

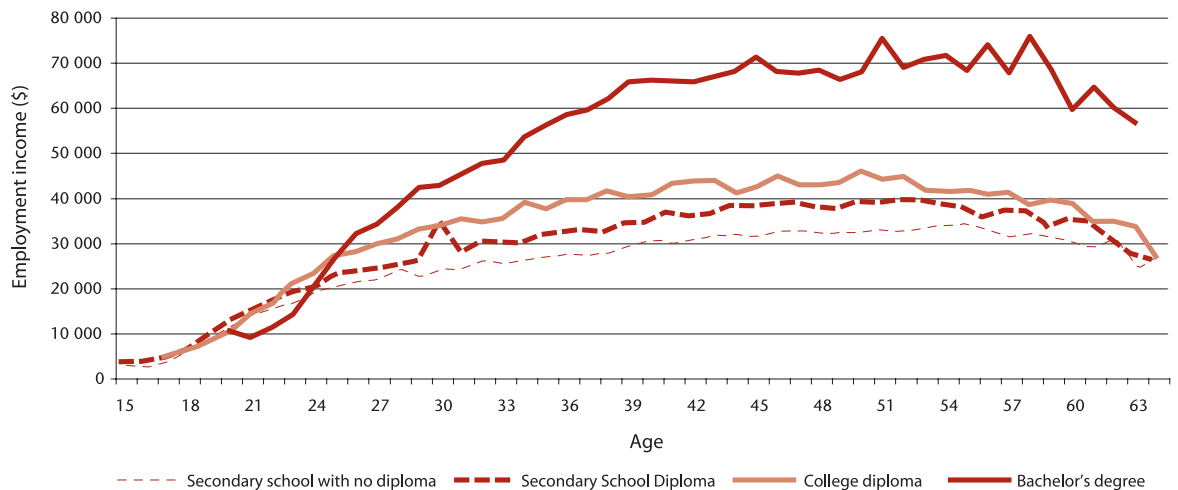
The Return on a Bachelor's Degree

Introduction

Comparisons of the incomes of two individuals with different levels of education generally show that the more educated person has the higher income (see Graph 1). The additional income earned by the more educated person benefits not only that individual but society as a whole, since the different levels of government collect a significant portion of this person's extra income through taxation.

The principal aim of this bulletin is to present data on public and private rates of return associated with obtaining a bachelor's degree. Calculating the rates of return makes it possible to establish a monetary cost-benefit relationship for the additional education received by university graduates. Information will also be provided on other types of benefits generated by an increase in the population's level of schooling.

Graph 1 Age-income profile for men, according to the highest level of schooling attained in 2001



Source: Statistics Canada, 2001 Census.

Methodology

This section outlines the main steps involved in calculating the public and private rates of return.

The Benefits

A better picture of the increase in income that additional schooling provides can be obtained by calculating the total employment income earned by a hypothetical person who, during his or her working life (age 17 to 64), had an income stream identical to that observed in the 2001 Census data, by level of schooling and sex. For the purposes of this exercise, the total employment income earned by a bachelor's degree holder during his or her working life is calculated by adding the average annual incomes using the Census data (for bachelor's degree holders 17 to 64 years old).

Table 1 Total employment income, by level of schooling and sex (\$)

Highest level of schooling	Men	Women	Together
Grade 9 to 11 with no Secondary School Diploma (SSD)	1 286 465	760 059	1 078 755
Secondary level education with a diploma (SSD)	1 446 134	912 133	1 186 700
College education with a diploma (DCS)	1 629 339	1 057 345	1 363 777
University education with a bachelor's degree	2 549 140	1 610 095	2 158 272

A strong positive relationship exists between the total calculated income and the level of schooling. However, a bachelor's degree generates the greatest increase in calculated income. Thus, the total calculated income for a man with a bachelor's degree is \$2.5 million, which is \$1.1 million more than for a man with only a Secondary School Diploma. In the case of a woman, the income increase is approximately \$700 000.

The additional income considered here is gross income (before taxes). As mentioned in the introduction, the tax system requires that the state collect a significant portion of the additional income earned by the more educated person. Only net additional income (after taxes) is considered for the purposes of calculating the private rate of return. For the purposes of calculating the public rate of return, the additional tax revenues are considered to be public income.

Naturally, the basic income data used to calculate the rates of return must be adjusted for certain factors.

The basic income data that will be used to determine the return on a bachelor's degree is taken from the 2001 Census and refers to income in the year 2000. The target population considered for the purposes of calculating the rate of return is between 17 and 85 years of age. Data on employment income was used for people between the ages of 17 and 64, whereas data on total income was used for people between the ages of 65 and 85. For the latter, the concept of employment income is no longer relevant, since most have retired from the job market.

