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## The effect of Quebec's CEGEPs on total years of schooling

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Years of Schooling**

**Pierre Fortin et Natalia Mishagina**

**Août 2020**

# The Effect of Quebec's CEGEPs on Total Years of Schooling

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**Document de travail No. 2020-08**

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# The Effect of Quebec's CEGEPs on Total Years of Schooling\*

Pierre Fortin and Natalia Mishagina

July 2020

## Abstract

We study the effects of the CEGEP innovation of the late 1960s in the province of Quebec on total years of schooling based on a difference-in-difference methodology applied to the microdata from the 20% sample of the 2001 Canadian Census long form. Eight demographic groups are investigated, namely Francophone men and women from Montreal, Quebec City and “Rest-of-Quebec”, and Montreal Anglophones of each gender. The average estimated effects are statistically positive and large: 0.33 year for men and 0.41 year for women. Putting these results in context, we further argue that they likely underestimate the true behavioural effects of the reform on educational attainment, particularly in the case of Francophones.

Keywords: college, CEGEP, Quebec, schooling.

JEL Codes: I23, I28.

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In the second half of the 1960s, provincial governments in Canada initiated major reforms of postsecondary education. The common purpose was to respond to mounting demographic pressure following the baby boom, widen access to higher education, and expand technical training and continuing education (Gallagher and Dennison 1995; Jones 1997a). The concrete search for a new model led to the creation of several different provincial college systems. Alberta and British Columbia opted for California-style community and regional colleges with optional transfer programs to universities. In Manitoba and New Brunswick, the new colleges were predominantly entry-level occupational training institutions with no such university transfer arrangements. Saskatchewan relied on colleges without walls in rural areas and technical institutes in urban areas. Ontario introduced a new model of community colleges called Colleges of Applied Arts and Technology (CAATs). 20 CAATs out of the 24 currently in existence were established across the province in 1967. Many emerged from previously-existing institutes of technology and vocational centres. They offered a vast array of mainly occupation-oriented programs as an alternative for high school graduates who were not eligible for university admission. Contrary to Alberta and British Columbia, Ontario made transfers of CAATs graduates to universities rare and difficult (Jones 1997b).

### **The CEGEP Reform in Quebec**

In Quebec, there was a widely-shared conviction that educational attainment had “accumulated delays of at least one generation” behind other parts of Canada (Lesage 1962) and that the educational system was due for a major overhaul. A sweeping revolution of postsecondary education took place following the report of the Royal Commission of Inquiry on Education (Parent 1961-1966). The Commission unanimously proposed to create a new institution called *collège d’enseignement général et professionnel* (college of general and professional education, abbreviated CEGEP). A leading figure of the Parent Commission has called it “the most daring and demanding innovation” put forward by his group (Rocher 2006). The provincial act creating CEGEPs was quickly assented to in 1967.

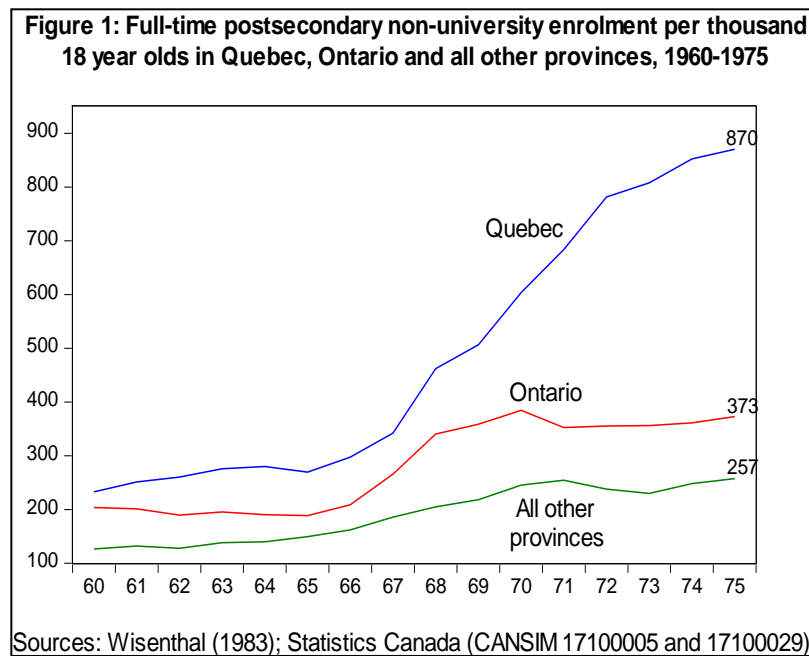
CEGEP attendance was made mandatory for all students who either intended to go on to university or wanted to get an intermediate-level technical training after graduating from a high school at the end of *Secondaire V* (Grade 11, not Grade 12) or from a first-level vocational school run by a school board. The CEGEP curriculum branched out into a 2-year academic pre-university stream for students planning to proceed to university, and a 3-year intermediate-level technical stream for those preferring to take a shorter route to the workplace. Whatever the stream chosen, the first CEGEP year was one of general education for all students. Students could change programs along the way. The intent was to make the path towards university or the labour market gradual and flexible. To make room for the second year of the CEGEP pre-university branch, the standard four-year university program leading to the bachelor’s degree was shortened to three years in all universities in Quebec, whether English or French. Contrary to Ontario CAATs’ graduates, graduates from CEGEP technical programs could be admitted to university programs under reasonable conditions.

