Education Statistics

Bulletin

The Return on Investment in Education

Introduction

The principal aim of this bulletin is to calculate the rate of fiscal return to attending higher levels of schooling.

Studies have shown that there is a strong correlation between individual income and level of schooling. The following graph illustrates the positive relationship between employment income and level of schooling (the data are taken from the 1996 Census).

The additional income earned by the more educated person also benefits the society as a whole. Through taxation, the public administration collects a significant portion of this person's additional income. When the rate of fiscal return is calculated, this additional tax revenue benefits the public directly.

**Graph 1
Age-income profile for men, according to the highest level of schooling attained in 1996**

Calculating the rate of fiscal return permits us to establish a relationship between the tax revenue the state can hope to collect from a more educated person on the one hand, and the cost incurred by the public administration to provide this person with his or her education on the other. However, there are many other benefits over and above the additional tax revenue generated when more people have degrees. Educated people are less burdensome to society in terms of the use of certain public services, such as social assistance (employment insurance benefits or welfare), and less likely

to commit criminal offences, hence to incur costs related to criminality. In addition, it can be shown that there is a positive relationship between level of schooling and the health status of those considered.

This bulletin updates the results of a study published in October 1991. In fact, only part of the methodology used to calculate the rate of fiscal return is presented here. Those interested in finding out more about the methodology as a whole or the definition of certain concepts are invited to consult the following document: *La rentabilité du diplôme.*[1]

The Taxation Benefits

Hence, through taxation, the public administration collects a significant portion of the more educated person's additional income. To quantify this, it is possible to estimate the total amount of taxes and income taxes paid by a hypothetical person with a given level of schooling, who, during his or her active life, obtained an income stream identical to that observed in data from the 1996 Census (based on income in 1995). The hypothetical person's level of schooling is then varied and comparisons are drawn between the total amount of taxes and income taxes paid, according to the level of schooling (see Table 1).

Table 1
Total amount of taxes and income taxes paid by a hypothetical person ($)

Highest level of schooling	Men	Women	Together
Grade 9-11 with no Secondary School Diploma (SSD)	406 465	173 648	309 275
Secondary education with SSD	507 316	233 573	361 953
College education with diploma (DEC)	613 563	313 779	460 083
University education with bachelor's degree	1 241 593	578 046	914 123

Based on tax revenue alone, it is clear that the highest possible level of schooling is of considerable benefit to the state. If we compare the category "Grade 9-11 with no SSD" with the category "Secondary education with diploma," we see that a man who earned an SSD generated $100 851 more in tax revenue ($59 925 for women). Among college graduates, men generated $106 247 more than secondary school graduates, and women, $80 206.

As expected, individuals with university degrees rated highest on the taxable-income scale. On average, male university graduates generated $628 030 more in tax revenue than college graduates ($264 267 for women).

One must realize, however, that for the public administration, the added taxation benefits of higher education represent a deferred return on investment spread out over a number of years. In deciding whether an investment is justified, the question of when it can be expected to yield a return is key: sooner is better than later. The more time it takes for an investment to yield a return, the less that return is valued in the present.

1. Marius Demers. *La rentabilité du diplôme*, Direction des études économiques et démographiques (Québec: Ministère de l'Éducation du Québec, October 1991).

This is also taken into account when the rate of fiscal return is calculated.

Otherwise, the basic data used to estimate the tax benefits must be readjusted to account for a number of factors: the expected increase in employment income since the 1996 Census. Because Census data are "static" (like a photograph taken at a precise moment in time), they have to be adjusted to allow for future increases in the real productivity of the economy.

Data are also adjusted to account for the possibility that the State, in certain cases, may not collect the expected tax revenue owing to the premature death of individuals considered.[1]

The Public Cost of Education

Here, the aim is to determine what the government invests when it helps a person with a given level of education attain a higher level of education. The following expenditures are considered here: the part of the cost of running educational institutions that is defrayed by the public administration, the expenditures incurred in managing ministries[2] and supporting the loans and bursaries program, and losses in government tax revenues.

