School quality and the distribution of male earnings in Canada

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Abstract

Using quantile regressions, this paper provides evidence that the relationship between school inputs and wages varies across points in the conditional wage distribution and educational attainment levels. Although smaller classes generally have a positive return for individuals at high quantiles, they have either no impact or a negative impact at low quantiles. Similarly, while more highly paid teachers benefit dropouts at high quantiles and graduates at low quantiles, they have a negative return for all other quantile-education groups. The results presented in this paper also suggest that the optimal school for high school graduates is likely smaller than for high school dropouts.

Keywords: School quality, quantiles, wages
JEL Classification: I2 and J3

1. Introduction

The relationship between school quality and student achievement has been debated for decades. In his survey of the evidence, Hanushek (1986) finds little or no relationship between school quality and student achievement on standardized tests. In contrast, using data from the Tennessee STAR class size reduction experiment, Krueger (1999) and Krueger and Whitmore (2001) find that smaller classes have a positive impact on test scores. Parallel work examining at the relationship between school quality and earnings later in life is equally indecisive. While several studies find a significant relationship between school quality and subsequent wages (Welch 1966; Morgan and Sirageldin 1968; Johnson and Stafford 1973; Wachtel 1976; Rizzuto and Wachtel 1980; Card and Krueger 1992) others find no significant relationship between school inputs and earnings (Ribich and Murphy, 1975; Akin and Garfinkel, 1977; Betts, 1995).

Although the school quality debate has re-surfaced several times, attention has generally focused on the relationship between school inputs and average wages. For example, linking 1980 earnings in the U.S. census to average state of birth school quality measures for three cohorts born between 1920 and 1949, Card and Krueger (1992) find that school inputs, such as the pupil-teacher ratio, relative teacher wages, and school term duration, are related to subsequent earnings. In contrast, Betts (1995) finds no statistically significant relationship between mean wages and similar school quality measures using National Longitudinal of Youth (NLSY) data.

It is possible, however, for school inputs and wages to be related at some points in the conditional wage distribution even if there is no statistically significant relationship on average. School inputs and student outcomes may therefore be significantly related even if school inputs and average outcomes are not. Brown and Saks (1975) argue that a school input is productive if it affects any student. Characterizing the distribution of student outcomes by its mean and

variance, an input is productive if it affects either moment. Regressing the mean and standard deviation of test scores on school inputs, they find that the standard deviation is significantly related to school inputs, but mean test scores are not. In a similar vein, Eide and Showalter (1998) find that school inputs affect test score gains at some points in the conditional test score distribution without impacting the mean. For example, they find that a longer school year has a positive impact on test scores at high quantiles, but no impact at low quantiles and the mean.

The current paper follows Card and Krueger (1992) in exploring the relationship between school inputs and earnings for men born in the middle of the last century. However, I depart from the Card and Krueger (1992) framework to explore the relationship between school inputs and the entire distribution of wages. Using quantile regressions and linking 1981, 1986, and 1991 Canadian Census data to provincial school characteristics from 1932 to 1970, this paper presents an extensive analysis of the relationship between school inputs - measured by class size (pupil-teacher ratio), school size (teacher-school ratio), and relative teacher pay - and the distribution of wages. I estimate the returns to school inputs at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} quantiles (percentiles) of the conditional wage distribution.

By following Brown and Saks (1975) and Eide and Showalter (1998) and looking across the conditional wage distribution, I am explicitly interested in the possibility that school inputs may impact different students in different ways. Stated somewhat differently, class size, school size and teacher salaries may differentially impact students of different ability levels.

For example, smaller classes may differentially benefit more able students because teachers have time to develop specialized enrichment programs, run multiple reading groups, and so on. Throughout the 1950s and 1960s, provincial Department of Education Annual Reports and Royal Commissions on Education repeatedly echo teacher concerns that the progress made

by gifted students is impeded by the presence of 'slower learners' and the inability of teachers to adopt ability specific curricula in large classes composed of students with diverse abilities. In contrast, Levin (1993) argues that less able students benefit from high instructor expectations, deadlines, and interaction with more able pupils. To the extent that larger classes encourage this environment, because teachers are forced to rely more heavily on group work and student mentoring, less able students may benefit.

