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Education Statistics Bulletin

Educational Spending Relative to the Gross Domestic Product (GDP) in 2004

(A Comparison of Québec and the OECD Countries)

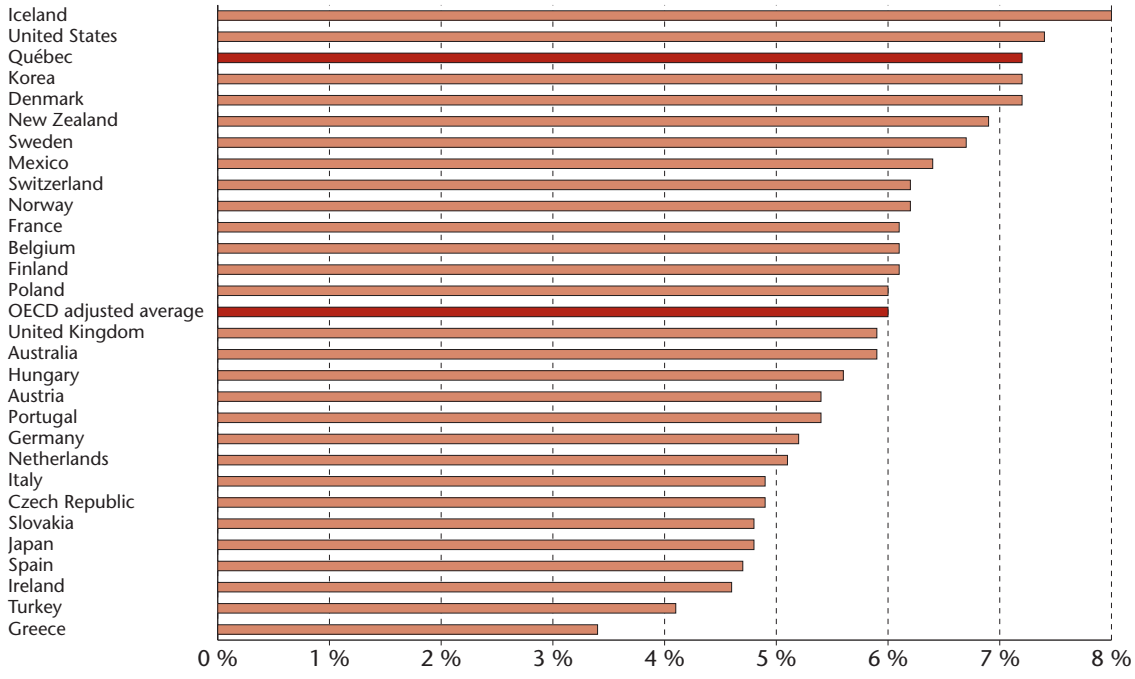
Introduction

How does Québec's financial investment in education rank? To help us answer this question, we need to define the appropriate indicators and study comparable data for other regions or countries.

The indicator most often used to measure financial investment in education is the percentage of the gross domestic product (GDP) spent on education. This indicator measures the relative share of a state's wealth that is invested in education. In this context, we can ask what percentage of the GDP is allocated to education in Québec; how this financial investment compares to that of other provinces, the United States and member countries of the Organisation for Economic Cooperation and Development (OECD); and what explains these differences.

In the *Education Indicators*[1] publication, comparisons are drawn between the other provinces and the United States. In this bulletin, the comparison is made between Québec and the OECD countries.

Graph 1 Total educational spending in relation to GDP for Québec and OECD countries in 2004



Source: See Appendix 1.

1 Ministère de l'Éducation, du Loisir et du Sport, Direction de la recherche, des statistiques et de l'information, *Education Indicators*, annual publication.

Éducation, Loisir et Sport
Québec

In September 2007, the OECD published a new edition of *Education at a Glance: OECD Indicators*. Among the indicators presented, there is an international comparison of the portion of the GDP allocated to education. The concept of expenditure used in calculating the portion of the GDP allocated to education is the overall spending figure. Total educational spending includes the operating and capital expenses of all levels of public and private education, government contributions to employee pension plans, the cost of research (in postsecondary institutions) and other education-related expenses.[2]

The table in Appendix 1 shows data for the following levels of instruction: preschool, elementary, secondary, non-university postsecondary and university education. The last column in the table shows the totals of all the levels of instruction (including non-categorized expenses). In addition, at the bottom of the table, we show the average for the OECD countries considered, as well as an adjusted average calculated by us, which excludes countries that have a particularly low level of wealth (measured by the per capita GDP). This adjusted average was used for our comparisons between Québec and OECD countries.