38 of the 48 public CEGEPs currently in existence were created between 1967 and 1971. Most of the remaining 10, to be founded later, came into operation as separate campuses of the CEGEPs already created in this same early period (Dassylva 2004). Enrolment in all CEGEPs was tuition-free. The 1967-1971 wave saw many old classical colleges and institutes of technology converted

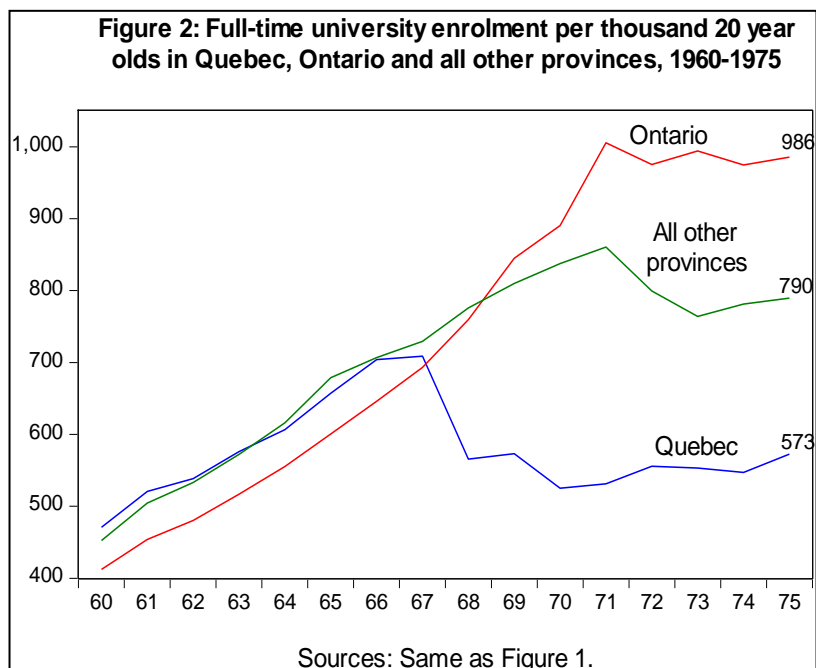
into CEGEPs. A few of them remained private and were allowed to offer the pre-university or technical CEGEP-level programs. They charged a fee, but were subsidized by the government under some conditions.

### Trends in Provincial Postsecondary Enrolment and Educational Attainment

Figures 1 and 2 show trends in full-time postsecondary enrolment in Quebec, Ontario and other provinces through the 1960-1975 period. Until 1966, enrolment followed quasi-parallel paths in the three regions. They were nearly flat in non-university institutions (Figure 1) and rose steadily in universities (Figure 2).



In contrast, beginning in 1967 the provincial paths diverged. In Quebec, the non-university enrolment rate tripled over the subsequent decade, owing to the greater room occupied by CEGEP pre-university and technical programs. In contrast, the university enrolment rate in the province decreased by 25% over the four years 1967-1970, reflecting the shortening of the undergraduate university curriculum and the abolition of the classical colleges (whose last four years from *Belles-Lettres* to *Philosophie II* were classified as being university-level until abolition). Meanwhile, mainly due to CAAT expansion, there was an 80% increase in the non-university enrolment rate in Ontario. The enrolment rate in Ontario universities simultaneously increased by 55%. Elsewhere in Canada, enrolment rates rose in both non-university and university settings, but less than in Ontario.

