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# Do Youth from Lower- and Higher-income Families Benefit Equally from Postsecondary Education?

by Marc Frenette

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# Do Youth from Lower- and Higher-income Families Benefit Equally from Postsecondary Education?

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Analytical Studies Branch
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**Analytical Studies Branch
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## Acknowledgements

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# Abstract

It has been well-documented that postsecondary graduates, on average, earn considerably more than others. Consequently, increasing postsecondary enrollment among youth from lower-income families—through targeted student aid or community outreach programs—may constitute an effective mechanism for promoting upward income mobility. However, there currently exists no evidence of the benefits of a postsecondary education (PSE) for youth from lower-income families per se. Using postsecondary administrative records and income tax records, this study bridges this information gap by estimating the association between earnings and PSE by level of parental income among a cohort of Ontario postsecondary graduates and a comparison group of Ontario youth who did not enroll in a postsecondary institution. The results suggest that the estimated earnings premiums associated with PSE are large and positive for youth from families across the income distribution. In relative terms, the premium is considerably larger for youth from the bottom income quintile than for their counterparts from the top income quintile. Supplementary analyses suggest that these results are not likely due to biases arising from omitted cognitive and non-cognitive skills, or to differences in the choice of field of study between youth from different levels of parental income.

# Executive summary

One of the most consistent findings in the empirical economics of education literature is that postsecondary graduates earn more than those who have no postsecondary education (PSE). The earnings advantage is generally large and persists over entire careers. Moreover, some studies even point to a causal link between higher education and labour market success.

Consistent with this literature, raising postsecondary enrollment among youth from lower-income families has become a key policy strategy in promoting upward income mobility. Indeed, government student-aid and community outreach programs have, for the most part, increasingly targeted youth from lower-income families. These changes have coincided with consistent increases in the postsecondary enrollment rate of such youth in most Canadian provinces.

However, the literature on higher education and earnings does not distinguish between youth from different family backgrounds. On average, PSE is positively associated with earnings, but it is not clear whether this holds true for the main clients of postsecondary enrollment strategies—youth from lower-income families.

This study bridges this information gap by estimating the earnings premium associated with a college diploma or university degree for youth from different family backgrounds (as measured by the level of parental income). Specifically, it uses the linked Postsecondary Student Information System (PSIS)–T1 Family File (T1FF) to track the earnings of 2010 Ontario college diploma and university bachelor's degree graduates five years after graduation (in 2015). The parental income of these youth is captured at age 19, when they were living with their parents, according to tax data. A comparison group of similar-aged Ontario youth who did not enroll in a postsecondary institution in their late teens or early 20s is constructed from the T1FF only.

The results suggest that the estimated earnings premiums associated with PSE are large and positive for youth from families across the distribution of income. In fact, the relative premium is considerably larger for youth from the bottom income quintile than for their counterparts from the top income quintile.

Using data from the Youth in Transition Survey, Cohort A, linked to the T1FF, the study demonstrates that the main earnings results are not likely due to biases arising from omitted cognitive and non-cognitive skills. Using data from the PSIS–T1FF file, the study also demonstrates that the earnings results are not likely due to differences in the choice of field of study between youth from different levels of parental income.

# 1    Introduction

It is well-established that Canadian postsecondary education (PSE) graduates earn considerably more than Canadians who have no postsecondary education (Zhao et al. 2017). The premium generally remains—or even grows—throughout an individual's career, resulting in sizeable differences in lifetime earnings (Frenette 2019). The extent to which the premium is causal has been debated, although some evidence in both the United States and Canada supports the notion that higher educational qualifications lead to higher earnings (e.g., Heckman, Humphries and Veramendi 2016, in the United States; Lemieux and Card 2001, in Canada).

Given the strong relationship between higher education and earnings, a college or university education is often recognized as a key factor in helping youth from lower-income families achieve their full potential on the labour market. Many efforts have been made over the last two decades to increase postsecondary attendance rates among this group. Youth from disadvantaged backgrounds have generally been the main targets in recent re-designs of student aid systems and new community outreach programs.[1] Recent initiatives that have yet to be implemented on a large scale have been field-tested with youth from lower-income families as the prime beneficiaries.[2]

While these efforts were being implemented, an increase in the postsecondary attendance rates of youth from lower-income families was observed (Frenette 2017). From 2001 to 2014, postsecondary attendance rates among 19-year-olds from families in the bottom income quintile increased from 37.7% to 47.1%. Increases were also registered in the top quintile of the income distribution, but were not as great (from 72.9% to 78.7% over the same period). However, sizeable differences remain across the income distribution, and there is still considerable policy interest in facilitating access to PSE for youth from lower-income families.[3]

Although most studies suggest that PSE may benefit the average graduate, it is not known whether it benefits youth from lower-income families in particular. Due to data limitations, studies to date have combined all individuals regardless of their level of parental income. Until now, no data have allowed researchers to compare labour market outcomes by educational attainment and by parental income during childhood. With the creation of the linked Postsecondary Student Information System (PSIS)–T1 Family File (T1FF) file, this is now possible. In this study, Ontario college diploma and university bachelor's degree graduates are followed from age 19 (when they were living with at least one of their parents) until five years after graduation. A comparison group consisting of individuals of similar ages who did not enroll in a postsecondary institution was also created using T1FF data.