Otherwise, the basic data used to estimate the income stream must be readjusted to account for the expected increase in employment income. Because the Census data are “static” data (like a snapshot taken at a specific point in time), they have to be adjusted to allow for future growth in the real productivity of the economy. The calculation of the rate of return on education presumes a growth rate of 1% per year in real employment income¹.

The estimate of the total income and other taxes paid by a given person is based on an estimate of the average tax rates associated with the different levels of income. These tax rates take account of income tax, taxes on social security, property tax, corporate tax as well as various taxes on goods and services².

The following table shows the total income and other taxes that a hypothetical person (either male or female, with a given level of schooling) would have paid during his or her working life (from 15 to 64 years of age) if his or her employment income stream had been identical to that calculated using the 2001 Census data. The figures in parentheses indicate the average tax rates.

Table 2 Total income and other taxes paid by a hypothetical person, by level of schooling and sex (\$)

Highest level of schooling	Men	Women	Together
Grade 9 to 11 with no Secondary School Diploma (SSD)	425 930 (33)	178 442 (23)	327 533 (30)
Secondary level education with a diploma (SSD)	505 482 (35)	226 158 (25)	380 293 (32)
College education with a diploma (DCS)	648 793 (40)	317 499 (30)	468 570 (34)
University education with a bachelor’s degree	1 277 290 (50)	665 581 (41)	1 049 109 (49)

It appears that the different levels of government collect a significant portion of employment income and that this portion increases with the education level of the individual being considered. A man with a bachelor’s degree pays a total of \$1.3 million in income and other taxes, which is over \$770 000 more than the total calculated for a secondary-school graduate (the corresponding difference for women is about \$440 000).

Once the age-income profiles are defined for the given individuals with different levels of schooling, the amount of additional net income earned by the more educated individuals can be determined and must then be compared with the private costs of education. For the purposes of calculating the public rate of return, the additional tax revenues must be compared with the public cost of education.

For the purposes of calculating the rates of return, two types of individuals were considered: those with a Secondary School Diploma and those with a bachelor’s degree.

1 Income increases stemming from inflation can be expected, but these will not be taken into account. The Census data make it possible to estimate the value of the differences in real income if it is assumed that future inflation will not affect the gap in real income between individuals with the levels of schooling under consideration. In actual fact, inflation will have an effect in this regard. All things being equal, it would widen the differences in real income to the extent that more educated individuals have more protection against inflation.

2 Source: The Fraser Institute. Special Compilation for Québec (estimates for 2003).

The Public Cost of Education

Here, the aim is to determine what it costs the different levels of government when a person with a given level of schooling works to attain a higher level of education. Only public education expenditures are considered in this case. The share of expenditures financed by tuition fees or any other source of private funding is not taken into account.

The concept of expenditure used here refers to overall expenditures allocated to university education³, and includes the operating and capital expenditures of universities, student assistance and the management expenses of the Ministère de l'Éducation (the portion attributable to university education). This concept is consistent with the one defined by Statistics Canada. These expenditures must, however, include the loss in tax revenues suffered by the various levels of government.

The loss in government tax revenues results from the foregone tax revenues and the public cost of the various tax exemptions granted to students or their parents⁴.

As regards the foregone tax revenues, consider that when a person with a given level of schooling decides to pursue his or her studies rather than seek gainful employment, that person accepts a decrease in potential earning capacity in the hope that increased earning power in the future will more than compensate for this loss. The government must also contend with a loss in tax revenues for the duration of the person's studies because he or she is foregoing income over that period. Like government education grants, these foregone tax revenues must be accounted for since they too represent a public cost linked to higher education.

These foregone tax revenues are estimated by calculating the difference between the income and other taxes that a given person would have paid had he or she decided not to pursue his or her studies, and the income and other taxes paid by that person as a student.

To begin with, determining the total public share of what it costs for a Secondary School Diploma holders to obtain their bachelor's degree involved estimating the per-student expenditure for the cost elements considered and for each year of education (pre-university college education and university education). An adjustment factor is applied to take account of the fact that the actual amount of time required to complete a course of study may be longer than the time set out in the program calendar⁵.

To educate an Secondary School Diploma holder until he or she earns a bachelor's degree, it costs the different levels of government a total of approximately \$79 000 per male and approximately \$71 000 per female. This cost is higher for a man because of the greater loss in tax revenues, but also because the actual amount of time required to complete a course of study is slightly longer for a man than for a woman.