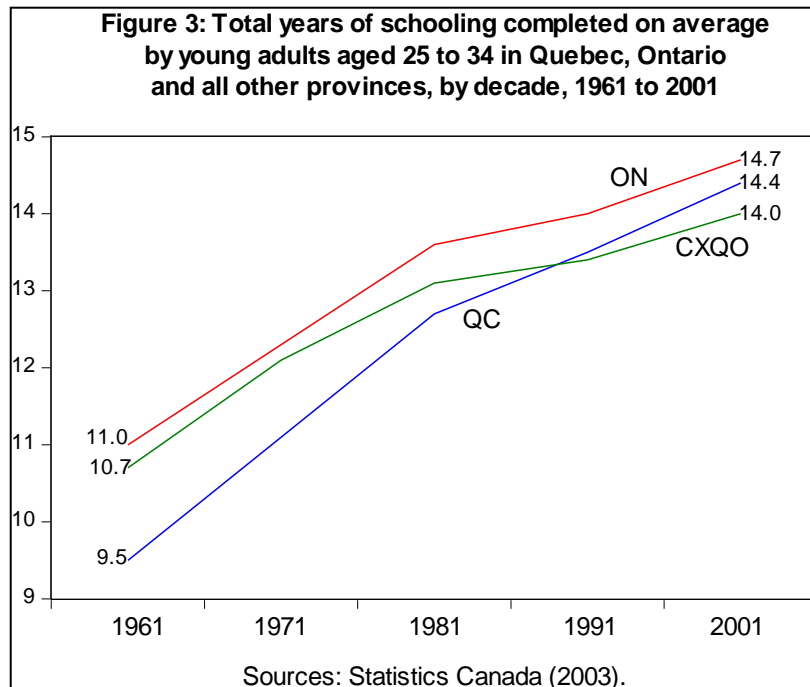


A central question about provincial postsecondary reforms is whether they helped generate an increase in total years of education of post-reform generations of students, which was the hoped-for objective at the time they were launched in the 1960s. Figure 3 shows that total years of schooling completed by young adults aged 25-34 – a summary measure of the amount of human capital accumulated by a generation – increased sharply in the three Canadian regions from 1961 to 2001.<sup>1</sup> Ontario posted the highest educational attainment throughout. Quebec started far behind, but largely caught up. In other provinces, the increase was also significant but a bit smaller than in Ontario and Quebec on average.

### Previous Studies of Effects of Community Colleges on Schooling

Because so many factors are simultaneously at work, it is impossible to deduct from a broad picture such as Figure 3 what effects the creation of community colleges had on total years of schooling completed on average by post-reform generations. As Rouse speculated in her 1995 study of U.S. community colleges, these effects could be negative or positive. On the negative side (“diversion”), community colleges might divert students from university, making them satisfied getting a first-level postsecondary diploma instead of spending more time towards completing an undergraduate university degree. On the positive side (“democratization”), community colleges expand career choices for students who would not be admitted to university. The net effect needs to be ascertained by detailed empirical study of actual behaviour. A later review of the U.S. evidence by Kane and Rouse (1999) did conclude that American community colleges increased average educational attainment on net.

<sup>1</sup> The reason that the trajectories in this picture end in 2001 is that the 2001 Census was the last one in which respondents to the long-form questionnaire were asked directly how many years they had completed at every level of education.



In Canada, the matter has been hard to settle empirically, partly because there has been such a variety of provincial postsecondary systems. In the rest of this paper, we focus on the question of whether the introduction of tuition-free CEGEPs in the second half of the 1960s increased total years of education in the province of Quebec.

On pecuniary benefits, an early estimate of the average real private return of a 3-year investment in the tuition-free technical CEGEP diploma (the *diplôme d'études collégiales*, or DEC) was 14% for men and 15% for women (Vaillancourt and Henriques 1986). For a full 5-year investment in a pre-university CEGEP degree followed by a university bachelor's degree, the average real private return was recently put at 20.6% for men and 23.6% for women (Ebrahimi et al. 2018). On the nonpecuniary side, Fortin and Van Audenrode (2018) mentioned a number of factors that may matter. First, CEGEPs offer an early – and often welcome – escape from the discipline and fatigue of high school right after Grade 11. Second, under the CEGEP structure the transition from high school to university is done in two separate small steps instead of a large one-step jump. This is arguably more consistent with the psychological/cognitive development of adolescents (Piaget 1971). Third, CEGEP education avoids premature specialization. Students know that they can easily change their orientation within the same establishment *en route* to university or the workplace at a low cost, with credits easily transferred and no extra tuition. Fourth, CEGEPs are widely spread geographically. There is one not too far from most Quebec towns and villages. The short distance from home may appeal to both students and parents. In addition, beginning in 1969 the opening of six establishments forming the University of Quebec network in Montreal, Trois-Rivières, Chicoutimi, Rimouski, Gatineau and Rouyn has helped absorb the rising tide of pre-university graduates from CEGEPs throughout the province.

