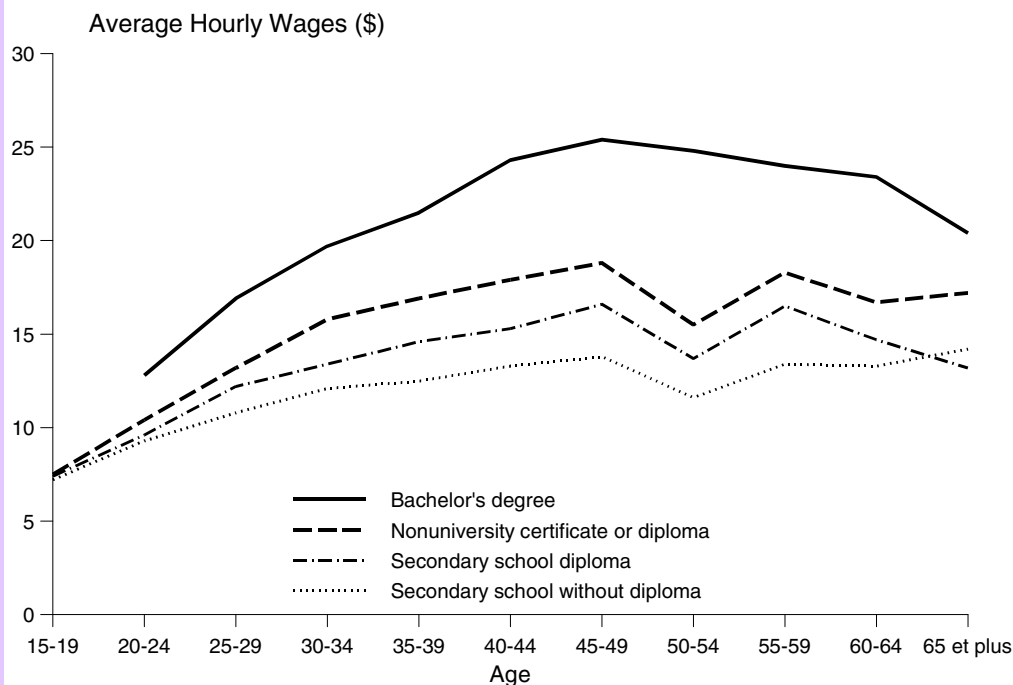*Education Statistics*
Bulletin

Education pays!

Introduction

An article in Le Devoir stated that "only slightly more than half of the population (51.5%) believe that young people have a better chance at getting a well-paying job if they continue their studies at the CEGEP or university level." [1]

In *Education Statistics Bulletin* No. 8, *The Return on Investment in Education*, we showed that it is in the State's interest to invest in education; in this bulletin, we consider the situation of young people who obtain a postsecondary education.

Graph 1 shows the positive relationship between the average hourly wage of workers and their level of schooling in 1999. The higher the level of schooling, the higher the employment income. In addition, the higher the level of schooling, the lower the risk of unemployment (see Graph 2 on page 6).

Graph 1
Average hourly wages by age in 1999, according to the highest level of schooling attained

Average Hourly Wages ($)

— Bachelor's degree
--- Nonuniversity certificate or diploma
-·- Secondary school diploma
···· Secondary school without diploma

Age

Source:
Statistics Canada,
Labour Force Survey

The principal goal of this bulletin is to estimate the rate of individual return associated with obtaining a first university degree (bachelor's). By calculating the rate of individual return, we can establish the relationship between the additional income that a more educated person can hope to obtain versus the private costs of additional education.

1. Paule Des Rivières and Jean Pichette. "L'éducation, ça donne quoi?" *Le Devoir* October 4, 1999 (Translation).

Additional Income

To get a better idea of the additional income that may be gained as a result of further education, it is possible to calculate the total income obtained by a given person who during his or her active life (from 15 to 64) obtained an income stream identical to that observed in the 1996 Census data (total income by age). Comparisons are made according to the person's level of schooling and gender (Table 1).

Table 1
Total income according to level of schooling and gender ($)

Highest level of schooling	Men	Women	Total
Grade 9 – 11 with no Secondary School Diploma (SSD)	1,153,627	654,738	952,680
Secondary education with SSD	1,294,291	807,704	1,054,106
College education with diploma (DEC)	1,451,764	943,298	1,222,999
University education with bachelor's degree	2,191,998	1,378,904	1,871,233

Source:
Statistics Canada, 1996 Census (income data from 1995)

A strong positive relationship exists between the total calculated income and the level of schooling. However, it is the bachelor's degree that results in the greatest increase in calculated income. Thus, the total calculated income of a man with a bachelor's degree is $2.2 million, which is $900 000 more than that of a man with only a Secondary School Diploma. In the case of a woman, the income increase is approximately $600 000.