There are several reasons why PSE may yield different benefits for youth from different family backgrounds. First, youth from lower-income families may make different program choices. This may be due to financial constraints that prevent them from paying for higher-cost programs or to

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1. Federal student aid initiatives have included education savings incentives for lower-income families in the form of the Additional Canada Education Savings Grant and the Canada Learning Bond, as well as grants for youth from lower- and middle-income families through the Canada Student Grant. Both New Brunswick and Ontario have modified their student aid packages to provide free tuition for students from lower-income families attending postsecondary institutions (although Ontario has recently announced it will no longer offer free tuition for students from lower-income families). The Pathways to Education Program is an outreach program providing various types of support to youth living in several lower-income communities across Canada to help them overcome barriers to educational success.
2. The Life After High School program, which has been tested in British Columbia and Ontario, is designed to aid students in low-transition high schools complete their postsecondary applications. The Learning Accounts initiative provides an early promise of non-refundable student aid, and has been tested on youth from lower-income families in New Brunswick.
3. Frenette (2007) found that most of the gap in university enrollment between youth from lower- and high-income families was related to differences in academic performance and whether the parents were college or university graduates, rather than to differences in financial constraints.

having less knowledge about the purported benefits associated with those programs (particularly if their parents do not have PSE). Second, youth from lower-income families may not perform as well in university or college. Frenette (2007) showed that youth from higher-income families tended to outperform those from lower-income families on standardized reading, mathematics and science tests, and to have higher marks overall in high school. These differences may persist in college or university. Third, youth from lower-income families may be less well-equipped in their job search as a result of a lack of labour market information or guidance from their parents, especially if their parents had fewer interactions with the labour market. Conversely, youth from higher-income families may benefit to a greater extent from labour market contacts through their parents. Indeed, Corak and Piraino (2011) found that, among a cohort of young Canadian men, the intergenerational transmission of employers was non-negligible and positively correlated with paternal earnings.

Related studies in the United States have looked at the degree of earnings parity across the distribution of parental income among a sample of postsecondary graduates (Chetty et al. 2017). This approach compares outcomes by characteristics shared only by postsecondary students, such as field or institution of study. In the current study, it is possible to also include youth who did not attend a postsecondary institution, thus enabling the analysis of the returns to schooling by parental income level.

Section 2, "Methodology," describes the data and methods used in the study. This is followed by a discussion of the results (Section 3). In Section 4, the study concludes with a summary of the results as well as thoughts on future research.

# 2    Methodology

The objective of this study is to estimate the labour market premium associated with postsecondary credentials by level of parental income. This places considerable demands on the data. First, youth must be observed when they are living with their parents, and their income must be recorded. Second, youth must be tracked throughout their postsecondary studies (if they enrolled) so that their qualifications can be noted. Third, they must also be tracked in the labour market after graduation.[4] Lastly, a comparison group consisting of individuals of similar ages who did not enroll in a postsecondary institution, and for whom parental income is available, must be observed over the same time period.

The first three requirements can be met by the newly linked PSIS–T1FF file. The PSIS is an administrative census of all students who have enrolled in or graduated from any public postsecondary institution in Canada. It contains information such as the province and type of institution, the level and field of study, the graduation date, as well as basic demographic information. The T1FF is a census of all Canadian tax filers, their spouses, and their children drawn from the T1 income tax return. It contains detailed information on all sources of income, as well as some basic demographics. Reliable graduation data are available for the years 2010 to 2015 in PSIS, while tax data are available for the years 2005 to 2015 in the linked file. The files were probabilistically linked based on the social insurance number, full name, date of birth, sex, postal code and telephone number. The overall linkage rates for Ontario graduates ranged from 92% to 97% for the years 2010 to 2015, depending on the year and type of institution (college or university).

For this study, two groups of interest were created: Ontario college diploma graduates and Ontario university bachelor's degree graduates.[5] On the basis of full-time attendance, college diploma programs typically take two years to complete, while university bachelor's programs take four years. If we assume that individuals graduate from high school in the year they turn 18, then students will typically graduate from a college diploma program at age 20 or from a university bachelor's degree program at age 22. However, many factors may come into play that result in earlier or later completion (early or late high school graduation, taking a gap-year between high school and college or university, pursuing postsecondary studies on a part-time or accelerated basis, enrollment in Ontario three-year advanced college diplomas, etc.).

To take into account these situations, the sample considers individuals aged 20 to 23 on December 31 of the year in which they graduated from college or university. This age range captures the vast majority of college and university graduates who could be followed from age 19 (the year during which they are most likely to be living with at least one parent and filing a tax return).[6] Individual earnings must also be observed following graduation.[7] As a result, the study focuses on graduates from 2010 who can be followed in the labour market for up to five years after graduation. Parental income is observed at age 19 (while youth were living with at least one

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4. Alternatively, income after graduation could be observed (as opposed to earnings) to measure intergenerational income mobility. However, more than 60% of graduates still live with their parents in their early 20s.
5. Microdata for some Ontario colleges are not available for the period of study as a result of missing identifiers at the institution level. Thus, they could not be linked to the tax data and are not included in the overall linkage rates noted above. In total, 13 out of 22 Ontario colleges with registered graduates in 2010 are represented in the study: Cité Collégiale – Campus d'Ottawa, Algonquin College of Applied Arts and Technology, Centennial College of Applied Arts and Technology, Conestoga College of Applied Arts and Technology, Fanshawe College of Applied Arts and Technology, George Brown College of Applied Arts and Technology, Niagara College Canada, St. Clair College of Applied Arts and Technology, St. Lawrence College of Applied Arts and Technology – Parent Institution, Sault College of Applied Arts and Technology – Parent Institution, Seneca College of Applied Arts and Technology, Sheridan College of Applied Arts and Technology, and Canadore College of Applied Arts and Technology.
6. See Frenette (2017) for more details.
7. Labour market earnings from all sources are included (i.e., wages and salaries reported in the T4 slip [Statement of Remuneration Paid], other employment income [such as tips, gratuities, and other occasional earnings], and net self-employment income).