However, none of the above studies of pecuniary or nonpecuniary benefits have shown whether the effects of CEGEPs on total years of schooling have actually been negative or positive on net. A pioneering contribution to answering this empirical question was made by Lewis (2003). He



applied a difference-in-difference (DID) methodology to pooled 3% samples from the three Canadian censuses of 1986, 1991 and 1996 and compared pre- and post-CEGEP born-in-Quebec Anglophone cohorts of each gender to control groups in various parts of Canada. His summary estimate was that the advent of CEGEPs in the late 1960s “caused an increase of about a third of a year of education for both men and women.”

## Data and Samples

In the rest of this paper, we expand on Lewis’ DID study of the effect of CEGEPs on total years of schooling in the province of Quebec. We rely on a wider sample, investigate three regional groups of Francophones in addition to Montreal Anglophones, use tighter definitions of language groups, and bring into the picture the CAAT reform occurring simultaneously in Ontario. We apply the DID methodology (see Angrist and Pischke 2009) to the anonymized microdata from the 20% sample of the 2001 Census long form (Statistics Canada 2001). We identify the effects of CEGEPs by comparing the differences between the schooling outcomes of various “treatment” and “control” groups before these institutions began to be introduced with their differences after they had been established.

Our full sample from the 2001 Census includes men and women born in years 1944 to 1955 and therefore aged 46 to 57 in 2001. Given that students entered CEGEPs at 17-18 years of age and that CEGEPs were essentially created during the 1967-1971 period, this 12-year time span extends backward into the pre-CEGEP period and forward into the post-CEGEP period, thus including many more birth cohorts than those immediately intended for treatment. We take advantage of the large size of the 20% sample of the Census to construct four treatment and two control groups of each gender. They are tailored to region and language, and to the periods over which CEGEPs were established according to Dassylva (2004). The four treatment groups are Montreal Francophones (1967-1968), Quebec City Francophones (1967-1969), “Rest-of-Quebec” Francophones (1967-1971) and Montreal Anglophones (1969-1971).<sup>2</sup> The two control groups are Toronto and “Rest-of-Ontario” residents. We call them for short MF, QCF, RQF, MA, TOR and RO. We investigate four treatment-control pairs of each gender: (MF, TOR), (QCF, RO), (RQF, RO) and (MA, TOR). Montreal, Quebec City and Toronto refer to the census metropolitan areas (CMAs). Rest of Quebec includes all regions of Quebec outside Montreal and Quebec City, and Rest of Ontario is comprised of all regions of Ontario outside Toronto. An individual is assigned to a Quebec or Ontario region if he/she was a 2001 resident of the region who was born in the province. We therefore restrict our samples to individuals whose province of birth was the same as their province of residence in 2001. This is meant to increase the likelihood that it was also their province of residence at the end of adolescence when they attended college and university.

Our classification of Quebec residents born in the province as Anglophones or Francophones is based on answers to questions 13 and 16 of the 2001 Census. Our Anglophone men and women are from two groups: 1) those whose mother tongue was English and who were fluent either in English only or in both official languages in 2001, and 2) those whose mother tongue was a non-official language and who were fluent in English only in 2001. Symmetrically, we consider two groups as Francophones: 1) those whose mother tongue was French and who were fluent either in

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<sup>2</sup> We leave out the scattered group of “Rest-of-Quebec” Anglophones, who accounted for 2.3% of total Quebec population aged 46 to 57 in 2001.

French only or in both official languages in 2001, and 2) those whose mother tongue was a non-official language and who were fluent in French only in 2001.

Our treatment groups of Anglophone men and women are strict subsets of Lewis' (2003). His Anglophone groups included all born-in-Quebec Canadians, whether they were still residing in Quebec or had moved to another province at census date; and they included all those whose mother tongue was a non-official language but who were fluent in both official languages at census date. Our definition aims at increasing the likelihood that they were residing in Quebec and had been exposed to an English institution when they were of CEGEP age. We keep born-in-Quebec Canadians in our treatment groups only if they were residing in Quebec at census date; and we leave out those whose mother tongue was a non-official language even if they were fluent in both official languages at census date, because it is unclear whether their preferred language and the CEGEP education to which they were exposed were English or French.

### Model and Estimation Results

For each of the eight Quebec language-region-gender groups, we estimate the following linear statistical model:

$$(1) \quad S_i = (\gamma_{44} * B_{1944_i} + \gamma_{45} * B_{1945_i} + \dots + \gamma_{55} * B_{1955_i}) * C_i \\ + (\tau_{44} * B_{1944_i} + \tau_{45} * B_{1945_i} + \dots + \tau_{55} * B_{1955_i}) * T_i + \varepsilon_i$$