3 Subsidized research is excluded.

4 This estimate of the cost of the various tax exemptions as well as the additional cost for a student (an element of the private cost) is based on the work of Professor Clément Lemelin (Université du Québec à Montréal). He is the author of the book *L'économiste et l'éducation*, Presses de l'Université du Québec, 1998.

5 The actual amount of time required to complete a course of study is longer than the theoretical duration for several reasons such as the resumption of courses following academic failures or change in academic programs during the course of study.

The Private Cost of Education

The expenses incurred by students (or their parents or sponsors) include tuition and other fees required by educational institutions, additional school-related costs and loss of earnings. However, the value of grants as well as tax exemptions obtained by students (or their parents or sponsors) must be subtracted from this amount.

Tuition and other fees paid to the institutions include the sums paid by students for educational services, admission and registration fees, contributions made for various services offered by the institution and other related fees.

During their studies, students will also face additional school-related costs. These consist of additional costs relative to what individuals would have to spend if they were working. School supplies are an example of these expenses.

However, the greatest expense that students incur in obtaining additional education is the loss of earnings. When individuals who are able to work decide to pursue their studies, they must accept a reduction in their present income in the hope that increased earning power in the future will more than compensate for their current loss. The estimated loss of earnings is based on the difference between the net income of workers with a Secondary School Diploma and the net income of students of the same age. The employment income earned by students is derived from summer jobs or part-time jobs during the school year.

What must be taken into account, however, is the fact that the government provides students (or their parents or sponsors) with direct financial assistance, which helps reduce the private cost of education. The financial assistance considered here consists of student grants and tax exemptions. The amount of government financial assistance must, therefore, be subtracted from the total estimated private cost.

To begin with, determining the total private cost of education involved estimating the per-student expenditure for the cost elements considered and for each year of education (pre-university college education and university education). An adjustment factor is applied to take into account the fact that the actual amount of time required to complete a course of study may be longer than the time set out in the program calendar⁶.

The private cost of educating an Secondary School Diploma holder until he or she earns a bachelor's degree is estimated to be approximately \$50 000 per male and \$37 000 per female. This cost is higher for a man because of the greater loss in income, but also because the actual amount of time required to complete a course of study is slightly longer for a man than for a woman.

The Rate of Return

The principal aim of calculating the costs and benefits involved in educating an Secondary School Diploma holder until he or she earns a bachelor's degree is to establish a cost-benefit ratio that will serve as an indicator of the return on investments made in education. An uninformed reader might be tempted to make a direct comparison between the benefits calculated earlier and the costs of education. However, the benefits and the costs are spread out over a number of years, and this must be taken into account in determining the return on an investment. Thus, today's return on an investment does not have the same value as the return that will be earned in 10 years. The more time it takes for an investment to yield a return, the less it is valued in the present.

⁶ See the explanation in the previous footnote.

One way to compare the costs and benefits is to determine the rate of internal return that makes the current value of the stream of additional income equal to the current cost of education (the net current value is equal to zero). This gives us the rate of return associated with obtaining a bachelor's degree. Due to the calculation methods used in this study, the rate of return associated with a bachelor's degree is equivalent to a real interest rate obtained on an investment (nominal interest rate – inflation rate).

Results

The following table presents the results obtained after calculating the public and private rates of return for a given person with a Secondary School Diploma who pursues and obtains a bachelor's degree.

Table 3 Private rate of return and public rate of return in 2000 (%)

	Men	Women	Together
Private rate of return	10.1	12.5	10.5
Public rate of return	11.5	10.7	10.9

The private rate of return was therefore 10.5% (10.1% for men and 12.5% for women). The higher private rate of return for women can be explained primarily by the fact that their education costs less, but also by the fact that for a certain number of years, at the beginning of a career, the salary advantage of university graduates over a Secondary School Diploma holders is greater for women than for men⁷.

The public rate of return (10.9%) was slightly higher than the private rate of return (10.5%), and it was higher for men (11.5%) than for women (10.7%). Although the public cost of education was lower for women than for men⁸, the additional fiscal benefits obtained from male bachelor's degree holders more than compensate for the differences in cost⁹.

The bachelor's degree is therefore profitable for both the state and those who acquire additional education.