Naturally, the basic income data used to calculate the rate of individual return must be adjusted for certain factors. Given the numerous hypotheses that must be made, we have adopted a conservative approach (choosing the hypotheses conservatively means that, to a certain degree, we have favoured the less "generous" hypotheses in the benefit calculations and the more "restrictive" in the cost calculations). Some of the data and hypotheses used to calculate the rate of individual return were also used to calculate the rate of fiscal return.[1]

We have thus adjusted the income data obtained from the census to account for the expected growth in the economy. Because census data are "static" (like a photograph taken at a specific moment in time), they have to be adjusted to allow for future increases in the real productivity of the economy. For the purpose of calculating the financial benefits of education, we have assumed a rate of increase in real income of 1% per year.

The basic data must also be adjusted to account for the possibility of premature death for the categories of people considered. We must consider this factor because the income of more educated people increases with age and because their expected income streams evolve differently over time.

The data were further adjusted to account for factors other than education that could explain why more highly educated individuals generally have higher incomes. This phenomenon could be due to the differences in the natural abilities of the given individuals considered as well as the socioeconomic background from which they come. It is thus generally accepted that an individual with stronger scholastic aptitudes will generally have a better chance of earning a higher salary than a less capable individual, even if both have attained the same level of schooling. To account for factors not related to education, we supposed that only 75% of the differences in the calculated incomes can be attributed to additional education.

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1. See the *Education Statistics Bulletin* published by the Direction des statistiques et des études quantitatives of the Ministère de l'Éducation du Québec: Marius Demers. *The Return on Investment in Education*, No. 8 (Québec: Ministère de l'Éducation du Québec, November 1998). For more information on the methods used to calculate the rates of return, see: Marius Demers. *La rentabilité du diplôme*, Direction des études économiques et démographiques (Québec: Ministère de l'Éducation du Québec, October 1991).

Furthermore, the income used to calculate the rate of individual return is net income. We therefore subtracted the amount of taxes and income taxes paid by the individuals from their gross income amounts. To estimate the total amount of taxes and income taxes that a given individual must pay, we had to estimate the average tax rates for each of the different income brackets. These rates account for income tax, social insurance taxes, property taxes, corporate taxes as well as various taxes on goods.[1]

Once the age-net income relationship was defined for the given individuals with different levels of schooling, we could determine the amount of additional income gained by the more educated individuals and compare these amounts to the private costs of higher education. For the purpose of calculating the rate of individual return, two types of individuals were considered: those with a Secondary School Diploma and those with a bachelor's degree.

The Private Costs of Education

The expenses paid by students (or their sponsors) include tuition and other fees required by educational institutions, additional school-related costs and loss of earnings. However, the value of grants and tax exemptions obtained by the students (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.[2]

During their studies, the students will also face additional school-related costs. Here, we consider these costs versus what the individuals would have to spend if they were working. These expenses could be related to school supplies and books, housing, food, transportation and clothing.[3]

However, the greatest expense that the 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 compensate for the present loss. The loss of earnings is estimated 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 income earned by the students is that which they obtain from summer jobs or part-time jobs during the school year.[4]

We must, however, take into account the direct financial assistance that the government grants to the students or their sponsors, which helps reduce the private cost of education. The financial assistance considered here includes student grants and tax exemptions.[5] The amount of financial assistance must, therefore, be subtracted from the total estimated cost.

The following table presents a summary of the private cost of education for a given individual who holds a Secondary School Diploma and has decided to pursue studies in order to obtain a bachelor's degree. To determine the total private cost of education, we must first estimate the

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1.   Source: The Fraser Institute. Special compilation for the province of Québec (estimates for 1998).

2.   Data on these expenditures are taken from the financial reports of the institutions (CEGEPs and universities).

3.   Lemelin estimated that in 1994, the additional cost per student at university was $1 200. This amount is one of the elements used in our estimate of the additional costs incurred as a result of pursuing higher education. Clément Lemelin. *L'économiste et l'éducation* (Sainte-Foy: Presses de l'Université du Québec, 1998) p. 571.