In each estimated equation, observations include all members  $i$  of the relevant control and treatment groups born in years 1944 to 1955. The four treatment-control pairs (MF, TOR), (QCF, RO), (RQF, RO) and (MA, TOR) are the same for the two genders. The left-hand-side variable  $S_i$  is the total years of schooling of individual  $i$  according to questions 26 to 28 of the 2001 Census. On the right-hand side,  $C_i$  and  $T_i$  are 0-1 dummies which identify the control or treatment group to which individual  $i$  belongs, with  $C_i + T_i = 1$ ;  $B_{y_i}$  are 0-1 dummies which specify the birth year ( $y = 1944, 1945, \dots, 1955$ ), with  $\sum_y B_{y_i} = 1$ ; and  $\varepsilon_i$  is a zero-mean error term. By construction, for each birth year  $y$ , parameters  $\gamma_y$  and  $\tau_y$  are the averages of total years of education of members of the control and treatment groups, respectively. There are 24 such parameters to be estimated per equation. Since the Census long form does not contain any question on family characteristics such as parental income and education or family type, no such covariates are included on the right-hand side of the equation.

In this quasi-experimental context, DID estimation consists of comparing the difference between the treatment and control outcomes before intervention with the difference between the treatment and control outcomes after intervention. Specifically, if index  $b$  refers to a before-CEGEP year and index  $a$  to an after-CEGEP year, then  $\Delta_b = \tau_b - \gamma_b$  and  $\Delta_a = \tau_a - \gamma_a$  are the pre- and post-CEGEP treatment-minus-control differences in total years of schooling, and the DID estimator is the difference between these two differences, namely:

$$(2) \quad \Delta\Delta = \Delta_a - \Delta_b = (\tau_a - \gamma_a) - (\tau_b - \gamma_b)$$

where  $\tau_a$ ,  $\tau_b$ ,  $\gamma_a$  and  $\gamma_b$  are the parameters obtained from ordinary least squares estimation of equation (1) with data from years 1944 to 1955.

Table 1 summarizes the results. Column (1) names the Quebec language-region groups that are treated. Column (2) specifies the period during which new CEGEPs were opened for each group. Column (3) identifies the single post-CEGEP birth cohort that is the focus of DID estimates. It is the earliest cohort that was entirely exposed to the CEGEP system once the period of opening the new institutions had been fully completed. The rule we follow is that the cohort must have reached age 17 in the year column (2) says the establishment period ended. For the pre-CEGEP period, we deal with several cohorts. They are identified in column (4). Specifically, they are those born between 1944 and the latest year for which the cohort would have been subjected to the pre-CEGEP system in adolescence. Here, the rule we follow is that this latest birth cohort reached age 19 in the year CEGEPs began to be established for the group according to column (2). Column (5) indicates the gender to which the estimation applies.

**Table 1. Difference-in-Differences (DID) Estimation of the Effect of Introducing CEGEPs on Total Years of Schooling for Eight Quebec Language-Region-Gender Groups**

(1)	(2)	(3)	(4)	(5)	(6) (7)		(8)
Region and language of treatment group	Period of opening of new CEGEPs	Earliest post-CEGEP birth cohort	Pre-CEGEP birth cohorts	Gender	DID effect on years of schooling of earliest post-CEGEP cohort relative to:		H <sub>0</sub> : Pre-CEGEP trends were parallel (p-value)
					latest pre-CEGEP cohort (s.e.)	average of pre-CEGEP cohorts (s.e.)	
Montreal Francophones	1967-68	1951	1944-48	Men	0.53 (0.16)	0.54 (0.13)	1944-47 (0.94)
				Women	0.19 (0.15)	0.20 (0.11)	1944-47 (0.26)
Quebec City Francophones	1967-69	1952		Men	0.34 (0.17)	0.43 (0.13)	1944-47 (0.74)
				Women	0.47 (0.14)	0.54 (0.11)	1944-47 (0.99)
Rest-of-Quebec Francophones	1967-71	1954		Men	0.10 (0.10)	0.31 (0.07)	1944-47 (0.85)
				Women	0.43 (0.09)	0.61 (0.07)	1944-47 (0.29)
Montreal Anglophones	1969-71	1954	Men	0.15 (0.29)	0.01 (0.22)	1944-49 (0.88)	
			Women	0.84 (0.27)	0.56 (0.20)	1944-49 (0.35)	

Note: For Montreal Francophones and Anglophones (MF and MA), the control group is Toronto (TOR) residents of same gender; for Quebec City and Rest-of-Quebec Francophones (QCF and ROQ), it is Rest-of-Ontario (RO) residents of same gender. Detailed results available upon demand.

Source: See explanations in text.