The Rate of Return Over Time

In earlier studies, we estimated the public and private rates of return for previous years¹⁰. However, due to changes in our method of calculating the rates of return, we are not including an historical series on the changing rates of return. Readers who are interested in the subject can consult a study conducted under the auspices of Human Resources Development Canada¹¹. According to this study, the trend rates of return increased by approximately 1 percentage point between 1981 and 1996. Furthermore, when this reference period is divided into sub-periods, the authors observed that the rates of return fluctuated according to the level of economic activity. Thus, it appears that the rate of return on a university diploma increased during periods of economic slowdown¹².

7 Remember that for the purposes of calculating the rates of return, for each age group the income of bachelor's degree holders is compared with that of secondary school graduates. Overall, the difference in income is higher for men than for women, but at the beginning of their careers, this difference is greater among women. For the purposes of calculating the rates of return, the closer the differences in income are in time, the more significant their contribution.

8 The difference between public education costs is nonetheless lower than the difference between private education costs.

9 The fact that tax rates increase with income level (progressive rates) partly explains the higher public rate of return in the case of men.

10 Among others, see the *Education Statistics Bulletins* published by the Direction de la recherche, des statistiques et des indicateurs of the Ministère de l'Éducation, du Loisir et du Sport (MELS): Marius Demers, *The Return on Investment in Education*, No. 8, February 1999 and Marius Demers, *Education Pays!*, No. 16, June 2000. These documents are available on the MELS Web site at <<http://www.mels.gouv.qc.ca/>>.

11 John Appleby, Maxime Fougère, Manon Rouleau, *Is Post-Secondary Education in Canada a Cost-Effective Proposition?*, June 2002. This document is available on-line at: <<http://www.hrdc-drhc.gc.ca/sp-ps/arb-dgra/publications/research/2002docs/W-01-9/W-01-9E.pdf>>.

12 In periods of economic slowdown, the income and employment status of workers with less schooling is more affected than that of more educated workers.

The Rate of Return by Field of Study

The rates of return considered until now are average rates for all the programs offered in Québec universities. A study conducted under the auspices of Human Resources Development Canada showed that the private rate of return can vary a great deal depending on the field of study¹³. Thus, for men with a bachelor's degree, fields of study such as agriculture, sociology, psychology and history result in median rates of return of 5% to 6%. Fields such as geology, chemistry, and business and commerce have median rates of return of 9% to 10%. Engineering and law programs have median rates of return of 13% to 15%. Finally, dentistry and medicine have median rates of return of more than 20%.

This study also showed significant differences in the individual rates of return on post-secondary education. The authors of the study obtained negative rates of return for one-fifth of bachelor's degree holders and rates of more than 30% for another fifth. Rates of return for the remaining three-fifths ranged from 0% to 30%.

However, negative rates of return do not mean that the individual made a poor choice by deciding to attend university. Rate of return calculations do not take into account non-pecuniary benefits; clearly, increased income is only one of many other advantages that graduates obtain from higher education.

Other Benefits of Education

In previous studies of the return on investment in education, we showed that there are other public and private benefits to additional education besides increased income. From the viewpoint of society, educated people are less burdensome in terms of the use of certain public services (welfare or costs related to crime)¹⁴. We also showed that there is a positive relationship between the health status and level of schooling of those considered.

University graduates also enjoy other benefits, specifically with respect to health, lifestyle and the quality of their employment status. One of the major benefits noted was the ability of people with higher education to obtain relatively more stable employment, which makes them less susceptible to unemployment.

Unemployment Rates and Levels of Schooling

There is a strong relationship between unemployment rates and education. The more educated the person, the less likely that person is to be unemployed. Table 4 shows average unemployment rates in 2001 for people in Québec, according to sex and the highest level of schooling attained. The data are taken from the 2001 Census.

Unemployment rates are particularly high among those who failed to complete secondary school. The unemployment rate is considerably lower (7.9% in 2001) among those who graduated with a Secondary School Diploma.

13 Daniel Boothby and Geoff Rowe, *Rate of Return to Education: A Distributional Analysis Using the Life Paths Model*, June 2002. This document is available on-line at: <<http://www.hrdc-drhc.gc.ca/sp-ps/arb-dgra/publications/research/2002docs/w-02-8/W-02-8E.pdf>>.

14 See the *Education Statistics Bulletin* published by the Direction de la recherche, des statistiques et des indicateurs of the Ministère de l'Éducation, du Loisir et du Sport: Marius Demers, *The Return on Investment in Education*, No. 8, February 1999. This document is available on-line at: <http://www.mels.gouv.qc.ca/stat/Bulletin/bulletin_8.pdf>.

Of course, the lowest unemployment rates are observed among those with post-secondary education. The unemployment rate is 6.6% among college graduates, 4.6% among holders of bachelor's degrees and 4.8% among those with graduate degrees.