Class composition - the number of grades or student types in each classroom - is directly related to school size. Historically, small rural schools struggled to attract and retain qualified teachers, had difficulty raising fund[1]s for infrastructure, and were often poorly supervised (Alberta, 1955). Making matters worse, instructors in small rural schools had to conduct simultaneous lessons for students spanning a wide range of grade levels. To give you a sense of the pervasiveness of single room schools, in 1957 there were still 395 one-room schools in Manitoba in which fewer than 15 students were enrolled.

On the other hand, larger schools are more able to support single-grade classrooms. In fact, once there is more than one class at each grade level, schools have the option to stream students into ability specific classrooms.[1] More teachers also means that high schools can offer a wider range of courses and hire more specialized instructors to teach them. However, just as there are costs associated with very small schools there are also costs associated with very large schools. Large institutions are plagued by student recognition, congestion, and discipline problems. While all students benefit from single-grade elementary school classes, the benefits of specialized classes may not outweigh the costs associated with large high schools for all students.

Finally, it is generally assumed that higher wages attract and retain more highly qualified teachers and that salaries and teacher quality are therefore positively correlated. This implicitly assumes that the teacher characteristics that are highly correlated with salaries are beneficial for all students. However, it seems unlikely that a specific set of teacher characteristics is optimal for all students. It seems more likely that the optimal matching between teachers (characterized by education and possibly gender) and students is more complex. Historically, higher salaries were accompanied by more certification and greater specialization. It seems possible that individuals attracted to teaching when few post-secondary requirements exist may be better suited to teach less able students while more highly paid teachers benefit higher ability students.

Using the Canadian Census data described above, I indeed find that the size and direction of the impact of class size, school size and teacher salaries vary across points in the conditional wage distribution. More specifically, the returns to any given input tend to be of opposite sign at opposing ends of the conditional wage distribution. Given the structure of the returns to school inputs across quantiles, it is not surprising that many studies have been unable to find a statistically significant relationship between school inputs and average wages.

The remainder of the paper is as follows. The next section discusses the estimation strategy. Section 3 describes the Canadian Census and school input data used in the analysis. Section 4 presents the results. Section 5 concludes.

2. Estimation

All regressions are of a standard Mincerian/education production function form.

$$\ln w_i = \beta_0 + Z\beta_Z + S_i\beta_S + Q_i\beta_Q + S_iQ_i\beta_{SQ} + \upsilon_i \qquad (1)$$

Observable characteristics, *Z*, include a quadratic function of experience and sets of dummy

variables for birth cohorts, province of birth, and census years. School quantity, *S*, is a three component vector measuring years of public school, university, and post-secondary technical training. Due to data restrictions, public school quantity is further divided into three variables: dummies for less than five years and between five and eight years of schooling and actual years for those with more than eight years of public education. School inputs[2] (or "quality") includes the pupil-teacher ratio, teacher-school ratio, and relative teacher wage. Class size and teacher pay enter all regressions directly. School size is divided into three groups: small, medium, and large (less than 4, from 4 to 7.99, and 8 or more instructors). The two latter dummy variables are included in all regressions.

This specification allows school inputs to affect the return to schooling (the slope of the earnings function) and the intercept. This formulation is similar to that of Betts (1995) and differs from both Card and Krueger (1992) and Johnson and Stafford (1973). Card and Krueger focus on the impact that inputs have on the slope of the earnings function and Johnson and Stafford focus on the intercept.

The quantile regression technique allows us to estimate the impact of school inputs at various points in the earnings distribution conditional on the values of covariates. In other words, this approach allows us to examine the impact of school inputs at the middle of the conditional wage distribution as well as a variety of other points giving us a more complete picture of the conditional distribution than a single estimate of the center. In order to convey a sense of the impact of school inputs across the entire conditional wage distribution, without reporting dozens of regressions, results for the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} quantiles (percentiles) are reported for all specifications. Several recent papers have similarly used quantile regressions to learn about points in the distribution of the dependent variable beyond the

mean. Examples of such work include Buchinsky (1994 and 1995) and Eide and Showalter (1997 and 1998).

Following Koenker and Bassett (1978) the quantile regression model can be written as:

$$\ln w_i = X_i\beta_\theta + \upsilon_{\theta i} \qquad \text{with} \quad \text{Quantile}_\theta(\ln w_i \mid X_i) = X_i\beta_\theta \quad i = 1,\ldots,n \tag{2}$$

where the X_i includes all variables defined in (1).