Columns (6) and (7) report two estimates of the DID effect on years of schooling for each treatment-control pair. Both are based on the same post-CEGEP birth cohort, but are calculated relative to two separate definitions of the pre-CEGEP birth period. The first estimate, in column (6), compares the difference between two single-year birth cohorts: the earliest post-CEGEP cohort (index a) versus the latest pre-CEGEP cohort (index b). The estimated pre- and post-

CEGEP differences are  $\Delta_b = \tau_b - \gamma_b$  and  $\Delta_a = \tau_a - \gamma_a$ , with index a set as in column (3) and index b as the end year of the period in column (4). The resulting DID effect on total years of schooling is the  $\Delta\Delta$  difference defined by equation (2).

Taking Montreal Francophone men as example, columns (2) to (6) read as follows. CEGEPs for this group were opened in 1967 and 1968, implying that the latest pre-CEGEP cohort was born in 1948 (1967 minus 19 years) and the earliest fully post-CEGEP cohort was born in 1951 (1968 minus 17 years). Comparing these treated Montreal Francophone men with their Toronto controls, we find from our full estimation of equation (1) that the pre-CEGEP schooling difference was  $\Delta_b = \Delta_{1948} = \tau_{1948} - \gamma_{1948} = -1.96$  years (a 23.5-month difference), while the post-CEGEP difference was  $\Delta_a = \Delta_{1951} = \tau_{1951} - \gamma_{1951} = -1.43$  years (a 17-month difference). For ease of reading, we do not record these differences in the Table, but report the resulting DID effect in column (6). It is an increase of  $-1.43 - (-1.96) = 0.53$  year (6.5 months) of schooling for Montreal Francophone men relative to Toronto men.

Since  $\Delta\Delta = (\tau_a - \gamma_a) - (\tau_b - \gamma_b)$  can be rearranged as  $\Delta\Delta = (\tau_a - \tau_b) - (\gamma_a - \gamma_b)$ , an estimate of  $\Delta\Delta$  also tells by how much the difference in years of schooling in the treatment group before and after the opening of CEGEPs ( $\tau_a - \tau_b$ ) has exceeded the difference in years of schooling in the control group before and after the opening of CEGEPs ( $\gamma_a - \gamma_b$ ). For this  $\Delta\Delta$  statistic to be a reliable estimate of the effect of introducing CEGEP structure on years of schooling, it has to be trusted that in the absence of the CEGEP intervention years of schooling would have evolved similarly in the treatment and control groups, that is, that  $\tau_y$  and  $\gamma_y$  would have followed parallel trends between birth dates  $y = b$  and  $y = a$ . A check that comes naturally to mind on whether this condition is met and is standard in the literature is to see if  $\tau_y$  and  $\gamma_y$  did in fact follow parallel trends for the birth years just before CEGEPs were established. We implement this by regressing the estimated annual treatment-minus-control differences  $\Delta_b = \tau_b - \gamma_b$  on linear time trends over the pre-CEGEP period 1944-1947 for the six Francophone groups and 1944-1949 for the two Anglophone groups. Column (8) of Table 1 shows that none of the p-values that are generated by these tests of the hypothesis of zero trend for  $\Delta_b$  falls short of 0.26. The no-parallel-trends assumption passes this simple test without much difficulty for every treatment-control pair at standard levels of confidence.

This suggests redefining the pre-CEGEP treatment-minus-control difference as the average of all (non-trended) annual  $\Delta_b = \tau_b - \gamma_b$  differences since 1944. This might be helpful in reducing single-year idiosyncrasy and increasing the robustness of estimates without going too far in the past. We implement this alternative by rewriting our model equation (1) as:

$$(3F) \quad S_i = (\gamma_{4448} * B_{4448}_i + \gamma_{449} * B_{1949}_i + \dots + \gamma_{55} * B_{1955}_i) * C_i \\ + (\tau_{4448} * B_{4448}_i + \tau_{449} * B_{1949}_i + \dots + \tau_{55} * B_{1955}_i) * T_i + \varepsilon_i$$

for the six Francophone groups, and:

$$(3A) \quad S_i = (\gamma_{4450} * B_{4450}_i + \gamma_{51} * B_{1951}_i + \dots + \gamma_{55} * B_{1955}_i) * C_i \\ + (\tau_{4450} * B_{4450}_i + \tau_{51} * B_{1951}_i + \dots + \tau_{55} * B_{1955}_i) * T_i + \varepsilon_i$$

for the two Anglophone groups. The new 0-1 dummies  $B_{4448_i}$  and  $B_{4450_i}$  are sums of the  $B_{y_i}$  dummies of years 1944 to 1948 for the six Francophone groups and 1944 to 1950 for the two Anglophone groups;  $\gamma_{4448}$ ,  $\tau_{4448}$ ,  $\gamma_{4450}$  and  $\tau_{4450}$  are the new parameters to be estimated;  $\Delta_b = \tau_{4448} - \gamma_{4448}$  or  $\tau_{4450} - \gamma_{4450}$  are the corresponding pre-CEGEP treatment-minus-control differences;  $\Delta_a = \tau_a - \gamma_a$  is the same as before (with  $a = 1951, 1952$  or  $1954$  set according to column(3) depending on the group); and  $\Delta\Delta = \Delta_a - \Delta_b = (\tau_a - \gamma_a) - (\tau_{4448} - \gamma_{4448})$  or  $(\tau_a - \gamma_a) - (\tau_{4450} - \gamma_{4450})$  are the DID estimators. The resulting second estimates of the DID effects on years of schooling are reported in column (7) of Table 1.