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parent), and individual earnings are observed five years after graduation. Furthermore, the sample is limited to individuals who did not enroll in a postsecondary institution during the five tax years following graduation. Postsecondary enrollment can be identified in the T1FF through the tuition credits and the education and textbook amounts.[8] Note that individuals are included in the analysis whether or not they reported positive earnings five years after graduation.[9]

The fourth requirement—creating an appropriate comparison group of individuals who did not enroll in a postsecondary institution—cannot be met by the PSIS–T1FF file as is. Currently, the PSIS–T1FF file includes linked records of individuals who appeared in both files, but does not include individuals who never enrolled in a postsecondary institution. Nevertheless, an appropriate comparison group can be constructed from the T1FF alone using the tuition credits and education and textbook amounts. As a result, the comparison group consists of individuals in the T1FF who were born the same year as the 2010 class of graduates in the PSIS–T1FF data; however, postsecondary graduation did not occur for the comparison group, so 2010 is simply a hypothetical graduation year. Furthermore, these individuals did not pursue PSE from the age of 18 (when they presumably graduated from high school) to five years after their hypothetical graduation. Finally, members of the comparison group were living with at least one parent in Ontario at age 19, and were living in Ontario during the year of their hypothetical graduation (specifically on December 31, the standard date used to determine the province of residence as reported in the tax data).

For example, one group of interest consists of 21-year-old college (or university) graduates in 2010. These individuals are observed at age 19 (in 2008), and at age 26 (in 2015). An appropriate comparison group for them would be individuals who were also 19 years of age in 2008, but who did not pursue postsecondary studies between 2007 and 2015 inclusive.

These measures resulted in an analytical sample of 7,146 Ontario university bachelor's degree graduates, 4,528 Ontario college diploma graduates, and 32,988 Ontario youth who did not pursue postsecondary studies.

After-tax parental income is expressed in equivalent dollars. After-tax income is preferred to total income since it better reflects the parents' disposable income. Expressing income in equivalent dollars creates a per-capita measure that also accounts for the economies of scale associated with larger families. The adjustment involves dividing income by the square root of the family size. Parental income and individual earnings are expressed in 2015 constant dollars and, at times, are expressed as quintiles. The quintiles are based on the 2015 distribution of parental income (for all families with a 19-year-old child) or individual earnings (for all individuals 25 to 28 years old—the age of the sample five years after graduation).

The analysis consists of calculating earnings premiums, which can be absolute or relative in nature. An "absolute premium" refers to the earnings difference between individuals with different levels of educational attainment (for example, those with a college diploma and those with no PSE). A relative premium" refers to the percentage difference in earnings between the two groups.

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8. See Frenette (2017) for more details.
9. Results are qualitatively similar when the sample is restricted to individuals with positive earnings.

# 3    Results

Chart 1 shows the median annual earnings five years after actual graduation (for postsecondary graduates) or hypothetical graduation (for individuals with no PSE) by education level and parental income quintile. The differences in the height of the lines represent the relationship between median earnings and education for the different parental income quintiles.

**Chart 1**
**Median annual earnings five years after actual or hypothetical graduation**

2015 constant dollars
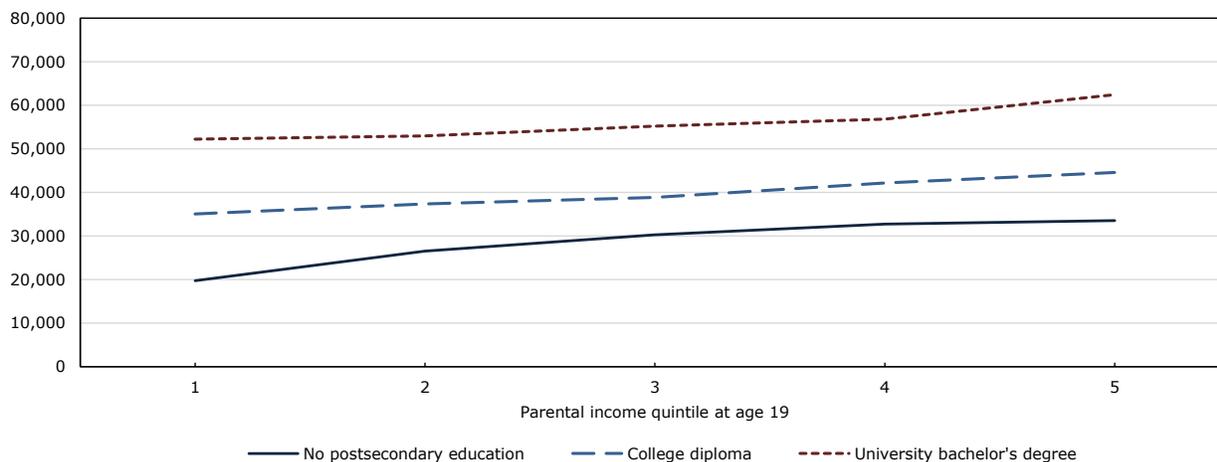


Parental income quintile at age 19

——— No postsecondary education    – – – College diploma    - - - - University bachelor's degree

**Note:** Actual or hypothetical graduation occurred in 2010.
**Sources:** Statistics Canada, Postsecondary Student Information System (PSIS)–T1 Family File (T1FF), and T1FF.

