TRENDS

IN MARITIME HIGHER EDUCATION

Volume 3, number 1

The Gender Gap in Employment Outcomes of University Graduates

Highlights

- This article explores employment outcomes by gender among Class of 1999 first degree holders (completed a bachelor's degree in 1999, and enrolled in the degree programme with a high school diploma) two years after graduation.
- 57% of first degree holders were female, and 43% male. There was no significant difference by gender in the average age on graduation.
- There was no significant difference between men and women in the labour force participation rate or in intervals of joblessness since graduating.
- Women were less likely than men to be employed in a permanent or fulltime position. This difference by gender in job status is linked at least in part to field of study, with women under-represented in many of the more professionally-oriented or applied fields of study such as Engineering & Applied Sciences and Commerce & Administration. Graduates of these fields of study were more likely to have had a full-time or permanent job.
- There was no significant difference between men and women employed full-time on measures of job quality, such as extent of skills use, relatedness of job and overall job satisfaction.
- Women working full-time hours worked fewer hours per week than did men: women worked on average 41 hours, and men, 44 hours per week.
- Calculated on an hourly basis, women working full-time earned \$14.34/h, or 84% of the wages of men (\$17.09/h).
- The link between field of study choice and choice of occupation explains part of the wage gap. The under-representation of women in Engineering & Applied Sciences and Mathematics & Physical Sciences, for example, led to their under-representation in some of the highest-earning occupations, such as computer programmer/analyst and engineer.
- Controlling for differences in field of study, occupation, province/country of residence, productivity (number of hours worked per week), educational background (first degree holders only), career stage (two years after graduation and employed full-time), we find that women earn \$0.50 to \$1.70 less than men using a procedure known to be correct 19 times out of 20. Thus the unexplained portion of the wage gap is 3-10%, based on men's average hourly wages.

Introduction

The MPHEC's Survey of 1999 Maritime University Graduates in 2001 identified a substantial gap in full-time earnings between male and female graduates, with women earning 85% of men's weekly wages. The existence of a gender-based earnings gap is not a new phenomenon. The fact that men earn more than women is one of the most studied issues in labour economics.¹ Within the general population, factors identified as contributing to the gap include differences between men and women in levels of education, the amount of time they work and the continuity of the work experience. That is, in comparison to women, men have traditionally achieved higher levels of education, and continue to report working longer hours.² Women are also more likely to take time out for raising children, and therefore do not accumulate as much total work experience as their male counterparts. Men and women often make different choices in field of study which in turn impacts upon their occupational choices. However, even when all of these factors are taken into account, many studies still find that a substantial proportion of the wage gap cannot be explained.3

This paper provides additional information on the nature of the gender gap by comparing earnings and employment outcomes of recent university graduates at the beginning of their careers. Using data from the



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University Graduates in 2001, we have attempted to control for the potential Just over half (54%) of the Class of 1999 compounding factors of educational graduates surveyed were classified as first background, age and career stage degree holders. Within this group, 57% differences between male and female were female, and 43% male. On rate was 86%. By four years after graduates by limiting the analysis to those graduation, the average age of male graduation, findings from the Class of who completed a bachelor's degree in graduates was 24, and the average age of 1999, and who enrolled in this programme female graduates, 23. This difference in with a high school diploma as their age by gender was not significant. highest completed level of education. Throughout this paper, this subsample of **2.** Labour force participation and job graduates will be referred to as "first status degree holders".

We begin the analysis with an examination of labour force statistics and Mirroring the success of the Class as a job quality measures. This is followed by a comparison of men's and women's earnings and the influence on wages of such factors as field of study, occupation and province/region of residence. We then present an analysis of the implications of the gender gap in wages defined in this paper.

The paper concludes that while there are no significant differences between men and women in labour force participation and various measures of job quality, women are less likely to have permanent employment or to be employed full-time. In addition, when we allow for number of hours worked, field of study, occupation, and province of residence, gender alone is still a strong predictor of wages. Whether this is the result of differences in other characteristics that are correlated with gender or the result of gender discrimination is unclear, and warrants further study. This is clearly a complex issue with multiple factors. We were able to control for some of these factors as outlined above. Others were outside the scope of the survey including, for example, characteristics of the workplace which are known to influence the gender gap.⁴

First degree holders

whole,⁵ the majority of first degree holders (88%) were part of the labour force two years after graduating, and of those who were in the labour force, 91% were employed. Among those who were not part of the labour force, eight-in-ten reported they were in school full-time. Table 1 presents labour force outcomes for first degree holders by gender. In all measures, there was no significant difference in the distribution of male and female graduates.