4.   The basic data used in estimating the loss of earnings figures come from the 1996 Census. The hypotheses used in the calculations are the same as those described in *La rentabilité du diplôme, op. cit.*, section 1.5.2.

5.   The numbers used to calculated the average value of grants were furnished by Aide financière aux études of the Ministère de l'Éducation du Québec and the value of tax exemptions was determined based on estimates by Lemelin and Perrot: Clément Lemelin and Jean Perrot. "Les dépenses publiques pour l'enseignement universitaire et le taux de rendement fiscal : le cas du Québec," *L'Actualité économique*, Vol. 66, No. 2, June 1990, pp. 193-217. See also Lemelin's more recent study: *L'économiste et l'éducation*, 1998, p. 573.

expenditure per student in 1995 for each of the components of the costs considered at each level of schooling (pre-university college and university studies). Next, we multiply the amount of yearly expenses by the number of years necessary to complete the postsecondary studies program in question (the actual amount of time required is usually longer than the estimate[1]). Finally, we add up all the private costs of education for each element considered to obtain the total cost.

Table 2
Private education costs for students pursuing additional studies ($)

Tuition and other related fees	7 142
Aditional costs	5 478
Loss of earnings	23 538
Bursaries	-3 141
Tax exemptions	-2 880
Total	30 138

Rate of Individual Return

Once we have the sum of the additional income obtained by a more educated individual and the total private cost of education, we can determine the amount of individual profit.

One way to compare the benefits with the private costs is to determine the rate of internal return that renders the current value of the stream of additional income equal to the individual cost of education. We thus obtain the rate of individual profitability related to obtaining a bachelor's degree. Due to the calculation methods used in this study, the rate of individual profitability associated with obtaining a bachelor's degree is equivalent to a real interest rate obtained on an investment (nominal interest rate – inflation rate).

The following table presents the results obtained after calculating the rate of individual profitability for a given person with a Secondary School Diploma who pursues and obtains a bachelor's degree. For information purposes, the table also indicates the rate of fiscal return (profitability of public investment in education).

Table 3
Rate of individual return and the rate of fiscal return (%)

	1986-1987	1990-1991	1995-1996
Rate of individual return	n.a.	11.4	9.5
Rate of fiscal return	11.2	8.1	9.7

n.a.: not available

The rate of individual return in 1995 is thus 9.5% and, as previously indicated, represents a real interest rate. If we assume a stable inflation rate of 3%, the rate of individual return corresponds to a nominal interest rate of 12.5%. In addition, the rate of fiscal return is basically at the same level as the rate of individual return in 1995.

Obtaining a bachelor's degree therefore proves profitable for both the State and the person who pursues the additional education.[2] The differences in income obtained by individuals with different levels of schooling are explained in part by the differences in their respective rates of unemployment. The relationship between unemployment and level of schooling will be presented in the following section. Furthermore, the evolution of the North American economy continues to favour more educated individuals, and the composition of the work force is shifting toward those with postsecondary or university degrees.[3]

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1. See *La rentabilité du diplôme, op. cit.*, pp. 27-29.

2. In *Education Statistics Bulletin* No. 8, we indicated that, in addition to increased tax revenues, other public benefits result from increased levels of schooling. Among these benefits, we observe that more highly educated individuals are less burdensome on society when it comes to certain public services. Individuals holding university degrees also benefit from these "other benefits." See the section on health and lifestyles.

3. See section 6.1 of the *Education Indicators* of the Ministère de l'Éducation du Québec: *Employment Trends by Level of Instruction.* This publication is available on the Web site of the Ministère de l'Éducation: http://www.meq.gouv.qc.ca/GR-PUB/m_englis.htm.

The rate of individual return is an average rate of return linked to earning a bachelor's degree. It therefore represents an average value for all programs offered in Québec universities. Clearly, if the calculations had been done according to field of study, the rates would differ from one program to another.[1] It is also possible that the rates of return associated with certain vocational or technical college programs could be higher than those of certain university programs.

The field of study is therefore a key variable. Readers wishing to learn more about the employment situation for new graduates may refer to the Relance studies, which were carried out at the secondary school, college and university levels.[2] These studies provide information on new graduates by field of study, with respect to unemployment rates, salaries and characteristics of jobs obtained.

Unemployment Rates and Levels of Schooling

There is a strong correlation between unemployment rates and education. The higher a person's level of schooling, the less likely he or she is to be unemployed. Table 4 provides average Québec unemployment rates for 1999, according to gender and the highest level of schooling attained. The data comes from the *Labour Force Survey.*[3]

There is a particularly high unemployment rate among individuals who have never finished secondary school. The unemployment rate among those with a Secondary School Diploma is considerably lower, falling to 9.6% in 1999.