$\text{Quantile}_\theta(\ln w_i \mid X_i)$ denotes the θ^{th} quantile of $\ln w$ given X. The θ^{th} quantile regression estimator for β, denoted β_θ, is the solution to the following minimization problem:

$$\min_{\beta}\left[+\sum_{\{i|\ln w_i \geq X_i\beta\}}\theta\left|\ln w_i - X_i\beta\right| + \sum_{\{i|\ln w_i < X_i\beta\}}(1-\theta)\left|\ln w_i - X_i\beta\right|\right]. \tag{3}$$

Stated somewhat differently, the quantile regression estimates result from minimizing the weighted sum of the absolute value of errors, where the weights assigned to positive and negative errors determine the quantile.

3. Data

All wage and educational attainment data are from the 1981, 1986, and 1991 *Census of Canada; Public Use Microdata File on Individuals.* The sample includes men born in Quebec, Ontario, Manitoba, Alberta, or British Columbia between 1926 and 1952.[3] The sample is restricted to non-agricultural employees earning at least $40 per week in 1986 dollars.[4] All nominal variables are deflated to 1986 dollars using the CPI. The sample contains 73,337 men: 27,832 in 1981, 21,101 in 1986, and 24,404 in 1991.

[Table 1 here]

The wage and educational attainment data are linked to province of birth specific school input measures.[5] Individuals are assigned the average provincial class size (pupil-teacher ratio),

school size (teacher-school ratio), and the relative pay of teachers during their potential period of enrollment.[6,7] More specifically, each school input measure is a province of birth and enrollment period specific moving average.

$$Q_{p_{kij}} = \sum_{d=i}^{i+11} \frac{Q_{kij}}{12} \tag{4}$$

where *p* denotes public school, *k* = pupil-teacher ratio, teacher-school ratio, or relative teacher pay, and *i* = year of school entry (school years are numbered using the June year).

Men born between 1926 and 1952 entered school between 1932 and 1958, with the youngest individuals completing grade thirteen in 1970. The period 1932 to 1970 was selected for two reasons. First, the provincial education systems exhibit substantial variation across provinces at any given point in time, and within provinces over time during this period. Secondly, by 1970 most provinces had relinquished a significant degree of educational control to local school districts. Reduced provincial control coincided with a decrease in provincially published school data. All school data used in this paper are from the Alberta, British Columbia, Manitoba, Ontario and Quebec provincial Ministry/Department of Education Annual reports from 1932-70.

3.1 Canadian school characteristics from 1932-70

While there was a general trend towards smaller classes in all provinces over the period of interest, the speed and pattern of changes varied substantially across provinces (Figure 1 graphs the school input measures by province from 1932-70). For example, the time path of the Ontario pupil-teacher ratio has three distinct phases: declining size from 1932 to 1941, relative stability with between 28 to 31 students per instructor until the early 1960s, and then rapid

decline to 21.8 students per teacher by 1970. In contrast, the relatively small Quebec classes, at an average size of 27.3 in 1932, declined slowly, but continuously, to 22.9 in 1960.

[Figure 1 here]

The importance of disentangling school and class size is most apparent for Alberta. Enrollment declines during the Great Depression led to smaller classes, but had no effect on the teacher-school ratio. In contrast, the larger schools created by urban school expansion and rural school amalgamation between 1945 and 1949 were accompanied by larger classes. Finally, by the early 1950s the average class began to shrink while the growth of urban schools and the consolidation of small rural schools into larger regional institutions continued at a rapid pace. It is during this era that school growth was accompanied by dramatic classroom composition changes. Multi-grade classes became less common, course selection diversified, and the availability of special services (learning assistance for example) increased. While the pace of school size expansion was not as rapid in other provinces, schools in all provinces grew from 2 or 3 teachers per school in the 1930/40s to 13-19 teachers per school by 1970.

The five provinces included in this study are economically diverse and geographically vast; significant inter-provincial cost of living, wage, and occupational opportunity differences have always existed. For these reasons, it is unlikely that teacher salaries are an adequate index of instructor quality. I therefore use the average annual teacher salary in each province relative to the average annual electrician's salary in the province's largest city.[8]

There are three noteworthy salary trends. First, relative teacher salaries were substantially higher in British Columbia than in other provinces until the 1960s, by which time British Columbia, Alberta and Ontario teacher salaries had converged. Secondly, Manitoba teachers were the only Canadian instructors who did not experience a wage decline during World War

Two. In every other province the relative wage earned by teachers fell during the early 1940s and then rose as the war drew to a close. Thirdly, Quebec schools were religiously affiliated, mostly Catholic[9], and largely staffed by Nuns and religious brothers[10] throughout the period of interest. As the remuneration received by religiously affiliated instructors was much lower than their layperson counterparts, the average salary of Quebec teachers was substantially lower than in other provinces.[11]

4. Results

Table 2a presents the estimates (for the specification described in Section 2) for the coefficients on class size, school size, and teacher pay on wages later in life at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} quantiles. The OLS estimates are also reported for comparative purposes. For descriptive purposes, Table 2b reports the percentage change in earnings associated with a one standard deviation change in each of class size, the percentage of medium sized schools, the percentage of large sized schools, and teacher salaries.