MPHEC's Survey of 1999 Maritime 1. First degree holders - Demographics Similar results were found in the MPHEC's survey of the Class of 1996, one year after graduation. Among the first degree holders of that Class, 90% were in the labour force and the employment 1996 revealed a slight change in the proportion in the labour force (87%), with an employment rate of 93%, but there was still no difference in these measures between male and female graduates.

> Gaining a foothold in the labour market can be a challenge early in a graduate's career. Asked about any periods of joblessness they may have experienced since graduating in 1999, nearly half (49%) of first degree holders reported that they had been out of work at least once. On average, these graduates reported two periods of unemployment, with no significant difference between male and female graduates, either in the proportion who reported being out of work at least once, or in the average number of periods of joblessness. Similar results were found among Class of 1996 first degree holders surveyed in 2000: 50% said they had been

Table 1Labour force participation amongfirst degree holders1		
	Female	Male
In the labour force	87.4% (n=1132)	88.7% (<i>n</i> =875)
Employed	91.6%	91.1%
Unemployed	8.4%	8.9%
Not in the labour force	12.6% (<i>n</i> =163)	11.3% (<i>n</i> =112)
In school full-time	77.9%	85.6%
Awaiting job start (more than 4 weeks)	3.7%	2.7%
Not looking for work	18.4%	11.7%
¹ Completed bachelor's degree and enrolled in programme with high school diploma as the highest level of educational attainment.		

without a job at least once in the four years since graduating, with no significant differences in the responses of men and women.

Among first degree holders from the Class of 1999 who were employed in the reference week, results showed that job status did vary significantly by gender, with women significantly less likely than men to be working full-time (30 or more hours per week)

(p<0.000) or to have a permanent job The difference by gender in job status that their university programme had (p<0.011) (Figure 1). That is, while nearly three-quarters of male graduates reported their job was permanent, just under twothirds of women enjoyed a permanent job status. And although the vast majority of women (85%) reported working full-time (at least 30 hours per week), this proportion was still significantly lower than the proportion of men (92%)employed full-time.

greater among graduates of more Sciences, Commerce & Administration, Mathematics & Physical Sciences, and Health Professions. And, with the



These findings are similar to the pattern found in the general population, where 92% of men, and 77% of women work full-time.⁶ (The difference in the full-time rate of women in the general population and first degree holders in this survey may be due to different levels of education, and/or life stage differences.)

These findings also echo the results of the surveys of the Class of 1996, where employed female first degree holders were less likely than their male counterparts to have a permanent job (female: 57% in 1997 and 70% in 2000 had a permanent job) (male: 64% in 1997 and 81% in 2000 had a permanent job). Women were also less likely than men to be working full-time (female: 83% in 1997 and 86% in 2000 employed fulltime) (male: 91% in 1997 and 91% in 2000 employed full-time).

exception of the latter field, women are under-represented among these graduates.

3. Job quality

First degree holders employed full-time

While we have found that women are less likely to hold permanent and full-time jobs, there appear to be no differences between men and women in the quality of employment. When we look at first degree holders who were employed fulltime in the reference week, findings showed no significant differences by gender in the extent to which respondents were using the skills they acquired in their 1999 programme, nor in the extent to which their programme helped them find a job. 73% of employed first degree holders said they were using their skills to some or a great extent, and 73% thought

observed in Figure 1 is linked at least in helped them, at least to some extent, in part to field of study. The likelihood of finding employment. In addition, men and having a full-time and permanent job is women were equally likely to say they were satisfied or very satisfied with their professionally-oriented or applied fields job (89%), and that their job was closely of study, such as Engineering & Applied related to their field of study (38%). The lack of any significant differences between men and women in this last finding is interesting given that women (47%) were significantly (p<0.002) more likely to say that it was very important to have a job related to their field of study than were men (38%). Finally, one-quarter of graduates said that they felt overqualified for their job, with no differences in male or female responses.

> Among the graduates of the Class of 1996 surveyed four years after graduating, similar findings were discovered: 73% reported they were using their skills to some or a great extent, 81% agreed that their university programme had helped them, at least to some extent, in finding employment, and 45% reported that their job was directly related to their field of study. Over one-third (36%) said they felt overqualified or significantly overqualified for their jobs. Nine-in-ten said they were satisfied or very satisfied with their job. There were no significant differences between men and women in any of these variables.