The operating costs considered include all activities associated with education, management and complementary activities (transportation to and from school) as well as related expenses such as servicing the public debt. However, as mentioned previously, only the part of educational expenditures that is financed by government funds is considered here. The share of expenditures financed by tuition fees or any other source of private financing was not considered.

In addition, there are losses in government tax revenues resulting from the tax revenue foregone and the public cost of the various tax exemptions granted to students or their parents.

As regards the tax revenue foregone, 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 compensate for this loss. The government must also contend with a loss in tax revenue for the duration of the person's studies. Like government educational grants, this tax revenue foregone must be accounted for, since it too represents a public cost linked to higher education.

The tax revenue foregone is estimated by calculating the difference between the amount of taxes and income taxes a given person would have paid had he or she decided not to pursue his or her studies, and the amount of taxes and income taxes paid by that person as a student.[3]

Table 2 presents the total contribution made by the public administration in terms of costs incurred in providing a person with a given level of schooling with higher education. The levels of schooling considered are as follows:

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1. To find out more about the adjustments made to the basic data, see *La rentabilité du diplôme* (*op. cit.*).

2. Current government expenditures on teachers' pension funds have been added to expenditures invested in managing ministries.

3. To find out more about the items factored into the costs of education, accounting methods and the sources of data, see *La rentabilité du diplôme* (*op. cit.*).

Level 1 - Grade 9 to 11 with no Secondary School Diploma (SSD);

Level 2 - Secondary education with SSD;

Level 3 - College education with diploma (DEC);

Level 4 - University education with bachelor's degree.

Table 2
Total contribution made by the public administration for education ($)

	1985-86	1990-91	1995-96
Level 1 ⟶ Level 2	12 620	18 817	18 101
Level 2 ⟶ Level 3	19 932	29 453	32 689
Level 3 ⟶ Level 4	33 216	47 086	46 471

A given person at Level 1 can be considered a dropout. In 1995-96, the public administration spent an estimated $18 101 per person to help dropouts obtain their SSDs. The cost of putting SSD holders through college (DEC) is estimated at $32 689 per person. Finally, the public share of the cost of financing one person's education from the college diploma through the bachelor's degree is $46 471.

We observed a sharp increase in the public share of education costs between 1985 and 1990, whereas it remained relatively stable between 1990 and 1995. This was due in part to reduced inflation, but also to significant budget cutbacks in recent years.

The Rate of Fiscal Return

The principal aim of calculating the costs and benefits of helping a person with a given level of education acquire a higher level of education is to establish a cost/benefit ratio that will serve as an indicator of the profitability of investments made in education.

One means of establishing a cost/benefit ratio is to determine the internal rate of return, which renders the current value of the stream of tax revenue equal to the public cost of education. Because of the calculation method used in the present study, the rate of fiscal return associated with a given degree is equivalent to a real interest rate obtained on an investment (nominal interest rate - inflation rate).

Table 3 presents the results obtained after the rate of fiscal return was calculated for a given person who graduated from one level of schooling to a higher level. The following levels of schooling were considered:

Level 1 - Grade 9 to 11 with no Secondary School Diploma (SSD);

Level 2 - Secondary education with SSD;

Level 3 - College education with diploma (DEC);

Level 4 - University education with bachelor's degree.

Table 3
Rate of fiscal return
(in %)

	1985-86	1990-91	1995-96
Level 1 ⟶ Level 2	8.0	4.4	5.3
Level 2 ⟶ Level 3	8.1	5.0	5.4
Level 3 ⟶ Level 4	11.0	8.7	10.5

As previously indicated, a given person at Level 1 can be considered a dropout. The rate of fiscal return the state could hope to gain by investing in helping this person obtain an SSD was 5.3% for 1995-96. Given that this is a real rate of return, society benefits when a person completes his or her secondary education and obtains an SSD.