[Table 2a here]

[Table 2b here]

4.1 Class size

Class size has the most pronounced impact on wages at more extreme points in the conditional wage distribution. For example, a one standard deviation reduction in the pupil teacher ratio, a decline of 2.4 students per teacher, is associated with a 0.3 percentage point wage increase for a man with ten years of public school education at the median. In contrast, the same class size reduction reduces earnings by 4.2 percent at the 10^{th} percentile of the wage distribution and increases earnings by 3.6 percent at the 90^{th} percentile. Between these two extremes, the

effect of class size on earnings rises fairly smoothly, depending upon the education level at which the relationship is evaluated. As a consequence, a nation-wide decrease in class size leads to an increase in the dispersion of male wages.

As is commonly found, there is no statistically significant relationship between class size and mean wages, except at very low levels of schooling. The mirror image nature of the class size effect across quantiles may help explain the absence of a relationship between class size and average earnings. More specifically, it may result because a class size reduction is associated with lower wages at low percentiles of the conditional wage distribution and higher wages at high points in the conditional wage distribution, at least for men with less than twelve years of public schooling. The small negative effect of smaller classes at high quantiles is likely the result of the imposed linearity of education from grade nine through twelve.

4.2 School size

As can be seen in Table 2b, the movement from small to medium sized schools has no impact at any point in the conditional wage distribution. In other words, there appears to be no systematic difference between small and medium sized schools, at least in terms of wages later in life. However, the movement to large schools does have an impact on wages, and in contrast to class size, the relationship between school size and subsequent earnings tends to be strongest at more central points in the wage distribution. A one standard deviation (0.3971) increase in the percentage of students educated in large schools is associated with a 1-2 percentage point wage increase for men with nine to ten years of education at the 25^{th} and 50^{th} percentiles of the wage distribution. These results are consistent with the idea that somewhat less able men, who benefit from the availability of vocational classes benefit from larger schools.

In contrast to the discussion in the introduction, there is no statistically significant impact of large schools on men at higher quantiles. In other words, there is no evidence of gain or loss associated with larger schools for more able men. This suggests that the gains from specialized classes are offset by the congestion costs associated with large institutions for these men.

4.3 Teacher salaries

There is no statistically significant relationship between more highly paid teachers and subsequent student earnings on average, at the mean or median. However, the relationship between teacher salaries and subsequent earnings is both statistically and economically significant at the 10^{th}, 25^{th}, 75^{th} and 90^{th} percentiles. The pattern of the relationship across quantiles is more complicated than those between earnings and class and school size. Less educated men at low quantiles suffer a wage loss as teacher salaries rise while more educated men at low quantiles enjoy a wage rise, or at least less of a fall. At the other end of the conditional wage distribution, less educated men enjoy a greater increase in wages as teacher salaries rise. Overall, this pattern implies that a nation-wide teacher salary will increase within education group wage dispersion for low education groups and compress within education group wage dispersion for high education groups.

4.4 Alternative specifications

Tables 3 through 5 expand the set of explanatory variables to include urban/rural residence, marital status, occupation,[12] and post-secondary field of study[13] dummy variables to ensure that their inclusion does not substantially alter the estimated impact of school input measures. Table 3 reports the results for the model expanded to include urban/rural residence,

marital status, and occupation. While there are some differences between Tables 2 and 3, most notably that the large school variables are no longer jointly significant at the 75th percentile and neither the class size nor teacher salary variables are jointly significant at the 25th percentile, the general patterns are very similar.

[Table 3 here]

Table 4 further expands the set of regressors to include a set of region of residence indicator variables. Region of residence is used instead of province of residence due to small cell sizes for Maritime and Prairie provinces. Individuals living in Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick are categorized as living in the Maritimes and those living in Manitoba, Saskatchewan and Alberta are classified as living on the Prairies. Quebec, Ontario and British Columbia enter as their own region. Tables 3 and 4 are very similar. The substantial difference is that the large school variables at the 10th and 25th percentiles are no longer statistically significant at the 5% level.