Consistent with many previous studies, the chart demonstrates that higher-educated individuals generally tend to earn more. What is new is how this relationship varies across the parental income distribution. The chart suggests that median earnings increase with more education for youth from all parental income quintiles. Median earnings are slightly more strongly associated with educational attainment among youth from lower-income families in an absolute sense. Youth from the lowest parental income quintile with a university bachelor's degree earned on average $52,238 five years after graduation, while those with no PSE earned $19,744. This difference corresponds to an absolute premium of $32,494 and a relative premium of 165%. In contrast, the gap in median earnings between the two groups is smaller ($28,922) among individuals from the top income quintile ($62,420 for those with a university bachelor's degree and $33,498 for those with no PSE). This difference corresponds to a relative premium of 86%. In other words, a university education is more strongly associated with higher earnings for youth from lower-income backgrounds in absolute and (especially) relative terms.

The same broad conclusion can be drawn about having a college education versus having no PSE. Among youth from families in the bottom income quintile, those with a college diploma earned $15,286 more than youth who did not pursue PSE (for a relative premium of 77%). Among youth from families in the top income quintile, college diploma graduates earned $11,056 (or 33%) more than those with no PSE.

How do these results vary by sex? Charts 2 (men) and 3 (women) address this question. In relative terms, both men and women from lower-income families benefit more from a college diploma or a university bachelor's degree—versus those with no PSE—than their counterparts from the top of the income distribution. However, the benefits of both credentials (versus those with no PSE) are about the same for women from the bottom and top quintiles of the income

distribution in absolute terms. For men, both credentials are associated with a larger absolute benefit among those from the bottom quintile of the income distribution.

**Chart 2**
**Median annual earnings five years after actual or hypothetical graduation, men**

2015 constant dollars
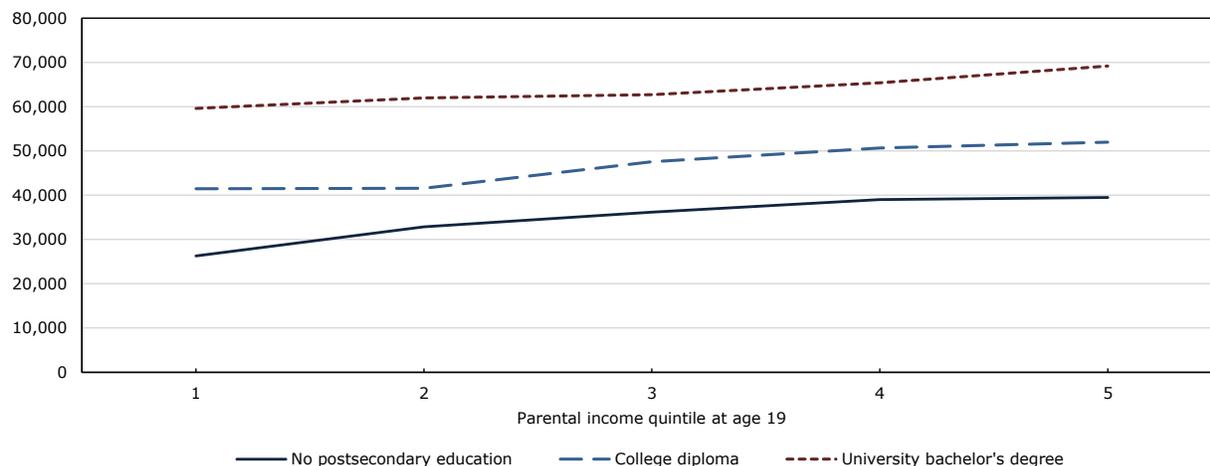


**Note:** Actual or hypothetical graduation occurred in 2010.
**Sources:** Statistics Canada, Postsecondary Student Information System (PSIS)–T1 Family File (T1FF), and T1FF.

**Chart 3**
**Median annual earnings five years after actual or hypothetical graduation, women**

2015 constant dollars
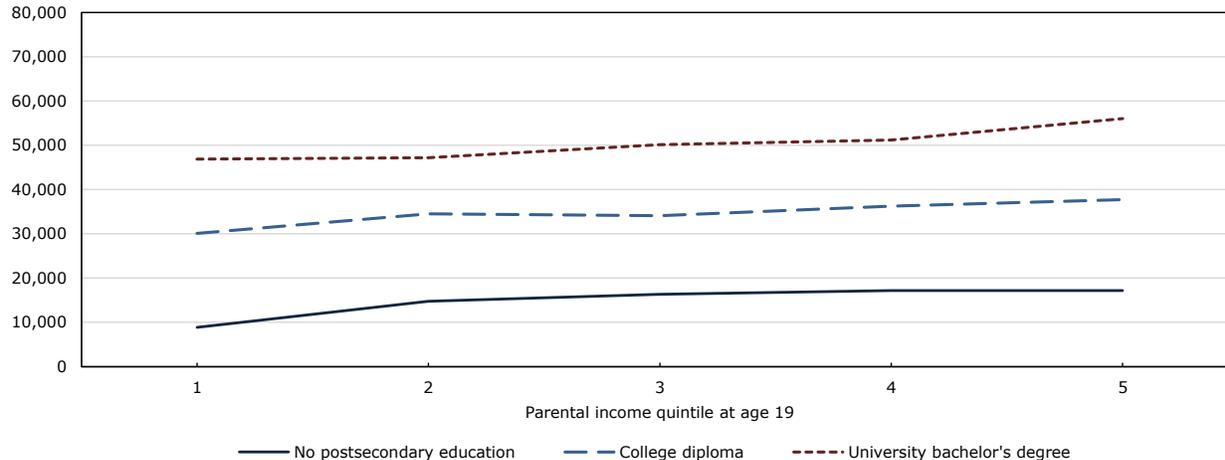


**Note:** Actual or hypothetical graduation occured in 2010.
**Sources:** Statistics Canada, Postsecondary Student Information System (PSIS)–T1 Family File (T1FF), and T1FF.