Also, when a person with a Secondary School Diploma was enabled to earn a DEC, the rate of fiscal return was 5.4% for 1995-96. However, in terms of taxation, the university degree was the most profitable, with a real rate of fiscal return of 10.5% for persons earning a bachelor's degree.

If we compare the rates of return in the last three censuses, we see that there was a decrease in profitability in 1990-91 (compared to 1985-86), then an increase in 1995-96 (compared to 1990-91).

The decrease in profitability in 1990-91 can be explained mostly by the fact that education costs increased more than the associated tax benefits. The economic recession in the early nineties also played a significant role in slowing down the growth of employment income, therefore decreasing tax revenue.

The rates of return calculated may be considered as the minimum rate. In fact, while we accounted for almost the total cost of education, it was possible to consider only a part of the benefits. One of the major benefits noted was the ability, on the part of the person with higher education, to obtain relatively more stable employment, therefore to be less susceptible to unemployment.

Unemployment Rates and Levels of Schooling

There is a strong correlation between unemployment rates and education. The more educated the person, the less likely that person is to be unemployed. Table 4 provides average unemployment rates in 1996 for people in Québec between 15 and 64 years of age, according to sex and the highest level of schooling attained. The data are taken from the 1996 Census.

Based on these results, we see that there is a strong correlation between unemployment rates and both level of schooling and sex. Unemployment rates are particularly high among persons who failed to reach grade 9, or more generally, failed to obtain a Secondary School Diploma. The unemployment rate is considerably lower (10.4%) among persons who graduated with SSDs.

Of course, the lowest unemployment rates are observed among graduates of post-secondary education. The average unemployment rate among college graduates is 9.2%; among holders of bachelor's degrees, it was 5.7%, while for holders of post-graduate degrees, the rate falls to 5.2%.

Note that unemployment rates among women are lower than those of their male counterparts for each level of schooling considered (with the exception of post-graduate university degrees, where unemployment rates are identical).[1]

Table 4
Unemployment rates in 1996 (%)

Highest level of schooling	Men	Women	Together
Less than grade 9	19.7	17.4	18.9
Grade 9 to 11 without Secondary School Diploma (SSD)	16.8	15.4	16.2
Grade 9 to 11 with SSD	11.2	9.5	10.4
Trade school education with diploma	11.3	9.0	10.5
College education with diploma (DEC)	9.8	8.5	9.2
University education without graduation	13.4	11.4	12.5
University education with certificate	10.3	8.6	9.4
University education with bachelor's degree	5.9	5.6	5.7
University education with post-graduate degree	5.2	5.2	5.2
Average	11.8	9.9	11.0

These unemployment rates cover the total population 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.
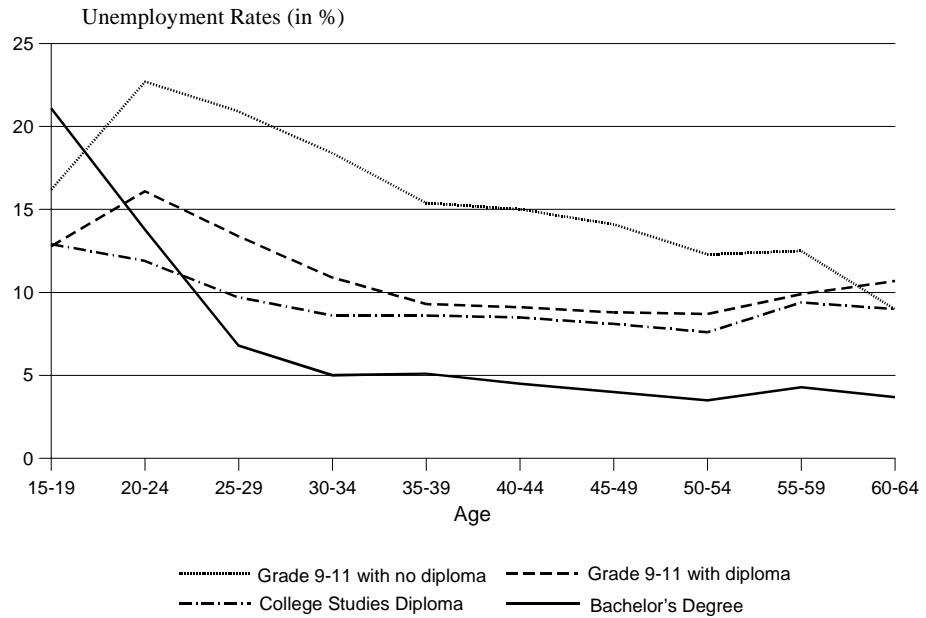
This graph shows that the relationship between unemployment rates and level of schooling is consistent in every age group and overall (with the exception of lower age groups in post-secondary education):[2] the higher a person's level of schooling, the less likely he or she is to be unemployed, regardless of age or sex.