[Table 4 here]

Table 5 further expands the set of explanatory variables to include post-secondary major fields of study. Unfortunately, the major field of study is not reported in 1981, this restriction reduces the sample size to 45,500, and eliminates the first nine-year cohort from the analysis. The estimates reported in Table 5 differ from those in Table 2 in two important ways. First, the large school variables are no longer jointly significant at any quantile. Secondly, the teacher salary variables are no longer jointly significant at the 75th percentile. With these exceptions, the statistical significance and pattern of results are again similar.[14]

[Table 5 here]

To this point all regressions have treated educational attainment as exogenous. However,

it is possible, indeed likely, that school inputs affect earnings by influencing the length of time that people choose to remain in school. It is of course also possible that school quality influences field of study selections in university, experience, urban/rural residence, and occupation choices. To address this issue, Table 6 presents some simple reduced form estimates of the effect that school inputs have on log earnings at various points in the conditional wage distribution. All choices that may be influenced by school quality are omitted from the list of regressors. These include educational attainment, field of study, labor market experience, occupational choices, and so on. Since educational attainment is excluded, the school input coefficients estimate both the direct effect of educational attainment as well as the indirect effects of school and post-secondary choices.[15] For example, larger schools may yield higher returns per year but at the same time reduce the amount of time spent in school. If the higher return per year dominates the loss associated with fewer years of schooling the overall impact of larger schools will be positive, while if the reverse is true the overall impact will be negative.

[Table 6 here]

The reduced form model includes the three school input measures, province of birth effects, cohort dummies, census year dummies, age, and age squared. Not surprisingly, the results in Table 6 differ somewhat from those presented in Tables 2 through 5. However, there remain unique patterns across quantiles. The only statistically significant relationship between teacher salaries and wages occurs at the median. At the median, higher teacher salaries have a positive impact on future wages. The coefficient on the large school variable is negative and statistically significant at the mean as well as the 75^{th} and 90^{th} percentiles. Finally, class size has a statistically significant positive impact on wages at the mean, median, and 75^{th} percentile. Notice that no school input is statistically significant at the 10^{th} or 25^{th} percentiles.

5. Conclusion

Comparing the least squares and quantile regression estimates highlights the importance of considering the entire distribution of wages when examining the return to school inputs. Class size and teacher salaries are most strongly related to earnings at more extreme quantiles and levels of educational attainment, while the relationship between school size and earnings is stronger at more central points of the conditional wage distribution. Further, the returns to class size and teacher pay at higher quantiles tend to offset those at lower quantiles. The mirror image nature of the returns to class size and teacher salaries across quantiles may help explain the inability of many previous studies to find a significant relationship between these characteristics and average wages.

The results presented in this paper add to the current debate about the effectiveness of school inputs by documenting the differential impact of school resources across points in the conditional wage distribution. More specifically, the estimates suggest that additional spending to reduce class size or raise teacher salaries is generally beneficial for individuals at high quantiles but has no effect or is detrimental for individuals at low quantiles. These results are in contrast to Eide and Showalter (1998) who find that school enrollment and per-pupil expenditures have the biggest impact on test score gains at low quantiles while a longer school year has the biggest return at high quantiles. Combined, these results suggest that the impact of smaller classes differs across student characteristics as well as the outcome measure.

Welch (1966) suggests that the returns to school size are initially positive, but may become negative if schools become too large. In a similar vein, the results presented in this paper hint that an optimal school size concept may exist; while high school dropouts benefit from large schools high school graduates do not.[16] The apparent interaction, or tradeoff between class

and school size may therefore be a fruitful avenue for future research. Modeling school hierarchy - administration, teachers, and students - in an environment where interactions determine optimal school and class size decisions may yield significant insight into good school system design.