Educational Spending Relative to the GDP

For all levels of instruction, Québec spent a larger portion of its GDP on education (7.2%) than the adjusted average for the OECD countries (6.0%). In fact, only Iceland, the United States, Korea and Denmark spent an equal or larger portion of their GDP on education than Québec. The other 24 countries examined by the OECD spent a smaller portion of their GDP on education (Graph 1 and Appendix 1).

As indicated above, the table in Appendix 1 also provides data by level of instruction. The portion of the GDP allocated to preschool, elementary and secondary education in Québec is below the adjusted average of OECD countries; however the figure for non-university postsecondary and university education is clearly higher in Québec.

These differences are partially explained by the structural differences between the education systems: preschool services are more developed in many OECD countries (admission at 3 years of age) than in Québec; elementary and secondary schooling is shorter in Québec than elsewhere in the world; the existence of characteristics specific to Québec's college system (such as the requirement to complete two years of college studies before entering university); and research expenses, which are higher in Québec's universities than in European universities.[3]

Because of these structural differences, and based on the available information, we have chosen to compare financial investment in the overall education system (all levels of instruction taken together). The gap between the portion of the GDP allocated to education in Québec (7.2%) and the adjusted average of OECD countries; (6.0%) is significant at 1.2 percentage points. In terms of the Québec GDP ($263 billion in 2004), 1.2% represents $3.2 billion.

To explain the higher level of financial investment in Québec, we will use all the information available on factors that play a role in this difference. These factors can be grouped into four general indicators: spending per student, collective wealth (defined by the per capita GDP), school attendance rates and the demographic factor (see Appendix 4). When considering all levels of instruction together, the school attendance rate is defined by the ratio of enrollment to the population aged 5 to 29, while the demographic factor is defined by the ratio of the population aged 5 to 29 to the total population.

2 The concept of spending used in the MELS *Education Indicators* (total spending concept used by Statistics Canada) is not exactly the same as the one retained by the OECD. For comparison purposes, spending data for Québec in this table have been adjusted to correspond with the OECD's definition. There are no equivalent data for the other Canadian provinces.

3 Based on available data. See also the following document published by the Institut de la statistique du Québec (ISQ): *Dépenses de recherche et développement, 2004, Science, technologie et innovation en bref*, November 2006 (available in French only). The document compares Québec's research and development structure with that of other countries, and notes that the contribution of the higher education sector is significantly more important in Québec than in many other countries where commercial enterprises carry out a large proportion of the research and development activities.

The following simulation will help readers to understand the role of each factor in determining the financial investment of each region. Let us suppose that all the factors except one are the same in all regions. If the spending per student is different, the region with the highest spending will exhibit a greater financial investment due to the fact that more resources are allocated to education.

A less wealthy region (with a lower per capita GDP) spends a greater portion of its GDP on education than a more wealthy region (with a higher per capita GDP) if both allocate the same quantity of resources to their students. If the school attendance rate or the proportion of the school-age population is different, then a higher ratio will reflect a greater financial investment because more financial resources are required.

Table 1 shows data on each of these factors, and Table 2 shows the contribution of the various factors to the difference between the portion of GDP spent on education in Québec and the adjusted average for OECD countries in 2004 (1.2 percentage points). The "positive" factors are those that are responsible for Québec's higher level of financial investment, while the "negative" factors are those that reduce the difference.

As the tables show, there is one "residual factor" due to the lack of precision of certain variables. As we will see later, school attendance rates have been estimated. The OECD method uses arithmetic averages, which creates a certain amount of bias in the results obtained when calculating the contribution of the explanatory factors to the difference between the portion of GDP spent on education in Québec and the adjusted average for OECD countries.[4]

Table 1 Educational spending per student, per capita GDP, school attendance rate and the demographic factor in Québec and in the adjusted average for OECD countries in 2004[e].

	Québec	OCDE
Spending per student (in $CAN[5])	12 271	10 303
Per capita GDP (in $CAN)	34 825	38 388
School attendance rate (in %)	64.8	68.2
Demographic factor (in %)	31.7	31.8

e: Estimates.

Sources: For OECD countries: Organisation for Economic Cooperation and Development, *Education at a Glance: OECD Indicators*, 2007 edition. For Québec: Ministère de l'Éducation, du Loisir et du Sport, Direction de la recherche, des statistiques et de l'information, estimates derived from Statistics Canada data and the financial reports of educational institutions.