## Interpretation and Context

The effects of CEGEPs on total years of schooling that we have estimated based on the DID methodology have two broad properties. First, for each language-region-gender treatment group the point estimates of column (7) are not too different from those in column (6). The way the pre-CEGEP reference period is defined does not seem to matter much. Second, while not everywhere as precise as one would wish, these point estimates show positive effects for all eight groups. This is supportive of the view that the introduction of CEGEPs increased aggregate educational attainment. Weighting the individual estimates of columns (6) and (7) by the corresponding population shares yields an average increase in schooling of 0.33 year from a base of 12.2 years for men, and 0.41 year from a base of 11.8 years for women. These are sizable effects given that they are concentrated in years of schooling beyond Grade 11.<sup>3</sup>

There are nevertheless reasons to conceive of the DID results of Table 1 as conservative estimates of the true behavioural response of schooling to the CEGEP innovation. One of these reasons is that all post-CEGEP differences  $\Delta_a = \tau_a - \gamma_a$  behind the DID estimates are calculated only for the earliest year following the end of intervention. This is assuming implicitly that the behaviour of the adolescent population was already fully adjusted to treatment at the very end of the period during which the new CEGEPs had been established. It is of course possible to argue that this assumption is too strong and that behaviour could have taken more years to adjust fully. Additional DID estimates could use post-CEGEP treatment-minus-control differences for a few more birth cohorts after the earliest one. However, there is risk that the later post-CEGEP differences would capture a confounding mix of (unobserved) behavioural changes involving more than the direct effects of CEGEP reform. To avoid this risk, we have refrained from going beyond earliest-year post-CEGEP differences. But in doing so we acknowledge that our DID estimates are subject to the opposite risk of being too conservative.

Another reason that our DID results may underestimate the true behavioural response of schooling to the advent of CEGEPs, at least for Francophones, is the possibly-confounding effect of the CAAT reform that took place in Ontario in 1967, which is also the year in which the

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<sup>3</sup> In 2018, the percentage of the young adult (25-44) population holding a postsecondary non-university or university certificate or diploma was 78% in Quebec, 73% in Ontario and 70% in other provinces (Statistics Canada 2019). Quebec's high percentage comes from its shorter secondary level and its large presence at the postsecondary non-university level. Note that the latter includes holders of first-level vocational training certificates, which Statistics Canada's Labour Force Survey finds impossible to identify properly among community college graduates outside Quebec.

CEGEP reform started for the six Francophone treatment groups. While proper testing of the true effect of CAATs on schooling would require another study, Figure 1 is suggestive that this innovation was followed by an increase in postsecondary non-university enrolment in Ontario relative to other provinces. The CAAT reform prevented trends in treatment and control from continuing their parallel course (absent the CEGEP innovation) in this crucial period. Since the DID effects  $\Delta\Delta = (\tau_a - \tau_b) - (\gamma_a - \gamma_b)$  we report in Table 1 subtract this positive jolt on  $(\gamma_a - \gamma_b)$  that had no counterpart in the change in treatment  $(\tau_a - \tau_b)$ , they must underestimate the true behavioural response of schooling of Francophones to the CEGEP innovation. For Anglophones, the context was different, because the founding of English CEGEPs started in 1969, which was two years after the new CAATs had been in operation. The CAATs-related underestimation affecting our DID results for Francophones could be small or zero in the case of Anglophones if one is to give credence to Figure 1's suggestion that in 1969 the postsecondary non-university enrolment rate in Ontario had already attained a steady-state maximum relative to other provinces.