Of course, the lowest unemployment rates are observed among graduates of postsecondary education programs. In 1999, the average unemployment rate among college graduates was 7.2%; among holders of bachelor's degrees, it was 5.6%, while for holders of master's degrees or doctorates, the rate fell to 4.8%.

Note that the unemployment rates among men and women with the same level of schooling are relatively similar and that, in general, the unemployment rate among women (8.8%) is lower than among men (9.7%). This lower rate among women does not, however, signify that they have better jobs. Women are more likely to have unstable jobs, and they are underrepresented in numerous professional fields.[4]

Table 4
Unemployment rates (%) in 1999, according to highest level of schooling attained

Highest level of schooling attained	Men	Women	Total
Less than Grade 9	16.5	15.3	16.0
Grade 9 to 11 without a Secondary School Diploma	14.4	15.3	14.8
Secondary School Diploma	10.2	8.9	9.6
College education without diploma	11.4	12.7	12.0
College education with diploma (DEC)	7.3	7.0	7.2
University education with bachelor's degree	6.2	4.9	5.6
University education with graduate or postgraduate degree	4.5	5.2	4.8
Average	**9.7**	**8.8**	**9.3**

Source:
Statistics Canada,
Labour Force Survey

These unemployment rates cover the total active population between 15 and 64 years of age. However, as expected, unemployment rates vary considerably when data from different age

1. See: David A. A. Stager. *Returns to Investment in Ontario University Education, 1960-1990, and Implications for Tuition Fee Policy* (Council of Ontario Universities, 1994).

2. The data are available on the Web site of the Ministère de l'Éducation du Québec: http://www.meq.gouv.qc.ca/GR-PUB/m_englis.htm.

3. Special compilation of Statistics Canada.

4. Among other documents, see: *Le travail des Québécoises. État de la situation à l'aube du deuxième millénaire*, Comité aviseur-femmes en matière de développement de la main-d'oeuvre (February 1997).

groups are compared. Graph 2 illustrates the relationship between the average unemployment rates per age group and the highest level of schooling attained.

The 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.

It should also be pointed out that the higher a person's level of schooling, the easier it is to get a job that is both interesting and stable. University graduates also have the advantage of obtaining jobs that offer greater independence and more possibilities for advancement.[1]

Graph 2
Unemployment rate according to age group and highest level of schooling for 1999

Unemployment rate (%)
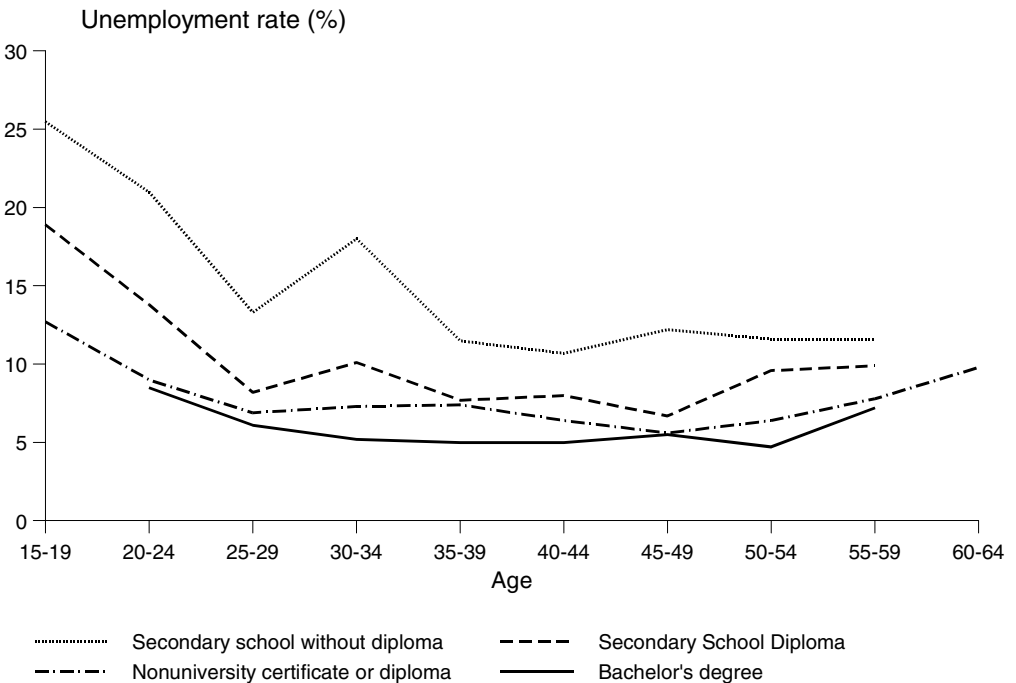
Source:
Statistics Canada,
Labour Force Survey