4 See Appendix 4.

5 The data was converted into Canadian dollars using the purchasing power parity rates (PPP) set by the OECD.

Table 2 Impact of various factors on the difference between the portion of GDP spent on education in Québec and the adjusted average for OECD countries, in 2004[e]

Education spending as a percentage of GDP in Québec	7.2
Education spending as a percentage of GDP for OECD countries	6.0
Difference (Québec and OCDE countries) in percentage points	1.2
Contribution of each factor to the difference (percentage points):	
Higher per student spending in Québec	1.1
Lower per capita GDP in Québec	0.6
Lower school attendance rate in Québec	-0.3
Demographic factor (more or less the same)	0.0
Residual factor	-0.2
Total	1.2

e: Estimates.
Source: Ministère de l'Éducation, du Loisir et du Sport, Direction de la recherche, des statistiques et de l'information.

Total Educational Spending Per Student

Total educational spending per student for all levels of instruction was 19% higher in Québec ($12 271) than the adjusted average for OECD countries ($10 303) in 2004. It was the factor that made the greatest contribution to Québec's higher level of financial investment in education, accounting for 1.1 percentage points in the difference between the portion of GDP spent on education in Québec and the average spending in OECD countries.

The OECD also produces information on per-student spending by level of education. However, it is difficult to compare OECD countries with Québec because of the structural differences mentioned earlier. For information purposes, the table in Appendix 2 shows the overall spending per student by country and level of instruction.

In Québec, the overall spending per student at the elementary and secondary levels of instruction was below the adjusted average of OECD countries. As for the university level, overall spending per student in Québec was significantly higher in 2004 than the average spending per student in OECD countries.[6]

In addition to including the elementary, secondary and university levels of instruction, the total spending per student also includes preschool and college levels as well as non-categorized expenses (retirement plans, professional development outside the educational institutions, etc.).

Currently, the OECD does not provide all the data required to fully understand the differences between educational spending per student for the countries studied. Available data relate mainly to elementary and secondary information, and very little information is available for higher levels of instruction.

6 In this study, the only factors excluded from overall spending at university level in Québec and in the OECD countries are auxiliary services (e.g. library expenses, food services, student residences and accommodation, parking lots, etc.). In Québec, the spending basis differs from that used in a previous *Education Statistics Bulletin* (No. 31) on the same subject in 2001. In that case, spending at the university level in Québec also excluded subsidized research. At the time, no information was available on research spending at the university level in OECD countries, and it was decided to take a conservative approach to per student spending in Québec's universities. However, recent editions of OECD indicators have provided information on research spending by universities, and this factor must therefore also be considered in the Québec data.

In a forthcoming *Education Statistics Bulletin*, we will present a comparison between Québec and the OECD countries based on the cost of teachers' salaries per student at the elementary and secondary levels of instruction in 2004.[7] To explain the gaps observed in the cost of salaries, the following four factors were considered: statutory teacher salaries, annual student classroom time, annual teaching time required of full-time teachers and class size.

Collective Wealth

The second factor considered in the analysis of the difference between Québec and the OECD average, in terms of the percentage of GDP spent on education, is collective wealth. In the present case, the per capita GDP is used as the indicator of collective wealth.

In 2004, Québec's per capita GDP was $34 825 as compared to $38 388, the adjusted average for the OECD countries. This represents a difference of 9% (Appendix 3). Since Québec is slightly less wealthy than the adjusted OECD average, for a given educational expenditure, Québec spends a larger portion of its GDP. This factor therefore contributed to widening the gap between the relative amount of financial support for education in Québec and the OECD average (see Table 2).

School Attendance Rates

The school attendance rate is defined here as the ratio of total enrollments (expressed in full-time enrollment equivalents) for all levels of instruction to the population of 5-to-29 year-olds. A higher school attendance rate for a given region indicates (all other variables being equal) that more individuals attend school in this region and, therefore, that a larger financial investment in education is required.

The 2007 edition of *Education at a Glance: OECD Indicators* does not supply data on school attendance rates for individual countries. However, sufficient data are available to make estimates. Based on our calculations, school attendance rates are lower in Québec (64.8%) than the adjusted average for OECD countries (68.2%). This comparison is for information purposes only, since it is difficult to obtain accurate information on full-time equivalent attendance in some OECD countries.

There are, however, comparative data on enrollment rates that use the number of individuals rather than full-time equivalents.[8] Table 3 presents a comparison of enrollment rates, by age, between Québec and the OECD average.

