

# How Much Do Women Make Compared to Men? Earnings Differences by Credential and Field of Study

## Key Findings

- Overall, female graduates from post-secondary education institutions earn substantially less than men, with the difference rising from 12% one year after graduation to 25% five years out.
- Five years after graduation, women earn less than men in every field of study and across all credentials:
  - The largest gender earnings differential in percentage terms is among college-level certificate graduates in **education**, where women earn 46% less than men (or \$28,300).
  - The largest differential in dollar terms is found among master's degree holders in **business, management and public administration**, where women earn nearly \$40,000 less than men (or 32%).

## Introduction

The **Labour Market Information Council** (LMIC) and **Education Policy Research Initiative** (EPRI) have published a joint report titled *How Much Do They Make?* focusing on the earnings outcomes of all students who graduated from publicly funded, Canadian post-secondary education (PSE) institutions from 2010 through 2014. We follow students' earnings after graduation from 2011 to 2015 using the newly available **Education and Labour Market Longitudinal Platform** (ELMLP) (see **Box 1**). This LMI Insight Report discusses the findings related to the differences in average earnings between male and female graduates across 11 primary fields of study for six PSE credentials.

### Box 1. What is the Education and Labour Market Longitudinal Platform?

Developed by Statistics Canada and Employment and Social Development Canada, the newly released ELMLP is a data environment that allows us to identify all college and university graduates from publicly funded Canadian PSE institutions starting in 2010, and follow their annual employment earnings through their tax records from the first year after graduation through 2015. The 2010 cohort of graduates currently has the longest period of available tax records (five years), so it is the focus of the LMIC-EPRI joint report, *How Much Do They Make?*. The associated data are available on our [interactive dashboard](#). For additional information, please visit our [project page](#).

While the ELMLP has many unequalled strengths for exploring the characteristics, experiences and outcomes of PSE graduates, it also has a number of important limitations that should be kept in mind when interpreting the results (see [Box 2](#)).

## Overall Earnings Differences Between Women and Men

Women earn substantially less than men in every year following graduation ([Figure 1](#)). Focusing on the 2010 cohort of graduates across all credentials (83,880 male and 120,210 female graduates),<sup>1</sup> men earn \$46,400 while women earn \$40,700 — a difference of 12% — in the first year after graduation. From their first to fifth year following graduation, men’s average earnings (inflation-adjusted) grow by 50%, whereas women’s earnings grow by 28%. As a result, women end up earning 25% (or \$17,700) less than men five years after graduation. It is also notable that among the 2010 cohort of PSE graduates, women account for a majority (56% or more) in five of the six credential types. Doctoral degree graduates are the only exception, among whom women represent 45% of the total.