A third consideration is that our DID estimates of the effects of the CEGEP reform do not capture behavioural changes alone, but a mix of institutional and behavioural adjustments. A main concern of the Parent Commission was with the bothersome disparities in program lengths throughout the educational system. One example it gave (Parent 1961-1966, 2, 38) was that in English universities the bachelor's degree could be obtained in 15 years of study (4 years after Grade 11) in fields such as commerce, science and agriculture and 16 years (5 years after Grade 11) in engineering. In Francophone universities, these four degrees could be obtained either in 16 years (4 years after Grade 12) if the student had graduated from a public secondary school, or in 19 years (4 years after Grade 15) if he/she had first gone through the lengthy 8-year program of classical humanities in a private college. The Commission successfully recommended that the schooling requirement for a bachelor's degree in all universities be standardized at 16 years of study: 6 years elementary, 5 years secondary, 2 years CEGEP and 3 years university.<sup>4</sup> As a result, the time it took to complete a bachelor's degree decreased on average for Francophones and increased for Anglophones. These institutional adjustments affect our estimates of the change in treatment  $(\tau_a - \tau_b)$  in the negative direction for Francophones and in the positive direction for Anglophones. They introduce an element of underestimation of the true behavioural response of years of schooling to the CEGEP reform in the case of Francophones and, conversely, of overestimation in the case of Anglophones. In particular, the abolition of the old private classical colleges alone may have mechanically lowered the effect of CEGEPs on average schooling by as much as 0.13 year on the Francophone side.<sup>5</sup>

Adding these considerations to the DID estimates of Table 1 strengthens the evidence that the effect of introducing CEGEPs had a significant positive effect on total years of schooling of the

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<sup>4</sup> Important changes were also introduced in areas such as teachers' education and nursing (Pelletier 1978). The old 15-year *Brevet A* granted by the *écoles normales* (4 years after Grade 11) was replaced by a 16-year bachelor's degree (2 years pre-university CEGEP and 3 years university after Grade 11). Meanwhile, the nursing diploma, which had previously taken 15 years to obtain (3 years after Grade 12), could now be reached after 14 years (3 years technical CEGEP after Grade 11).

<sup>5</sup> In academic year 1966-1967, 4,750 students reached the eighth year of the classical curriculum (Pelletier 1978). They represented 4.5% of the 20-year-old population of Quebec. It took 19 years to get a bachelor's degree under this classical system, but 16 years in the new CEGEP system. The replacement thus generated a decrease of  $0.045 \times 3 = 0.13$  year in the overall average years of schooling.

six treated groups of Francophones. A significantly positive effect for Anglophone women also stands out in Table 1. However, the evidence of a positive effect for Anglophone men is weaker than in Lewis' (2003) study, which may be a consequence of our definition of Anglophone groups being different.

### **Summary and Lessons for Policy**

In this paper, we have applied a simple difference-in differences (DID) methodology to the 20% sample of Census 2001 microdata and estimated the effects of the CEGEP innovation of the late 1960s on total years of schooling for eight demographic groups in the province of Quebec, namely Francophone men and women from Montreal, Quebec City and "Rest-of-Quebec", and Montreal Anglophones of each gender. Our average estimated effects are large: 0.33 year for men and 0.41 year for women. Putting these results in context, we have further argued that they likely underestimate the true behavioural effects the CEGEP reform had on educational attainment, particularly in the case of Francophones.

How did the policy decision to introduce this new postsecondary non-university structure come about? It was implemented in 1967 by the provincial government of Quebec following the recommendation of the Royal Commission of Inquiry on Education (Parent 1961-1966) to this effect. Basically, it had come to be widely recognized in the 1950s and early 1960s that educational attainment in Quebec was badly lagging behind that in other parts of Canada (see Figure 3), that the educational system was full of incongruities, particularly on the Francophone side, and that it was due for a major overhaul. This view was shared by Premier Jean Lesage, his Minister of Education Paul Gérin-Lajoie, his Deputy Minister (also a highly-respected educator) Arthur Tremblay, and the outgoing Rector of Laval University (and a towering intellectual figure) Mgr. Alphonse-Marie Parent, who chaired the Royal Commission. Lesage's successor, Premier Daniel Johnson, later went on board. It was a unique historical moment of confluence of political, administrative and intellectual leadership. Public opinion was carried over the hesitations of groups who were losing power from the CEGEP reform, mainly university principals and rectors and the *Fédération des collèges classiques*.

The evidence we present in this paper suggests that the CEGEP reform met successfully its intended goal of increasing total years of schooling in Quebec, likely exceeding what was achieved by the reforms of postsecondary education that were initiated in the same period in other parts of Canada. This raises naturally the question of why, if successful in Quebec, the CEGEP structure has not been considered for adoption by other provinces in the last 50 years. Part of the answer is informational: it took 30 years before academic research began to look seriously into what was actually achieved by the CEGEP reform. Another part of the answer is political: this kind of major institutional change would require that in other parts of Canada school boards and universities each agree to cede one year of study so as to create a new separate 2-year structure. This is unlikely to be feasible politically, as evidenced by the strong opposition of Ontario university presidents to transfer arrangements with CAATs in the past. For a long while, the Quebec reform will probably remain the outcome of a hard-to-repeat historical moment.

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