> Among Class of 1999 graduates, there was a significant (p<0.002) difference between men's and women's responses when asked about their level of satisfaction with wages. Men (81%) were more likely than women (74%) to say they were satisfied or very satisfied. Very similar results were recorded for graduates of the Class of 1996 four years after graduation. This finding reflects the wage gap explored in the following section.

4. Earnings

Employed first degree holders

The findings show a substantial disparity in the earnings of male and female first degree holders which is larger than that calculated for the Class as a whole (85%).7 Employed first degree holders from the Class of 1999 in 2001earned an Because of this disparity, hourly wage average of \$604 per week. Women earned significantly (p<0.001) less than men. The average weekly earnings of female first degree holders (\$530) were 75% that of their male counterparts (\$704). When we consider only those graduates employed full-time, women (\$580) made 78% of the earnings of men (\$741). This constitutes an earnings gap of 22%.

A similar earnings gap existed among employed first degree holders who graduated in 1996. One year after graduation, women made 77% of men's earnings (women: \$388; men: \$502). Among those graduates who were working full-time hours, women (\$420) brought home 80% of the earnings of their male counterparts (\$527). By four years after graduation, there was little convergence of earnings, with female graduates (\$573) making 78% of men's earnings (\$735); among those working full-time, women (\$618) made 81% of men's earnings (\$762).

According to Drolet (2001) "It is a welldocumented fact that men and women differ considerably in the amount of time they work."8 In this study, findings show that Class of 1999 women working fulltime hours reported working an average of 41 hours per week, whereas men reported working an average of 44 hours per week. This difference in hours worked is similar to that found in other studies. According to the National Graduate Survey, women working full-time worked three hours less per week than did men;9

Labour Force Survey results (1996) reported that men employed full-time worked an average of 43.6 hours while full-time women worked 39.6 hours per week,¹⁰ while the Employment Policy Foundation (U.S.) reports that men work 45 hours, and women, 41.3 hours per week 11

rates are regarded as a superior measure.¹² All subsequent earnings analyses in this paper will be based on the calculated hourly wage. In addition, only those respondents working full-time (30+ hours per week) will be included in the analyses.

First degree holders employed full-time

Class of 1999 first degree holders working full-time in the reference week (2001) earned an average hourly wage of \$15.52. Women earned \$14.34/h, or 84%, of men's wages (\$17.09/h), a wage gap of

16%. It is apparent, then, that the number of hours worked is a major contributing factor to the earnings gap. In fact, the earnings gap shrinks by 6 percentage points if we take into account differences in the number of hours worked. By comparison, Drolet¹³ found that among workers in the general population (1999), women's hourly wage rate was 79.6% of the men's average, or wage gap of 20.4%. While these statistics are from different years, they suggest that the wage gap is smaller among more highly educated workers.

Exploring the wage gap further, we find that female first degree holders cluster in the lower wage ranges (Figure 2), with women (23%) significantly (p<0.000) more likely than men (15%) to be earning under \$10 per hour at their full-time job. Male first degree holders (21%) are significantly more likely (p<0.000) than their female counterparts (9%) to earn \$22.00 or more.



An analysis of the data showed no significant differences between men and women in their average age, the number of years between high school graduation and enrolment in university, or in whether or not they had children. These are all factors which could affect earnings.

among graduates of Agricultural & Biograduates.

earn 92% of the wages of men. The gen- Four years after graduation, the Class of der gap in hourly wages is narrowest 1996 showed a similar trend. Information Technology graduates had the lowlogical Sciences (96%), Education (97%) est ratio of women's to men's earnings and Humanities (97%). In these three (62%), while Education (97%), Humanifields, women comprise at least 60% of ties (111%) and Agricultural & Biological Sciences (98%) had the highest ratios.

Field of Study

As reported in the Survey of 1999 Maritime University Graduates in 2001, choice of field of study among graduates was influenced in part by gender. Choice of a field of study in turn affects occupational choice and therefore earnings. Figure 3 shows average fulltime hourly wages by field of study. The relationship between earnings and field of study is clear: the more applied in nature the field, the higher the earnings, with the Information Technology subset of majors bringing in the highest earnings for graduates. Graduates of Social Sciences, Humanities and Agricultural & Biological Sciences were among the lowest wage-earners.