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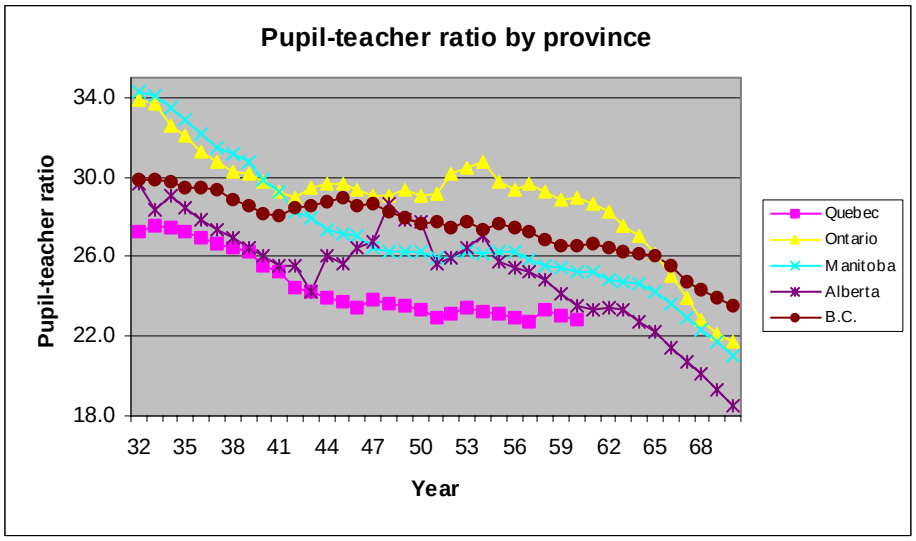
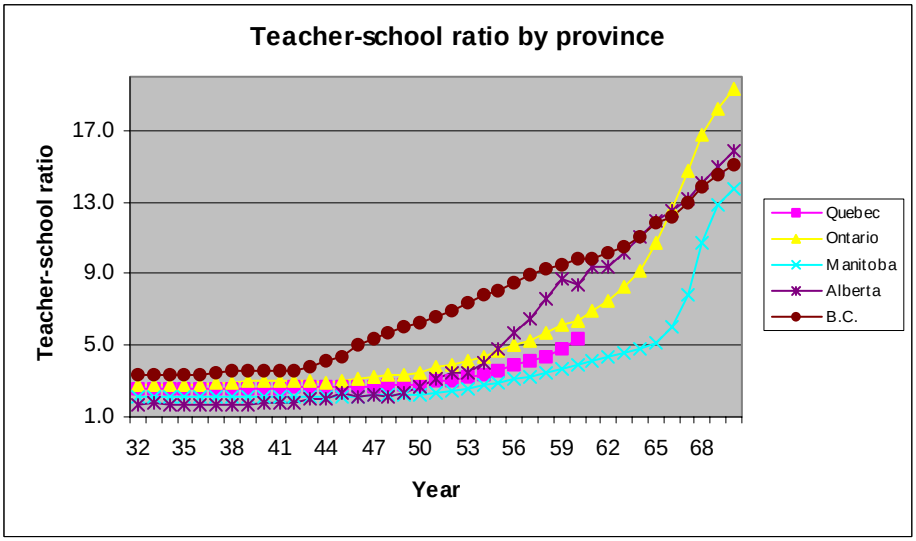
Figure 1. School inputs by province across time





