…	…	-0.0094	…
Geography	…	-0.0005	…	…	-0.0033	…
Weeks	…	-0.0035	…	…	0.0090	…
University	…	…	…	0.0450	0.0072	0.0377
Education	…	…	…	…	-0.0050	…
Family	…	…	…	…	-0.0037	…
Geography	…	…	…	…	0.0035	…
Weeks	…	…	…	…	0.0125	…
NUPC[5]	…	…	…	0.0010	-0.0069	0.0079
Education	…	…	…	…	-0.0001	…
Family	…	…	…	…	-0.0069	…
Geography	…	…	…	…	-0.0029	…
Weeks	…	…	…	…	0.0031	…
Method 2[4]						
All	-0.0756	-0.0512	-0.0244	-0.0353	-0.0371	0.0017
Education	…	-0.0151	…	…	-0.0345	…
Family	…	-0.0327	…	…	-0.0068	…
Geography	…	-0.0004	…	…	-0.0019	…
Weeks	…	-0.0029	…	…	0.0062	…
University	…	…	…	0.0450	0.0022	0.0428
Education	…	…	…	…	-0.0050	…
Family	…	…	…	…	-0.0030	…
Geography	…	…	…	…	0.0061	…
Weeks	…	…	…	…	0.0041	…
NUPC[5]	…	…	…	0.0010	-0.0079	0.0089
Education	…	…	…	…	-0.0037	…
Family	…	…	…	…	-0.0038	…
Geography	…	…	…	…	-0.0027	…
Weeks	…	…	…	…	0.0022	…

… not applicable

1. Results were generated from Ordinary Least Squares (OLS) models of log earnings (in the year prior to the census).
2. The sample consists of 25 to 29 year-old men and women who were employed full-year, full-time in the year prior to the census, with at least $5,000 in earnings and zero net self-employment income.
3. The explained portion of the gap is evaluated using the coefficients in the earlier period and the unexplained portion of the gap is evaluated using the characteristics in the later period.
4. The explained portion of the gap is evaluated using the coefficients in the later period and the unexplained portion of the gap is evaluated using the characteristics in the earlier period.
5. NUPC = Non-university post-secondary certificate.
6. X = Explained component of the gap.
7. b = Unexplained component of the gap.

Source: Statistics Canada, Census of Population, 1981, 1991 and 2001.

4. Conclusion

It has been well documented that young women have been gaining ground on young men in terms of educational attainment. In 1981, 16.2% of women and 15.5% of men aged 25 to 29 years-old who were in the labour force held a university degree. The gap only widened moderately by 1991, as 19.1% of young women and 16.1% of young men held a university degree. By 2001, the gap had increased dramatically: 31.3% of young women and 21.6% of young men held a university degree. The objective of this study is to assess the role of rapidly rising educational attainment of young women in explaining trends in the gender gap in labour market outcomes, such as obtaining full-time employment and earnings.

The gender gap in the probability of full-time employment (among labour force participants) declined in the 1980s, and this has largely been associated with changing family composition of young men and women, as well as unexplained factors. Young men increasingly became more likely to remain single than young women, and single people are generally less likely to be employed full-time. Educational factors played little or no role in helping to reduce the gap. In contrast, there was essentially no change in the gap in the 1990s.

In terms of the log earnings gap (among full-year, full-time workers), we note a large decline in the 1980s, which was mainly associated with changing family characteristics and unexplained factors. Unlike the gap in the probability of full-time employment, however, educational attainment did play a (smaller) role in reducing the earnings gap over this period.

In contrast, education was the main driving force behind a (smaller) reduction in the gap in the 1990s. In fact, education almost fully explained the declining gap over the decade. Unlike the 1980s, however, other characteristics generally did not contribute towards reducing the gap, and there was virtually no unexplained reduction in the gap. The lack of an unexplained reduction in the gap was, in fact, the most important factor behind the slowing convergence in the earnings gap in the 1990s. In the United States (U.S.), Blau and Kahn (2004) examined the issue of slowing convergence in the gender wage gap. They too find that the largest factor contributing towards the slowing wage convergence is the "unexplained gap". Specifically, they find evidence that changes in labour force selectivity, changes in gender differences in unmeasured abilities and labour market discrimination, and changes in the relative advantage of supply and demand shifts all played a part in explaining the slowing convergence of the gender wage gap.

The earnings gap in the 1990s actually *rose* moderately at the university level, but remained unchanged at the college level. The relative stability in the disciplines men and women continued to take in university may have prevented the earnings gap from further declining in the 1990s. It may, in fact, have contributed towards increasing the gap. Public spending cuts were felt by health and education graduates (female-dominated fields) and the high tech boom helped engineering and other technology graduates (male-dominated fields). Alternatively, the rapid rise in the number of women in universities may have extended further down the distribution of unobserved earnings-related characteristics, which may explain why the unexplained component is so prominent. The academic discipline was not available in the U.S. data used by Blau and Kahn (2004). However, it is possible that it was also a factor in their findings.

Why did rapidly rising educational attainment among young women help to narrow the earnings gap in the 1980s (to some extent) and in the 1990s (to a greater extent), but had relatively no role to play in reducing the gap in the probability of full-time employment over these periods? The answer may lie in the fact that education is simply more strongly associated with earnings than with locating full-time employment, and thus, similar increases in educational attainment would correspond to larger increases in earnings than in the probability of being employed full-time. Going back to Table 3 in the descriptive results, we note that the university–high school earnings ratios are always substantially higher than the university–high school full-time employment ratios for young men and women in each year considered, suggesting that education is more strongly associated with earnings than with full-time employment.

References

Baker, M., D. Benjamin, A. Desaulniers and M. Grant. 1995. "The distribution of the male/female earnings differential, 1970-1990." *Canadian Journal of Economics.* 28, 3: 479–501.

Blau, F. and L.M. Kahn. 2004. "The US gender pay gap in the 1990s: Slowing convergence." National Bureau of Economic Research. Working Paper Series, no. 10853.

Blinder, A.S. 1973. "Wage discrimination: Reduced form and structural estimates." *Journal of Human Resources.* 8, 4: 436–455.

Christofides, L. and R. Swidinsky. 1994. "Wage determination by gender and visible minority status: Evidence from the 1989 LMAS." *Canadian Public Policy*. 21, 1: 34–51.

Drolet, M. 2001. "The persistent gap: New Evidence on the Canadian Gender Wage Gap." Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE2001157. Ottawa: Statistics Canada.

Fairlie, R. 1999. "The absence of the African-American owned business: An analysis of the dynamics of self-employment." *Journal of Labor Economics.* 17, 1: 80–108.

Finnie, R. and T. Wannell. 2004. "The evolution of the gender earnings gap amongst Canadian university graduates." Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE2004235. Ottawa: Statistics Canada.

Gunderson, M. 1998. "Women and the Canadian Labour Market: Transition Towards the Future." 1991 Census Monograph Series. Catalogue no. 96-321-MPE1998002. Ottawa: Statistics Canada.

Murphy, K. and F. Welch. 1990. "Empirical age-earnings profiles." *Journal of Labor Economics.* 8, 2: 202–229.

Oaxaca, R.L. 1973. "Male-female wage differentials in urban labor markets." *International Economic Review*. 14, 3: 693–709.

Wannell, T. 1989. "The persistent gap: Exploring the earnings differential between recent male and female post-secondary graduates." Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE1989026. Ottawa: Statistics Canada.