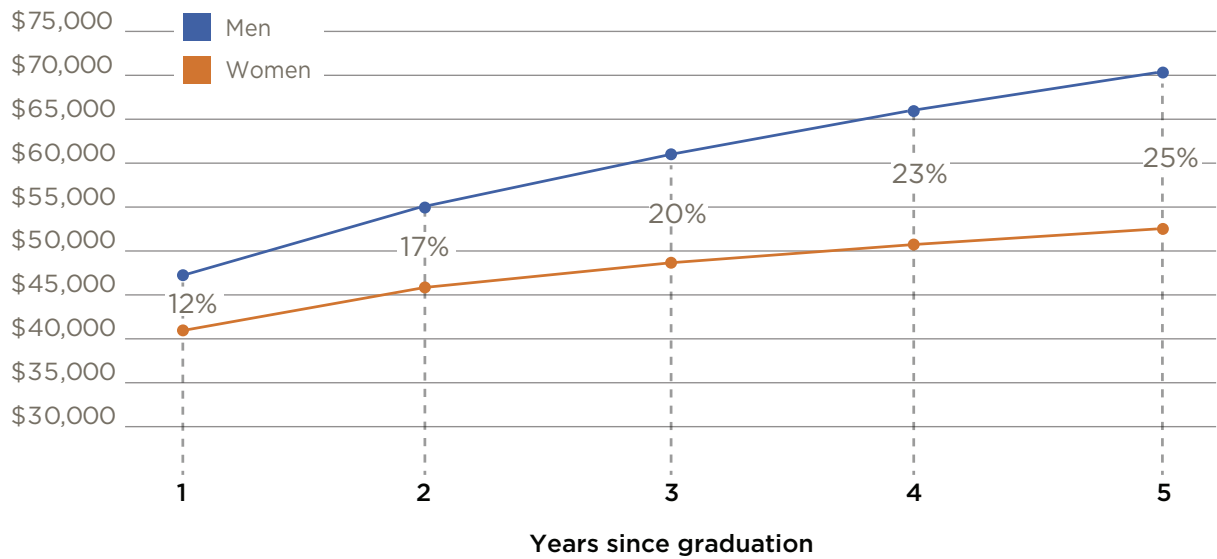
### Box 2. Limitations of the ELMLP

Although the administrative datasets available in the platform offer expansive coverage of students and apprentices, there are several limitations and corresponding caveats associated with using the ELMLP to measure gender earnings differentials. These include the lack of available information about hours and weeks worked, and about schooling and occupational choices (see [LMI Insight Report no. 4](#)).

There are ongoing discussions in literature about whether we should control for occupation when calculating earnings by gender. On one hand, doing so might cause the true earnings differentials to be underestimated if occupation choices are mainly the outcome of labour market factors (such as discrimination) that limit women’s access to certain occupations. On the other hand, not controlling for occupation might lead to an overestimation of the true differences if occupation choices are the outcome of different preferences (e.g. if women voluntarily choose occupations that are lower-paying but offer more flexibility).

However, there is evidence that field of study is a significant factor driving the differences across occupations for PSE graduates. Therefore, controlling for field of study would indirectly account for a significant proportion of the gender differences, which are more likely preference-based and less likely to be the result of labour market discrimination.

**Figure 1: Average earnings of all PSE graduates and gender differences**  
(2016 constant \$)



### Magnitude of the Gender Earnings Differential

The results show that there are statistically significant and growing earnings differentials between women and men among PSE graduates within each of the six PSE credential types (Table 1). First-year earnings among professional degree graduates are the only exception — in

this category, women earn 2% less than men, but the difference is not statistically significant. In percentage terms, the largest gender earnings differential is among college-level certificate holders (women earn 34% less than men). In dollar terms, the greatest difference is among master’s degree graduates, where women earn \$27,200 less (or 28%) than men five years after graduation.

**Table 1: Earnings levels and differences by gender, one and five years after graduation, 2010 cohort**  
(2016 constant \$)

PSE credential	Year since graduation	Count (individuals)	Earnings (\$)		Difference*	
			Men	Women	\$	%
College-level certificate	Year 1	28,300	40,700	32,100	-8,600	-21%
	Year 5	21,130	58,500	38,800	-19,700	-34%
College-level diploma	Year 1	49,010	37,200	32,700	-4,500	-12%
	Year 5	38,850	56,200	40,000	-16,200	-29%
Bachelor's degree	Year 1	90,860	43,000	39,800	-3,200	-7%
	Year 5	69,160	67,400	52,800	-14,600	-22%
Master's degree	Year 1	27,340	72,600	59,800	-12,800	-18%
	Year 5	23,450	98,800	71,600	-27,200	-28%
Doctoral degree	Year 1	3,420	63,100	56,600	-6,500	-10%
	Year 5	3,210	89,600	75,300	-14,300	-16%
Professional degree	Year 1	5,140	69,200	67,800	-1,400	-2%
	Year 5	3,970	111,000	91,900	-19,100	-17%

\*The difference is calculated as women's earnings minus men's earnings divided by men's earnings.

## Fields of Study with the Greatest Gender Differentials

In most fields of study, women earn less than men every year after they graduate — and in the vast majority of cases, these differences grow over time such that five years out, women earn less than men in every case. **Table 2** presents gender earnings differences for the fields of study with the greatest earnings gap — in both percentage and dollar terms — for each credential five years after graduating.

The largest gender earnings differentials for both college-level certificate and diplomas are among **education** graduates. Women, who represent four out of five **education** graduates with these credentials, earn 46% and 44%, respectively, less than men.

Among bachelor's degree holders, graduates in **agriculture, natural resources and conservation** and in **mathematics, computer and information sciences** have the greatest gender earnings differences. Women earn 23% and 21%,

respectively, less than men in these fields, resulting in an absolute earnings difference of approximately \$15,000.