Conclusion

When we compare the additional income resulting from having a bachelor's degree with the cost of obtaining this level of schooling, we see that it is very profitable for a person to obtain this degree. However, the calculated rates of individual return are only average rates and, as indicated above, they can vary considerably based on the chosen field of study.

The rate of fiscal return is also high and, therefore, the State also profits from the greater income earned by individuals with a bachelor's degree versus the lower income earned by those with only a Secondary School Diploma.

These data show that individuals who earn a bachelor's degree not only profit from their personal investment, but also reimburse society for the resulting increased public expenditures in education.

So, yes, it pays to pursue higher education—but is it available to everyone? Here we question the accessibility of university education and the redistributional effect of public financing for education.

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1. See: George Butlin and Jillian Oderkirk. "Educational attainment—A key to autonomy and authority in the workplace," *Education Quarterly Review*, Statistics Canada, Vol. 4, No. 1, 1997.

When it comes to accessibility, we often think of the financial constraints that can limit access to postsecondary studies. Québec has a good financial assistance program and tuition fees are the lowest in Canada (for the 1999-2000 school year, tuition fees were less than half those charged in the other provinces[1]). However, in Québec, as elsewhere in the world, the children of more educated parents are the ones that are most likely to complete university studies. An international study on postsecondary education showed that, for all the countries considered, the higher the parents' level of schooling, the higher the proportion of children that obtained postsecondary diplomas.[2]

In Canada, students whose parents completed studies beyond secondary school were 2.4 times more likely to complete postsecondary school programs than those whose parents did not have a Secondary School Diploma.[3] A person coming from a more educated family background therefore has a greater chance of pursuing postsecondary school studies and of benefiting from higher income levels.

When we look at the redistributional effect of public financing for education, we consider the distribution of the costs and benefits of education among the different groups in society. To better understand this issue, we can divide the population into categories according to income. A progressive distribution of costs and benefits favours the lower income levels at the expense of the more affluent, while a regressive distribution would favour the more affluent members of the population. Studies carried out on the subject have produced contradictory results: some studies indicate that the distribution is regressive, while others affirm that it is progressive. Lemelin's studies (conducted in the 70s and 80s) conclude that the distribution in Québec is regressive.[4]

This result is strongly linked to the question of accessibility addressed above. Children from the more affluent strata of society (more highly educated) are greatly overrepresented in universities, while the inverse is true of children from the less affluent strata (less educated). A horizontal study carried out by Statistics Canada on secondary school graduates in 1995 showed that almost 70% of graduates with at least one parent with a university degree pursued their studies at university, while only 30% of the graduates whose parents had only completed secondary school (or less) attended university.[5]

In general, parents with a higher level of schooling provide a family atmosphere favouring scholastic advancement. In order to increase the number of students in postsecondary school programs from poorer and less educated family environments, the government is increasingly intervening during the early years of school. During the past few years, measures have been taken in Québec to help students facing scholastic difficulties: full-day kindergarten, increased individual educational services for 4- and 5-year-old students coming from economically disadvantaged backgrounds, expansion of after-school daycare services, and smaller classes in preschool and lower elementary school. It is, however, too early to tell whether or not these measures will have any effect on rendering college and university studies more accessible.

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1. See section 1.15 of the Education Indicators of the Ministère de l'Éducation du Québec: *Student Financial Assistance and Tuition Fees*. This publication is available on the Web site of the Ministère de l'Éducation: http://www.meq.gouv.qc.ca/GR-PUB/m_englis.htm.

2. Source: Patrice De Broucker and Kristen Underwood. "Intergenerational education mobility: An international comparison," *Education Quarterly Review*, Statistics Canada, Vol. 5, No. 2, 1998.

3. However, adults were most likely to hold postsecondary school diplomas in Canada and the United States.

4. See Lemelin. *L'économiste de l'éducation, op. cit.*, chapter 16.

5. Source: George Butlin. "Determinants of postsecondary participation," *Education Quarterly Review*, Statistics Canada, Vol. 5, No. 3, 1999.

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