Charts 4 and 5 are similar to Chart 1, except that they show the percentage of youth in the top quintile (Chart 4) or the top two quintiles (Chart 5) of the earnings distribution among individuals of the same age. The absolute and relative benefits associated with a university bachelor's degree are larger for youth from the bottom of the income distribution than for youth from the top of the distribution; this is especially true for the relative benefits. Having a college diploma is associated with only a slightly higher probability of being in the top earnings quintile than not having postsecondary studies. This can be observed in all quintiles of parental income.

**Chart 4**
**Percent in top earnings quintile five years after actual or hypothetical graduation**
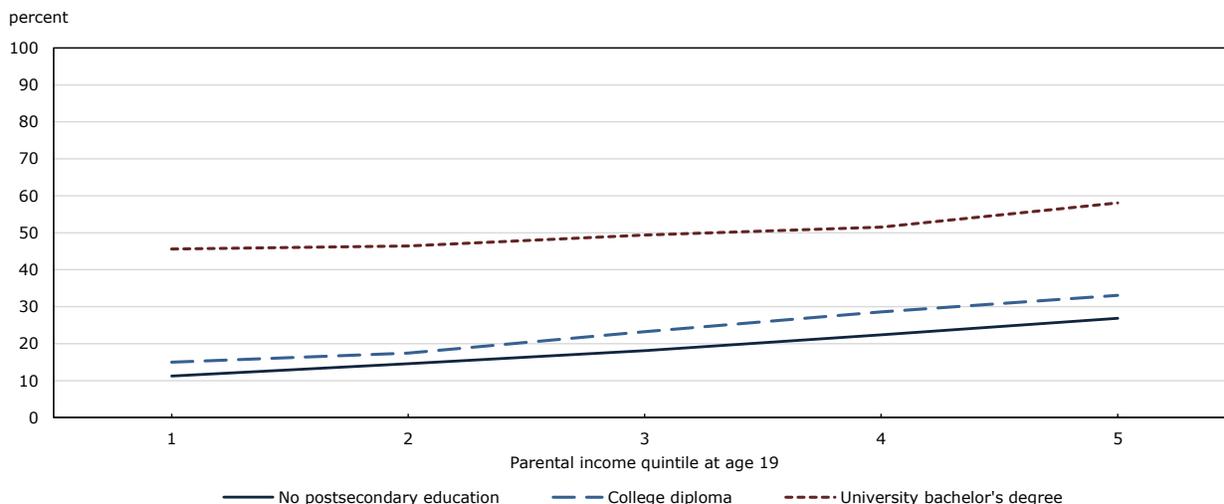
percent



Parental income quintile at age 19

——— No postsecondary education  — — College diploma  ----- University bachelor's degree

**Note:** Actual or hypothetical graduation occurred in 2010.
**Sources:** Statistics Canada, Postsecondary Student Information System (PSIS)–T1 Family File (T1FF) and T1FF.

Chart 5 provides the proportion of youth in the top two quintiles of the earnings distribution. Here, both college and university studies are associated with a higher probability of being in the top 40% of the earnings distribution than not doing postsecondary studies. Moreover, the relative and absolute premiums are higher for youth from the bottom of the income distribution than for youth from the top of the distribution (especially with regard to university studies).

**Chart 5**
**Percent in top two earnings quintiles five years after actual or hypothetical graduation**
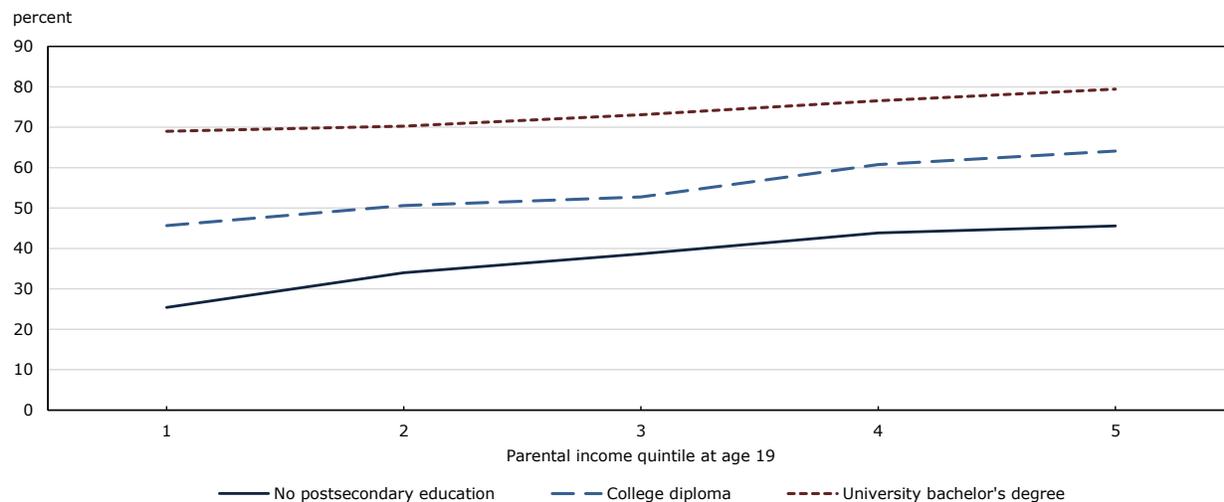
percent



Parental income quintile at age 19

——— No postsecondary education  — — College diploma  ----- University bachelor's degree

**Note:** Actual or hypothetical graduation occurred in 2010.
**Sources:** Statistics Canada, Postsecondary Student Information System (PSIS)–T1 Family File (T1FF), and T1FF.