As seen at the credential level, women with master's degrees earn the least, in dollar terms, when compared with their male counterparts. This applies to most fields of study as well. Across the fields of study observed, the earnings differences are less than 20% in only two cases: **education** (where women earn 16% less) and **humanities** (where women earn 14% less). The percentage difference is greatest among **visual and performing arts and communication technologies** master's graduates, among whom women earn 32% (\$16,800) less than men. The greatest dollar difference is among **business, management and public administration** graduates, where women earn nearly \$40,000 less than men (or 32%). Although not shown, female graduates in **mathematics, computer and information sciences** also earn substantially less than men: \$24,500 (or 28%) five years after graduating.

Earnings differences among doctoral graduates are much lower than among master's degree holders. Of the eight doctoral fields of study observed, only two have earnings gaps greater than 20% (see [Table 2](#)). Female doctoral graduates in **business,**

**management and public administration** and in **mathematics, computer and information sciences** earn \$33,200 (or 24%) less and \$23,700 (or 23%) less than their male counterparts.

**Table 2. Fields of study with the greatest differentials in each PSE credential five years after graduation**

PSE credential	Field of study	Men	Women	Difference*	
		(\$)	(\$)	\$	%
College-level certificate	<b>Education</b> (female share: 88%)	61,600	33,300	-28,300	-46%
College-level diploma	<b>Education</b> (female share: 81%)	65,200	36,600	-28,600	-44%
Bachelor's degree	<b>Agriculture, natural resources and conservation</b> (female share: 51%)	64,500	49,800	-14,700	-23%
	<b>Mathematics, computer and information sciences</b> (female share: 21%)	72,400	57,000	-15,400	-21%
Master's degree	<b>Business, management and public administration</b> (female share: 49%)	123,300	83,700	-39,600	-32%
	<b>Visual and performing arts and communication technologies</b> (female share: 64%)	51,900	35,100	-16,800	-32%
Doctoral degree	<b>Business, management and public administration</b> (female share: 43%)	138,300	105,100	-33,200	-24%
	<b>Mathematics, computer and information sciences</b> (female share: 26%)	104,700	81,000	-23,700	-23%
Professional degree	<b>Health and related fields</b> (female share: 63%)	114,100	91,100	-23,000	-20%

\*The difference is calculated as women's earnings minus men's earnings divided by men's earnings.

There are two fields of study in which the 2010 cohort of women earn more than men for at least one year following graduation:

1. Female college-level certificate holders in the **humanities** earn 15% more than men in their first year after graduation; this narrows to 4% more than men three years out. By year five, these women earn 6% less than men.
2. Female bachelor's graduates in **health and related fields** start out earning 23% more than men. However, this premium narrows every subsequent year, such that women earn 2% less than men by five years after graduation.

## Putting It All Together

Five years following graduation, women earn substantially less than men — both overall and within each PSE credential type and every field of study. Furthermore, the earnings differentials between men and women increase overall and within most fields of study. This is notably different than earnings differentials between Canadian and international students (see the forthcoming LMI Insight Report), which narrow over time. In other research, we have shown that these gender earnings differences also persist across different income levels (see [our blog post on that topic](#)).

As mentioned in **Box 2**, the ELMLP does not currently include information about some key labour market factors. As a result, we could not investigate how much of the gender earnings differences can be explained by, for example, choice of occupation, hours worked per week, or the effects of gender-based discrimination in

hiring and promotion. Research on those issues would, in many cases, rely on different data with more variables of this type. However, the findings reported here provide a unique perspective on the earnings differentials that exist for recent PSE graduates.

## Acknowledgments

This LMI Insight Report was prepared by Behnoush Amery of LMIC and draws heavily on the joint LMIC-EPRI report on earnings of post-secondary graduates by credential and field of study. We would like to thank Ross Finnie, Michael Dubois and Masashi Miyairi of EPRI for their feedback on this LMI Insight Report. For more information about this Insight Report and other related LMIC activities, please check out our [project page](#) or contact Behnoush Amery, Senior Economist, at [behnoush.amery@lmic-cimt.ca](mailto:behnoush.amery@lmic-cimt.ca) or Tony Bonen, Director, Research, Data, and Analytics, at [tony.bonen@lmic-cimt.ca](mailto:tony.bonen@lmic-cimt.ca). Stay tuned for forthcoming reports on the labour market outcomes of post-secondary education graduates in Canada by subscribing to our [newsletter](#). More results will be made available as we complete our analyses.

## End Notes

1 See the [report](#) for more information on the sample selection criteria.