The enrollment rate for students between 5 and 14 years of age is slightly lower in Québec, but the Québec rates for students in the 15-to-19 and 20-to-29 age groups are higher than the OECD average. The higher enrollment rates for older students are explained by a higher school attendance rate in Québec postsecondary schools.

7 The publication in question will be an updated version of the following *Education Statistics Bulletin*: Marius Demers, *Cost of Statutory Salaries of Teachers per Student for Elementary and Secondary School Levels in 2000-2001: A Comparison of Québec and OECD Countries*, DRSI, MELS, No. 29, November 2003.

8 The enrollment rate is calculated by dividing the number of students in a given age group by the general population in the same age group. School enrollment is expressed in terms of the number of individuals enrolled in either full-time or part-time programs.

Table 3 Enrollment rates (%) per age group in 2004

	Students aged 5 to 14 years as a % of the population of the same age group	Students aged 15 to 19 years as a % of the population of the same age group	Students aged 20 to 29 years as a % of the population of the same age group	Students aged 5 to 29 years as a % of the population of the same age group
QUÉBEC	98.3	85.7	31.1	66.9
ADJUSTED AVERAGE FOR OECD COUNTRIES	99.2	83.0	26.8	65.7

Sources: For OECD countries: Organisation for Economic Cooperation and Development, *Education at a Glance: OECD Indicators*, 2007 edition (averages calculated by the DRSI, MELS).
For Québec: Ministère de l'Éducation, du Loisir et du Sport, Direction de la recherche, des statistiques et de l'information.

Demographic Factor

The age structure of the population of the regions considered also contributes to differences observed in the portion of GDP spent on education.

The demographic factor is defined here as the portion of the total population that is between 5 and 29 years of age, which is the segment of the population that is most likely to attend school. For a given area (all other variables being equal), a larger proportion of young people in the total population indicates that there will be more people attending school in that area, and therefore that a greater financial investment in education will be required.

In 2004, this proportion was 31.7% in Québec, compared to an OECD average of 31.8%. Because these figures are so similar, this factor did not contribute to the gap between Québec's financial support of education and the average for the OECD countries considered.

It should also be noted that this proportion decreased significantly in Québec between 1981 and 2004, declining from 43% to 32%. This could have caused a significant decrease in financial support for education. However, such was not the case because, at the same time, there was a considerable increase in school attendance rates. The opposing effects of these two factors meant that they cancelled one another out to a large extent.

Summary of Contributing Factors

In 2004, Québec allocated 7.2% of its GDP to education, compared with the OECD country average of 6.0%, for a difference of 1.2 percentage points.

Table 2 indicates the degree to which the main factors contributed to this difference.

In 2004, Québec's total educational spending per student at all levels of instruction ($12 271) was 19% higher than the adjusted OECD average ($10 303). This factor contributed most (1.1 percentage points) to the difference in the portion of the GDP spent on education in Québec and the OECD average.

In addition, Québec's per capita GDP ($34 825), which was less than the adjusted OECD average ($38 388), also increased the difference in the portion of the GDP spent on education by 0.3 of a percentage point.

With regard to the slightly lower school attendance rate in Québec, its contribution is -0.3 of a percentage point. The demographic factor did not have an impact on the gap between the portion of GDP spent on education in Québec and the adjusted average for OECD countries.

Information:

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APPENDIX 1 – TOTAL EDUCATIONAL SPENDING IN RELATION TO GDP IN QUÉBEC AND THE OECD COUNTRIES IN 2004, BY EDUCATIONAL LEVEL (%)