The results presented so far are highly descriptive. As such, they do not take into account differences in other important determinants of earnings that are observed in the data, such as age and sex. To address this, both of these factors are included in quantile (median) regressions.

Table 1 presents the results of the median regressions of the natural logarithm of earnings by level of study and other covariates separately for each of the five parental income quintiles.[10,11] Beginning with the overall results (both sexes combined), the findings confirm the results in Chart 1: a higher level of education is more strongly associated with higher earnings among individuals from lower-income families. A university bachelor's degree is associated with an additional 235.7% in median earnings per year for youth from families in the bottom income quintile. In contrast, the relative premium for youth from families in the top income quintile is only 54.0%. A college education is also much more strongly associated with higher earnings among youth from families in the bottom quintile (140.3%) than in the top (16.3%) quintile.[12]

**Table 1**
**Median regression of earnings by level of study and other covariates**

| | College diploma | | | University bachelor's degree | | |
|---|---|---|---|---|---|---|
| | coefficient | standard error | percent effect | coefficient | standard error | percent effect |
| **Men and women combined** | | | | | | |
| Bottom income quintile | 0.877 | 0.047 | 140.3 | 1.211 | 0.046 | 235.7 |
| Second income quintile | 0.564 | 0.031 | 75.8 | 0.861 | 0.031 | 136.5 |
| Third income quintile | 0.432 | 0.034 | 54.0 | 0.706 | 0.031 | 102.7 |
| Fourth income quintile | 0.312 | 0.037 | 36.7 | 0.567 | 0.029 | 76.3 |
| Top income quintile | 0.151 | 0.055 | 16.3 | 0.432 | 0.036 | 54.0 |
| **Men** | | | | | | |
| Bottom income quintile | 0.634 | 0.052 | 88.6 | 0.904 | 0.051 | 147.0 |
| Second income quintile | 0.377 | 0.040 | 45.8 | 0.632 | 0.040 | 88.2 |
| Third income quintile | 0.243 | 0.039 | 27.6 | 0.471 | 0.037 | 60.1 |
| Fourth income quintile | 0.189 | 0.044 | 20.8 | 0.373 | 0.036 | 45.2 |
| Top income quintile | 0.062 | 0.067 | 6.4 | 0.256 | 0.042 | 29.1 |
| **Women** | | | | | | |
| Bottom income quintile | 1.427 | 0.112 | 316.4 | 1.805 | 0.108 | 508.1 |
| Second income quintile | 0.844 | 0.065 | 132.6 | 1.214 | 0.063 | 236.6 |
| Third income quintile | 0.790 | 0.074 | 120.4 | 1.147 | 0.067 | 214.8 |
| Fourth income quintile | 0.633 | 0.090 | 88.2 | 0.965 | 0.071 | 162.6 |
| Top income quintile | 0.500 | 0.119 | 64.8 | 0.894 | 0.086 | 144.6 |

**Notes:** The dependent variable is the natural logarithm of annual earnings from all sources five years after graduation (in 2015). All models also include fixed effects for age at graduation; the pooled model with men and women combined also includes fixed effects for sex.
**Source:** Statistics Canada, Postsecondary Student Information System (PSIS)–T1 Family File (T1FF), and T1FF.

How do these results vary by sex? As shown in previous studies (e.g., Dougherty 2005), the relative PSE premium is higher for women than for men (Table 1). For both men and women, the relative premiums associated with a college diploma and a university bachelor's degree are higher for youth from lower-income families than for youth from higher-income families.

Two factors that were not taken into account in the analysis are the skills of individuals in the different groups examined (which are not available in the data), as well as the choice of field of study of the groups of PSE graduates (which do not apply to youth who do not have PSE). The appendix explores in some detail the role that these two factors may have played, and concludes that the results in the study are not likely due to biases arising from omitted cognitive and non-cognitive skills, or to differences in the choice of field of study between youth from different parental income backgrounds.

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10. Individuals with non-positive earnings were assigned $1 in order to estimate the log models. Coefficients were converted to percent effects using the following formula: $\text{percent effect} = (e^{\text{coefficient}} - 1) * 100$ .

11. Since the results that follow are based on log models, they necessarily refer to relative premiums. Models based on the level of earnings were also estimated, and the resulting absolute premiums supported the descriptive findings in Charts 1, 2 and 3.

12. The differences in coefficients associated with these percent effects between youth from the top and bottom income quintiles are statistically significant at less than 0.1%.

# 4    Conclusion

Federal and provincial student aid systems in Canada are largely designed to make postsecondary education (PSE) more affordable for students in need. Such assistance may help youth from lower-income families succeed in the labour market, as studies consistently associate PSE with higher earnings. However, until now, it was not known whether PSE benefitted youth from lower-income families. After linking postsecondary administrative data with tax data, it is now possible to estimate the PSE premium by level of parental income.