Furthermore, findings show that not only are women under-represented in some of the highest earning fields, but that the ratio of women's to men's hourly wages is lowest in some of these fields (Figure 4). In the most extreme example, females make up only 11% of all Information Technology graduates, and earn 75% of the full-time hourly wages of their male counterparts. This disparity seems to be due at least in part to differences in occupations, with a much greater number of men than women employed as computer programmer/analysts (highest paid occupational category among first degree holders-see Figure 5). It is interesting to note however, that the scarcity of women among Engineering graduates (women comprise 22% of Engineering graduates) is not accompanied by as large an earnings gap - among these graduates, women



Figure 4

Representation of female graduates (% female) and ratio of female to male full-time hourly wages by field of study in 2001 among Class of 1999 first degree holders



Occupation

Figure 5 presents hourly wages by occupation. Top wages (\$23.56/hour) were earned by graduates employed as

those occupations with the largest gender gap representation of women and the in wages¹⁴ (Figure 6). Other occupations with large wage gaps were Managers (87%), Financial/Accounting (88%), and Policy trend is Nursing - an occupation computer programmers and analysts. Researchers, Programme Officers and where women are over-represented Women make up just 13% of graduates Consultants (88%). Following the general and which yields the third highest employed in this occupation and earn trend observed among the fields of study, we 87% of the wages of men, placing find that the lowest-paying occupations are

computer programmers and analysts among among those with the largest smallest, or even reversed, earnings gap.¹⁵ One important exception to this wages.





Place of residence

Figure 7 presents hourly wages by province/country of residence in 2001. Class of 1999 graduates living outside the Maritimes earned the highest average wages, with those living in the U.S. earning the highest average wages (\$26/hr). However, the wage gap was also greatest among graduates living and working in the United States, with women earning 71% of the wages of men (Figure 8).



Although place of residence in 2001 ap- of residence in 2001, and all two-way sector employers, supervisory vs nonpears to play some role in explaining the wage gap (Figure 8), these differences seem largely to reflect the different occupational distributions, particularly in higher-paying occupations where men are over-represented. For example, Ontario and the U.S. have higher proportions of men employed as Computer Programmers and Analysts than other jurisdictions. A detailed analysis is not presented because numbers are too small at the place of residence level.

effect. Results show that gender alone still beyond the scope of the survey. plays a statistically significant role in determining wages ($R^2 = 0.56$; p<0.000). 5. Other factors Thus, allowing for differences in field of productivity differences (analysed hourly degree holders only), career stage (two years following graduation, and employed



Combined effect of field of study, occupation and place of residence

To determine whether field of study, occupation and place of residence combined accounted for the remaining wage gap, an analysis of variance (GLM, SPSS version 10.0) was performed on There are certainly other factors involved hourly wages (Class of 1999 first degree holders employed full-time). The model included: field of study, occupation, place Drolet¹⁷ (for example, nonprofit vs private

full-time), we find that women earn \$0.50 to \$1.70 per hour less than men, using a procedure known to be correct 19 times out of 20. A conservative¹⁶ estimate of the unexplained portion of the wage gap is 3-10%.

in explaining the gap, such as the genderbased workplace differences identified by

interactions, with gender as an additive supervisory positions, etc.), but these are

study, occupation and residence, as well Graduates were asked a series of as having already controlled for questions about their thoughts on enrolling in their 1999 programme, wages), educational background (first including questions regarding the importance they placed on acquiring skills for a particular job, and having a chance at a good income. Among first degree holders who were employed full-time in the reference week, findings showed that while there was no difference in the responses between male and female graduates in the importance they placed on having a chance at a good income (59% said it was very important), women (56%) were significantly (p<0.004) more likely than men (46%) to say that it was very important to acquire the skills needed for a particular job. In this case, field of study plays a compounding role. Among graduates of Education, Health Professions (*i.e.* Nursing) and Commerce & Administration, women were more likely than men to say that the acquisition of skills was very important. These findings are similar to those of the Class of 1996.

> Results also indicated that work experience gained during the programme, and knowledge of potential career paths did not differ significantly between male and female first degree holders. Findings showed that 21% of first degree holders reported having at least one work placement (either paid or unpaid) during their programme, and 68% said that their programme had provided them with knowledge of career opportunities to some or a great extent. In addition, there did not appear to be any significant differences between men and women in the academic qualifications gained post-

1999 that might influence the wage gap: women and men returned to study in equal proportions (58%).

It is also interesting to note that women were more likely than men to have completed their programme in a shorter amount of time - 70% of women, and 52% of men completed their programme within four years.