Given that workers with less schooling are more likely to collect unemployment insurance benefits, it may be concluded that lower education levels account for part of these expenditures. That many young people drop out of school before completing their SSDs is particularly costly for society, given the very high rate of unemployment among young people in these circumstances.

It must be pointed out that in addition to difficulties breaking into the job market, young people with lower education tend to be unemployed for longer periods and to hold jobs that are less interesting and far more unstable.

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1. If we compare unemployment rates in the last three Censuses (1986, 1991 and 1996) according to level of schooling and sex, we see that the data reveals a constant improvement in employment status for women. In 1986, unemployment rates among women were higher than those for men. By 1991, the rates were quite similar for men and women. Finally, in 1996, unemployment rates were lower among women.

2. This relationship cannot be verified in the case of lower age groups in post-secondary education, owing to the belated entry into the job market of graduates from these educational levels.

Graph 2
Unemployment rates according to age group and highest level of schooling for 1996

Unemployment Rates (in %)

Grade 9-11 with no diploma ....
Grade 9-11 with diploma – – – –
College Studies Diploma –·–·–·
Bachelor's Degree ———

Welfare

If a person with less schooling is more likely to be unemployed, the probability that this person will one day receive welfare benefits is also higher. In fact, adults collecting welfare benefits are on average considerably less educated than the overall adult population.

Table 5
Breakdown of welfare recipients and the general population of Québec by level of schooling (in %)

Level of schooling	Welfare recipients	Total population
Less than grade 9	34.5	20.2
Grade 9 to 11	51.7	37.0
Post-secondary education	13.8	42.8
Total	100.0	100.0

Table 5 compares the distribution of welfare recipients between the ages of 25 and 64 and the general population by level of schooling. The data on welfare recipients are taken from the consolidated social assistance file (obtained from the *Ministère de la Sécurité du revenu[1]*) while overall data on the population of Québec are taken from the 1996 Census.

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1. The adult recipients of welfare benefits are from June 1996 and the data have been provided by the *Direction de la recherche, de l'évaluation et de la statistique* of the *Ministère de la Sécurité du revenu*.

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Other Education Statistics Bulletins available:

- Lespérance, André. *Level of Graduation upon Leaving the Education System:* No. 1, November 1997.

- Demers, Marius. *Statutory Salaries and Teaching Time of Teachers in Public Elementary and Lower Secondary Schools: A Comparison of Québec and OECD Countries*: No. 2, November 1997.

- Demers, Marius. *Educational Spending Relative to the GDP: A Comparison of Québec and OECD Countries*: No. 3, June 1998.

- Maheu, Robert. *Graduation from Secondary School, College and University in 1995: A comparison of Québec and OECD Countries*: No. 4, June 1998.

- Beauchesne, Luc. *Secondary School and College Graduates: A Sociodemographic Analysis*: No. 5, June 1998.

- Lebel, Jean-Louis, and Claude St-Germain. *Québec Student Achievement in Mathematics and Science: An International Comparison*: No. 6, August 1998.

- Foucault, Diane. *The Aboriginal School Population of Québec*: No. 7, September 1998.