This study finds that the estimated earnings premiums associated with PSE is large and positive for youth from families across the income distribution. Relative premiums are considerably larger for youth from the bottom income quintile than for their counterparts from the top income quintile. These results are not likely due to biases arising from omitted cognitive and non-cognitive skills, or to differences in the choice of field of study between youth from different levels of parental income.

Future research could focus more on family income mobility once most graduates have left the parental home. This would require waiting until the individuals in the current study are much older. In the shorter term, the data could also be used to conduct an analysis similar to that of Chetty et al. (2017), who looked at the extent to which youth from lower-income families attended specific colleges in the United States.

# Appendix

One factor that may bias the results in this study is the omission of skills in the analysis. For example, if there exists a larger gap in abilities between individuals who completed PSE and those who did not attend a postsecondary institution among youth from lower-income families than among youth from higher-income families, then the true returns to PSE may actually be smaller among youth from lower-income families. This is important since studies have demonstrated the importance of both cognitive and non-cognitive skills in determining earnings (e.g., Heckman, Stixrud, and Urzua 2006).

To address this issue, the Youth in Transition Survey, Cohort A (YITS-A) and T1FF linked file was used to compare the mean cognitive and non-cognitive skills of youth who, according to the T1FF, attended a postsecondary institution by age 23 with those of youth who did not attend such an institution during the same timeframe.[13] The results indicate that the absolute gaps in cognitive and non-cognitive skills between the PSE group and the non-PSE group were about the same, regardless of parental income. This was true for all cognitive and non-cognitive skills examined, including the Programme for International Student Assessment (PISA) reading test scores, overall high school marks, and composite scores for self-esteem, self-efficacy, academic participation, social engagement, and high school identification. The gaps were also more or less constant in relative terms when measures were expressed in raw (or unstandardized) form, such as in the case of reading. Some measures (such as social engagement) were already standardized to a mean of 0 on the original data file; as a result, assigning a relative value to the gaps would be inappropriate in these cases.

To illustrate, Chart A.1 shows the results for the PISA reading scores, while Chart A.2 shows the results for the social engagement score. In both cases, the absolute gap in scores across education categories (those who have PSE and those who do not) is more or less constant across family income quintiles. Moreover, the relative gap is also more or less constant in the case of the reading score (nothing can be said about the relative gap in the case of the social engagement score). These findings suggest that the results of the PSIS–T1FF and the T1FF analysis are not likely biased from missing information on skills.[14]

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13. YITS-A participants were born in 1984 and first interviewed in 2000. They were interviewed again every two years thereafter, that is, up to five more times.
14. The earnings analysis could not be conducted with the YITS-A–T1FF linked file since there is no flag for graduation and no distinction between college and university in the tax data (the source for PSE in these files). Although the YITS-A contains more detailed education information than the T1FF, approximately two-thirds of respondents were no longer responding to interviews by age 25. In addition, the YITS contains only a total (pre-tax) measure of parental income.

**Chart A.1**
**Mean reading score of individuals with or without postsecondary education by age 23, by parental income at age 15**

mean reading score
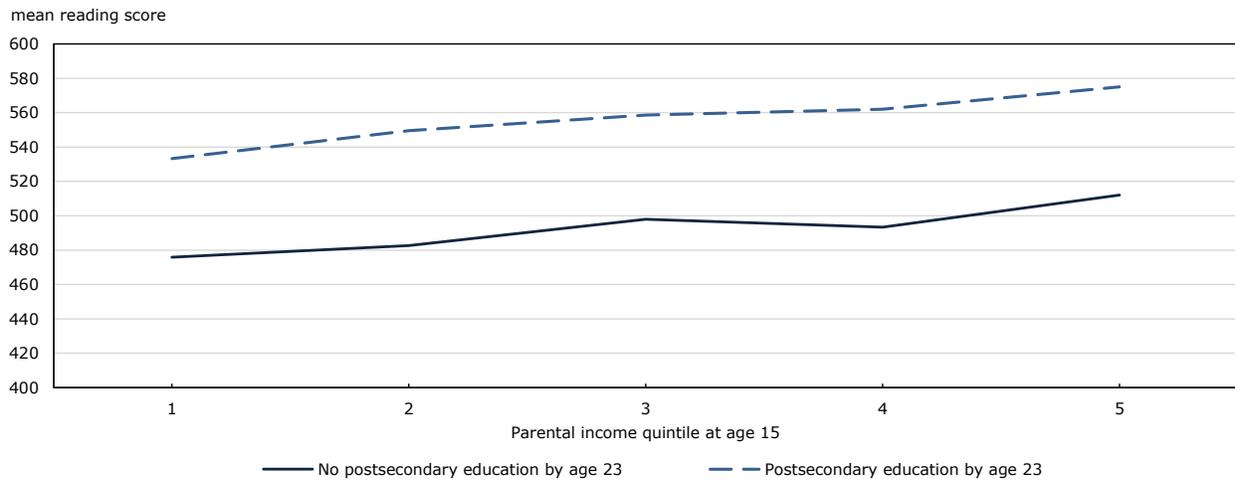


**Note:** Postsecondary education is observed up to 2008.
**Source:** Statistics Canada, Youth in Transition Survey, Cohort A (YITS-A)–T1 Family File (T1FF).