Is the wage gap accompanied by differing perceptions between men and women relative to their jobs and overall financial situations? In addition to enabling a detailed exploration of factors influencing the gender gap, the survey also provided an opportunity to explore this question. Results showed that there was no significant difference between men and women in their level of satisfaction with their current employment situation (69%) said they were either satisfied or very satisfied). However, women (15%) were significantly (p<0.000) less likely than men (21%) to say they were very satisfied with their current financial situation. Similar results were obtained in the survey of the Class of 1996 in 2000.

6. Conclusion

Female first degree holders entered university with the same goals as their male counterparts. They said that acquiring jobs skills and having a chance at a good income were important to them. They were also just as likely as men to say that it was important to have a job related to their field of study.

However, while women are finding satisfaction in their jobs, they are earning less than men. Allowing for differences in field of study, occupation and residence, as well as having already controlled for productivity differences (analysed hourly wages), educational

career stage (two years following wages are findings showing that women graduation, and employed full-time), we are less likely than men to say they are find that women earn \$0.50 to \$1.70 per satisfied with their earnings or their hour less than men, using a procedure current financial situation. There is also known to be correct 19 times out of 20. the potential for this earnings disparity to Our analysis of survey data shows an impact upon the ability of female unexplained wage gap of 3-10%, and while this is an oversimplification of the nature of the wage gap, it can nonetheless serve as a 'ballpark' range.

suggests gender discrimination or differences in other characteristics that are correlated with gender is unclear, and warrants further study. It may very well be that factors outside the scope of this survey, such as workplace characteristics, would be able to explain the remaining gap. However, it should be noted that comprehensive studies which examine worker and workplace both characteristics still find that a substantial portion of the wage gap cannot be explained.

Exploring the nature of the wage gap, we find that, in general, occupations with a low representation of women tend to come with higher average wages but a larger gender gap in hourly wage rates. There are some important exceptions to this trend, however. These include Nursing, which is dominated by women and which is the third-highest paid occupational category in this study, and Engineering, where women are underrepresented but enjoy a relatively higher wage ratio. Furthermore, the results of the Class of 1996 longitudinal surveys showed little or no convergence of the overall gender gap over time. Whether or not this will be the case for graduates of the Class of 1999 is unknown, but will be addressed in the planned follow-up survey of the Class of 1999, five years after graduation.

background (first degree holders only), Coexisting with this substantial gap in graduates to repay their student loans. In an upcoming companion article, we will explore the experiences of male and female degree holders in borrowing to finance their education, as well as Whether this unexplained component repayment of loans; this will include an examination of the relative burden student debt places on female and male first degree holders.

Methodology

Statistics presented in this article are based on the MPHEC's surveys of Maritime University Graduates, including the Class of 1999 in 2001 and the Class of 1996 in 1997 and in 2000. Further information on these surveys may be obtained from the MPHEC.

Earnings data: Respondents were asked to report their gross wages for the job held in the reference week by using whichever of the following categories they preferred: hourly, daily, weekly, biweekly, etc. Standardized weekly wages were then calculated. Graduates were also asked how many hours they worked each week at their job. This information was used to calculate an hourly wage rate.

Field of Study and Occupation Groupings: Occupation categories were derived from Statistics Canada's National Occupation Codes. A list of the major fields of study included in each broad field of study category and occupations included in each occupation category may be found in the report Survey of 1999 Maritime University Graduates in 2001. The reader should note that the Information Technology category is not a completely separate category, but rather a composite of majors taken from other broad-level categories (Mathematics & Physical Sciences, Engineering & Applied Sciences and Commerce & Administration) and therefore overlaps with them.

Statistical Analyses

In all cases, the confidence level determining significance was set at 95%. All statistics presented have been generated from weighted data. Main effects in ratio/continuous data were tested using one-way ANOVA (SPSS version 10.0). Differences between groups were tested using the Student-Neuman-Keuls test. Differences in proportions (ordinal/categorical data) were tested using Chi-Square (SPSS version 10.0). Notable differences were identified using adjusted standardized residuals.

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14. It should be noted that some graduates employed as computer programmer/analysts obtained their occupation-specific training post-1999, therefore there will not be a direct link between the pattern for Info Tech graduates and graduates employed as computer programmer/analysts.

15. Accurate comparisons between the Classes of 1999 and 1996 cannot be made because in the 1997 survey, graduates were not asked to report the number of hours worked (therefore can't compare hourly wages) and in the 2000 survey, a different occupational coding structure was used.

16. The percentage wage gap is based on the average male hourly wage of \$17.09; this is an oversimplification of the nature of the wage gap, but nonetheless provides a rough 'ballpark' range.

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