Note that for the levels of schooling considered, unemployment rates among men are slightly higher than those among women. Overall, the unemployment rate among men (8.7%) is one percentage point higher than the unemployment rate among women (7.7%). However, a lower unemployment rate among women does not mean that their employment status is better than that of men. More women than men face precarious job situations, and they are underrepresented in certain occupations.

Table 4 Unemployment rate according to highest level of schooling attained in 2001 (%)

Highest level of schooling	Men	Women	Together
Less than Grade 9	15.9	15.0	15.6
Grade 9-11 with no Secondary School Diploma (SSD)	12.4	13.5	12.8
Grade 9-11 with SSD	8.3	7.5	7.9
Trade school education with diploma	8.3	6.6	7.7
College education with diploma (DCS)	7.0	6.1	6.6
University education with bachelor's degree	4.7	4.4	4.6
University education with graduate degree	4.8	4.8	4.8
Average	8.7	7.7	8.2

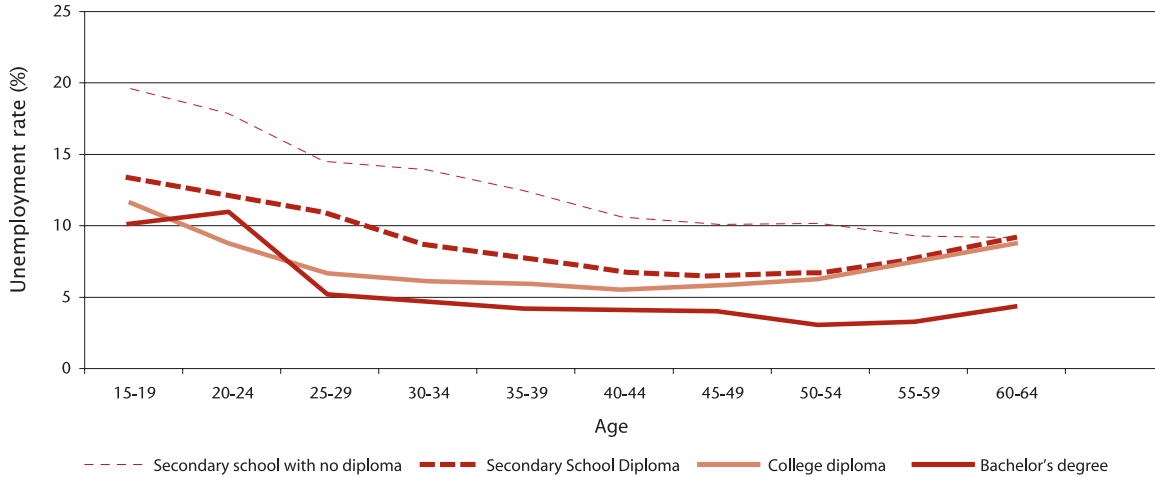
These unemployment rates cover the total labour force between 15 and 64 years of age. However, as expected, unemployment rates vary considerably when data from different age groups are compared. Graph 2 illustrates the relationship between average unemployment rates per age group and highest level of schooling.

This graph shows that the relationship between unemployment rates and level of schooling is consistent in every age group and overall: the higher a person's level of schooling, the less likely he or she is to be unemployed.

Note also that the more educated people are, the more likely they are to find it easy to break into the job market and to hold jobs that are both more interesting and more stable. University graduates also have the advantage of being able to hold jobs that offer more autonomy and opportunities for advancement¹⁵.

15 See: George Butlin and Jillian Oderkirk, *Educational Attainment: A Key to Autonomy and Authority in the Workplace*, Quarterly Education Review, Statistics Canada, Vol. 4, No. 1, 1997.

Graph 2 Unemployment rate according to age group and highest level of schooling attained in 2001



Source: Statistics Canada, 2001 Census.

Conclusion

When the additional income made possible by a bachelor's degree is compared with the private cost incurred by a person in order to acquire additional education, this degree appears to be a very worthwhile investment. However, the private rates of return calculated are average rates and, as mentioned earlier, the rates can vary considerably depending on the individual and the field of study.

The public rate of return is also high in the sense that the state also benefits from the additional income earned by the more educated person.

This study is based on monetary considerations, but there are also significant non-monetary advantages. It must also be pointed out that the analysis of the recent changes in the rates of return shows a slight upward trend. This increase can no doubt be explained primarily by the evolution of the North American economy, which continues to favour more educated persons, and by the fact that the changes in the structure of the labour market favour those with post-secondary diplomas or university degrees.

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