**Chart A.2**
**Mean social engagement score of individuals with or without postsecondary education by age 23, by parental income at age 15**

mean social engagement score
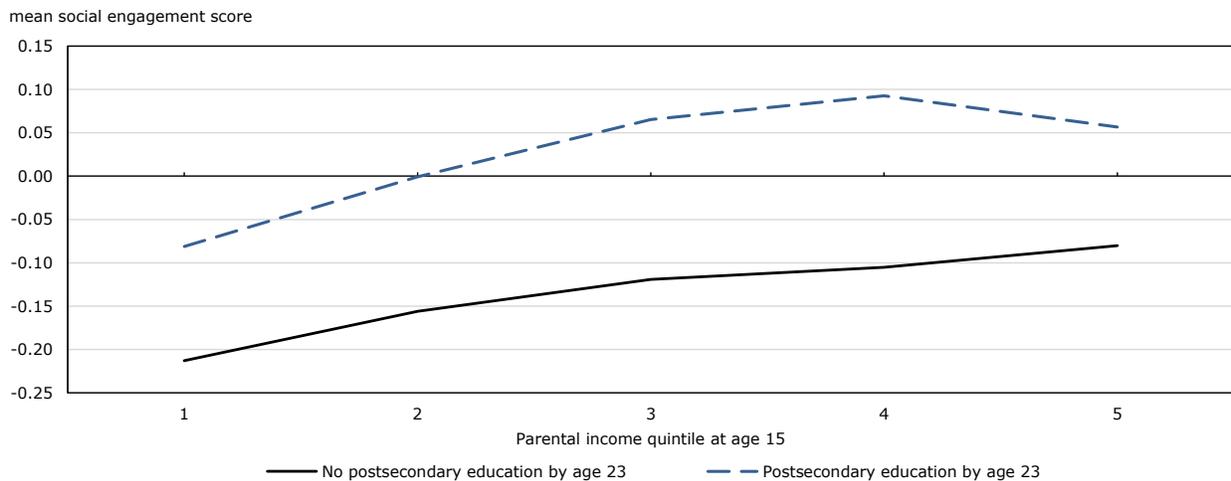


**Note:** Postsecondary education is observed up to 2008.
**Source:** Statistics Canada, Youth in Transition Survey, Cohort A (YITS-A)–T1 Family File (T1FF).

Another factor that could potentially affect the results are differences in the choice of field of study made by PSE graduates from across the parental income distribution. For example, if PSE graduates from lower-income families tend to choose fields associated with lower pay than the fields typically chosen by PSE graduates from higher-income families, then the true returns to PSE may be even greater among youth from lower-income families.

However, Table A.1 shows that the distribution of fields of study by parental income quintile is about the same for college diploma and university bachelor's degree graduates in the sample, although there are some exceptions (e.g., the probability of selecting architecture, engineering, and related technologies increases with parental income at the college level).

Do these small differences matter in the labour market? To test this, log earnings models were estimated separately for college and university graduates. In each case, the models were estimated with and without field-of-study covariates. The results suggest that the differences in earnings across parental income quintiles remained more or less constant with the addition of the field-of-study covariates. This means that the choice of field of study did not preferentially benefit youth from any particular part of the income distribution.

**Table A.1**

**Percent distribution of graduates at age 23 across fields of study, by level of study and parental income quintile at age 15**

| | College diploma | | | | | University bachelor's degree | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Bottom quintile | Second quintile | Third quintile | Fourth quintile | Top quintile | Bottom quintile | Second quintile | Third quintile | Fourth quintile | Top quintile |
| | percent | | | | | | | | | |
| Personal improvement | 0.1 | 0.4 | 0.4 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Education | 0.6 | 0.9 | 1.1 | 0.3 | 0.5 | 1.4 | 2.7 | 3.1 | 2.9 | 1.7 |
| Visual and performing arts, and communications technologies | 9.1 | 7.9 | 8.2 | 9.4 | 10.0 | 4.3 | 5.1 | 4.8 | 6.1 | 6.1 |
| Humanities | 0.5 | 0.6 | 0.6 | 0.9 | 1.0 | 6.1 | 8.1 | 8.2 | 9.6 | 8.1 |
| Social and behavioural sciences and law | 13.4 | 15.0 | 13.5 | 11.7 | 12.1 | 24.3 | 24.7 | 24.7 | 22.8 | 22.9 |
| Business, management and public administration | 27.7 | 27.4 | 23.3 | 24.4 | 25.5 | 27.9 | 22.1 | 22.0 | 23.5 | 28.7 |
| Physical and life sciences and technologies | 0.5 | 0.8 | 0.2 | 0.6 | 0.2 | 5.7 | 6.8 | 5.7 | 4.9 | 5.2 |
| Mathematics, computer and information sciences | 1.9 | 2.8 | 2.0 | 2.4 | 3.4 | 3.8 | 2.7 | 3.6 | 2.9 | 2.9 |
| Architecture, engineering, and related technologies | 15.5 | 16.2 | 20.8 | 23.3 | 22.3 | 13.6 | 12.3 | 11.3 | 13.3 | 13.5 |
| Agriculture, natural resources and conservation | 1.0 | 0.9 | 1.8 | 0.7 | 2.0 | 1.1 | 0.8 | 0.7 | 0.8 | 1.1 |
| Health and related fields | 12.5 | 12.5 | 13.3 | 12.9 | 9.3 | 10.4 | 13.3 | 14.4 | 12.1 | 8.8 |
| Personal, protective and transportation services | 17.3 | 14.5 | 14.9 | 13.5 | 13.5 | 0.8 | 0.9 | 0.5 | 0.6 | 0.3 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.7 | 1.2 | 0.6 | 0.6 |

**Note:** The percentages by parental income quintile may not add up to 100.0% because of rounding. Postsecondary graduation is observed up to 2008.

**Source:** Statistics Canada, Youth in Transition Survey, Cohort A (YITS-A)–T1 Family File (T1FF).

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