	Preschool, Elementary Secondary Education	Non-University Postsecondary Education	University Education	Partial Total[1] (Postsecondary Education)	All Levels[1] (Including Non-Categorized Expenses)
ICELAND	6.2	n.a.	1.2	1.2	8.0
UNITED STATES	4.5	n.a.	2.9	2.9	7.4
KOREA	4.6	0.5	1.8	2.3	7.2
DENMARK	5.2	n.a.	1.8	1.8	7.2
NEW ZELAND	5.2	0.4	1.2	1.6	6.9
SWEDEN	5.0	n.a.	1.8	1.8	6.7
MEXICO	*4.9*	*n.a.*	*1.3*	*1.3*	*6.4*
SWITZERLAND	4.6	0.1	1.6	1.7	6.2
NORWAY	4.6	n.a.	1.4	1.4	6.2
FRANCE	4.8	0.3	1.1	1.3	6.1
BELGIUM	4.7	n.a.	1.2	1.2	6.1
FINLAND	4.3	n.a.	1.8	1.8	6.1
POLAND	*4.4*	*0.1*	*1.5*	*1.6*	*6.0*
UNITED KINGDOM	4.8	n.a.	1.1	1.1	5.9
AUSTRALIA	4.2	0.2	1.5	1.7	5.9
HUNGARY	*4.1*	*0.2*	*1.0*	*1.3*	*5.6*
AUSTRIA	4.2	0.1	1.2	1.2	5.4
PORTUGAL	4.2	0.3	0.7	1.0	5.4
GERMANY	3.7	0.3	1.0	1.3	5.2
NETHERLANDS	3.8	n.a.	1.3	1.3	5.1
ITALY	3.9	0.1	0.9	1.0	4.9
CZECH REPUBLIC	*3.6*	*0.1*	*1.0*	*1.1*	*4.9*
SLOVAKIA	*3.5*	*n.a.*	*1.1*	*1.1*	*4.8*
JAPAN	3.1	0.2	1.1	1.3	4.8
SPAIN	3.6	n.a.	1.2	1.2	4.7
IRELAND	3.2	0.2	1.2	1.4	4.6
TURKEY	*3.1*	*n.a.*	*n.a.*	*1.0*	*4.1*
GREECE	*2.2*	*0.2*	*0.9*	*1.2*	*3.4*
OECD AVERAGE	**4.2**	**0.2**	**1.3**	**1.4**	**5.8**
OECD ADJUSTED AVERAGE[2]	**4.4**	**0.2**	**1.4**	**1.5**	**6.0**
QUÉBEC	**3.9**	**1.4**	**1.9**	**3.3**	**7.2**

n.a. : Not available.

Sources: For OECD countries: Organisation for Economic Cooperation and Development, *Education at a Glance: OECD Indicators 2007*, Table B2.2.
For Québec: Ministère de l'Éducation, du Loisir et du Sport, Direction de la recherche, des statistiques et de l'information.

1 The totals may be slightly different from the sum of the subtotals due to rounding off.

2 Countries with particularly low per capita GDP figures were excluded from the comparison (countries in italics: Mexico, Poland, Hungary, Czech Republic, Slovakia, Turkey and Greece). The data for Canada and Luxembourg are missing from the table.

N. B.: The concept of spending used in the MELS's *Education Indicators* (total spending concept used by Statistics Canada) is not exactly the same as the one retained by the OECD. For comparison purposes, spending data for Québec in this table have been adjusted to correspond with the OECD's definition.

APPENDIX 2 – TOTAL PER-STUDENT EDUCATIONAL SPENDING, QUÉBEC AND OECD COUNTRIES, PER LEVEL OF INSTRUCTION IN 2004

(in PPP-converted Canadian dollars)

	Elementary Education	Secondary Education	University Education[1]	Total[2]
AUSTRALIA	7 194	10 163	17 801	10 030
AUSTRIA	9 551	11 765	17 659	12 210
BELGIUM	8 265	9 654	14 345	9 988
CANADA	n.a.	n.a.	n.a.	n.a.
CZECH REPUBLIC	*3 477*	*5 952*	*8 619*	*5 585*
DENMARK	10 065	11 021	18 963	12 163
FINLAND	6 951	9 268	15 577	9 713
FRANCE	6 330	10 882	13 193	9 814
GERMANY	6 163	9 436	15 726	9 717
GREECE	*5 723*	*6 493*	*8 408*	*6 396*
HUNGARY	*4 784*	*4 598*	*8 598*	*5 388*
ICELAND	10 505	9 617	11 061	10 293
IRELAND	6 753	8 855	12 718	8 361
ITALY	9 204	9 769	9 219	9 619
JAPAN	8 160	9 485	17 159	10 148
KOREA	5 593	8 420	10 650	7 465
LUXEMBOURG	16 762	22 264	n.a.	n.a.
MEXICO	*2 110*	*2 393*	*7 197*	*2 650*
NETHERLANDS	7 749	9 392	17 242	9 963
NEW ZEALAND	6 464	7 845	12 248	7 844
NORWAY	10 627	13 836	18 449	13 353
POLAND	*3 899*	*3 599*	*5 566*	*4 138*
PORTUGAL	5 831	7 683	9 641	7 235
SLOVAKIA	*2 582*	*3 417*	*6 694*	*3 809*
SPAIN	6 183	8 346	11 934	8 219
SWEDEN	9 303	10 012	20 200	11 316
SWITZERLAND	10 674	15 165	29 138	14 800
TURKEY	*1 395*	*2 251*	*n.a.*	*1 901*
UNITED KINGDOM	7 400	8 831	14 304	9 055
UNITED STATES	10 967	12 378	25 373	15 060
OECD AVERAGE	**7 264**	**9 062**	**13 988**	**8 794**
OECD ADJUSTED AVERAGE[3]	**8 486**	**10 640**	**15 838**	**10 303**
QUÉBEC	**7 753**	**9 536**	**26 136**	**12 271**

n.a.: Not available.

Sources: For OECD countries: Organisation for Economic Cooperation and Development, *Education* at a Glance: *OECD Indicators 2007*, Table B1.1.
For Québec: Ministère de l'Éducation, du Loisir et du Sport, Direction de la recherche, des statistiques et de l'information.

1 For the purposes of comparing Québec witgh OECD countries, and taking into account the OECD classification system, we have considered per-student spending for tertiary education (type A tertiary education and advanced research degrees where country data were available, otherwise the total amount for tertiary education was used).

2 Including preschool and college education, as well as non-categorized expenses.

3 Countries with particularly low per capita GDP figures were excluded from the comparison (countries in italics: Mexico, Poland, Hungary, Czech Republic, Slovakia, Turkey and Greece).

APPENDIX 3 – PER CAPITA GROSS DOMESTIC PRODUCT (GDP) FOR QUÉBEC AND OECD COUNTRIES IN 2004

(in PPP-converted Canadian dollars)

AUSTRALIA	38 455
AUSTRIA	41 394
BELGIUM	39 825
CANADA	40 369
CZECH REPUBLIC	*24 195*
DENMARK	40 273
FINLAND	37 157
FRANCE	36 127
GERMANY	37 260
GREECE	*34 489*
HUNGARY	*20 575*
ICELAND	41 439
IRELAND	45 505
ITALY	34 555
JAPAN	36 032
KOREA	25 810
LUXEMBOURG	80 761
MEXICO	*12 635*
NETHERLANDS	41 812
NEW ZEALAND	30 930
NORWAY	52 162
POLAND	*16 302*
PORTUGAL	24 068
SLOVAKIA	*18 248*
SPAIN	32 405
SWEDEN	38 700
SWITZERLAND	43 269
TURKEY	*8 983*
UNITED KINGDOM	39 582
UNITED STATES	49 396
OECD AVERAGE	**35 425**
ADJUSTED AVERAGE*	**38 388**
QUÉBEC	**34 825**

Sources: For OECD countries: Organisation for Economic Cooperation and Development, *Education at a Glance: OECD Indicators 2007*, Table X2.1.
For Québec: Ministère de l'Éducation, du Loisir et du Sport, Direction de la recherche, des statistiques et de l'information (calculations performed using Statistics Canada data).

* Countries with particularly low per capita GDP figures were excluded from the comparison (countries in italics: Mexico, Poland, Hungary, Czech Republic, Slovakia, Turkey and Greece). In addition, Canada and Luxembourg were excluded because data on total educational spending in relation to GDP were not available for these countries.

APPENDIX 4 – FACTORS ACCOUNTING FOR THE DIFFERENCE BETWEEN THE PERCENTAGE OF GDP DEDICATED TO EDUCATION IN QUÉBEC AND THE OTHER REGIONS

To explain the differences observed between the percentage of GDP dedicated to education in Québec and the other regions, it is necessary to compare the main factors determining the level of financial support provided by each region. These factors are: total educational spending per student, per capita GDP, a school attendance rate indicator (the percentage represented by the number of students in the 5-to-29 year-old population) and a demographic factor (the ratio of the 5-to-29 age group to the total population) (according to the methodology established by the OECD).[9]

The equation used is as follows:

$$\frac{EXP}{GDP} = \frac{EXP}{FTE} \times \frac{1}{GDP/POP} \times \frac{FTE}{5-29} \times \frac{5-29}{POP}$$

where,

EXP: total spending for all levels of instruction

GDP: gross domestic product

FTE: enrollments in full-time equivalents

POP: total population

EXP/GDP: proportion of the GDP spent on all levels of instruction

EXP/FTE: spending per student

GDP/POP: per capita GDP

FTE/5-29: school attendance rates

5-29/POP: demographic factor

9 The formulas used to calculate the contribution of each factor to the difference between the percentage of GDP dedicated to education in Québec versus the OECD average are not included in this document, but are available upon request.