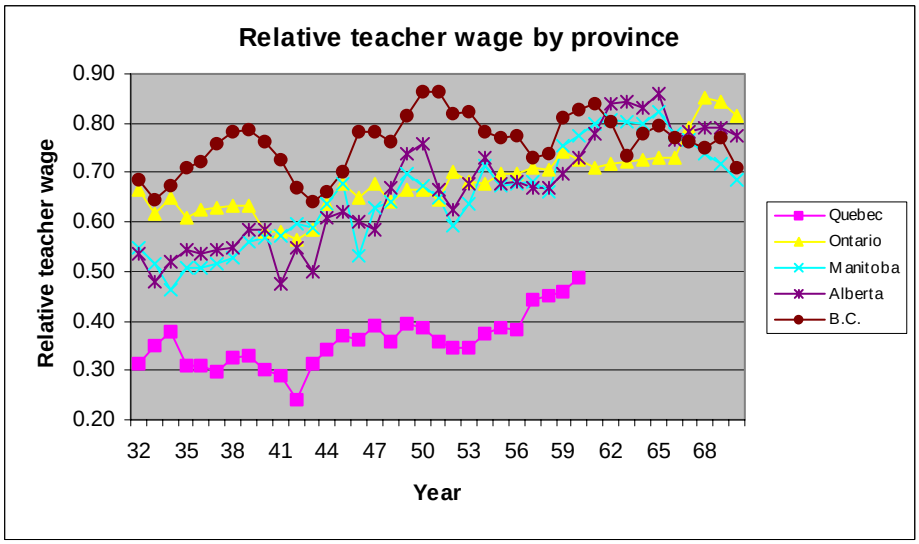


Table 1. Summary statistics

	Mean	Standard deviation
Log weekly earnings	6.3932	0.5257
Experience	27.5606	8.3511
Schooling		
<5 years of public schooling	0.0101	0.1001
5-8 years of public schooling	0.1326	0.3391
Years of public schooling	9.8921	4.2007
Years of university	0.9413	1.8325
Years of technical training	0.6343	1.1474
Province of birth		
Born in Quebec	0.2318	0.4220
Born in Ontario	0.4829	0.4997
Born in Manitoba	0.0882	0.2836
Born in Alberta	0.0999	0.2999
Born in B.C.	0.0972	0.2962
Provincial public school inputs		
Class size	26.8943	2.3856
Small sized school	0.4866	0.4998
Medium sized school	0.3172	0.4654
Large sized school	0.1961	0.3971
Relative teacher pay	0.6255	0.1515

Table 2a. Quantile and OLS results

	10th quantile	25th quantile	Median	75th quantile	90th quantile	OLS
Years of public school (ED)	**0.1368**	0.0216	-0.0292	**-0.0394**	**-0.1092**	-0.0039
	(0.0506)	(0.0230)	(0.0157)	(0.0195)	(0.0304)	(0.0209)
Dummy for <5 years of public school (G4)	0.1034	-0.0341	**-0.8791**	-0.4698	**-1.1885**	-0.6192
	(0.8105)	(0.3737)	(0.2576)	(0.3230)	(0.5007)	(0.3428)
Dummy for 5-8 years of public school (G58)	0.8999	-0.1768	**-0.6321**	**-0.4231**	**-1.0540**	-0.3109
	(0.6018)	(0.2733)	(0.1865)	(0.2317)	(0.3604)	(0.2478)
Years of university	**0.0606**	**0.0655**	**0.0577**	**0.0581**	**0.0634**	**0.0601**
	(0.0028)	(0.0013)	(0.0009)	(0.0011)	(0.0016)	(0.0011)
Years of technical training	**0.0277**	**0.0252**	**0.0238**	**0.0212**	**0.0152**	**0.0227**
	(0.0040)	(0.0018)	(0.0012)	(0.0016)	(0.0025)	(0.0016)
Pupil-teacher ratio (PTR)	**0.0800**	0.0106	**-0.0389**	**-0.0514**	**-0.1099**	-0.0178
	(0.0318)	(0.0143)	(0.0097)	(0.0120)	(0.0188)	(0.0129)
PTR*ED	**-0.0062**	0.0002	**0.0038**	**0.0050**	**0.0095**	0.0019
	(0.0025)	(0.0011)	(0.0008)	(0.0010)	(0.0015)	(0.0010)
PTR*G4	-0.0030	0.0071	**0.0593**	**0.0424**	**0.0901**	**0.0392**
	(0.0420)	(0.0190)	(0.0129)	(0.0162)	(0.0256)	(0.0172)
PTR*G58	-0.0425	0.0134	**0.0459**	**0.0431**	**0.0852**	**0.0255**
	(0.0303)	(0.0137)	(0.0093)	(0.0115)	(0.0180)	(0.0123)
Dummy for medium school (TSR2)	-0.0811	0.1021	0.0422	0.0749	0.0264	0.0380
	(0.1317)	(0.0599)	(0.0415)	(0.0523)	(0.0817)	(0.0551)
TSR2*ED	0.0077	-0.0096	-0.0036	-0.0073	-0.0028	-0.0033
	(0.0113)	(0.0051)	(0.0036)	(0.0045)	(0.0070)	(0.0047)
TSR2*G4	-0.2695	**-0.2313**	0.0541	-0.1235	-0.0590	-0.0778
	(0.2283)	(0.1019)	(0.0695)	(0.0865)	(0.1354)	(0.0927)
TSR2*G58	0.0315	**-0.1532**	-0.0484	-0.0881	-0.0234	-0.0553
	(0.1371)	(0.0622)	(0.0430)	(0.0541)	(0.0845)	(0.0571)
Dummy for large school (TSR3)	0.1360	**0.2970**	**0.1625**	0.1102	0.1161	**0.2163**
	(0.1986)	(0.0893)	(0.0603)	(0.0754)	(0.1187)	(0.0802)
TSR3*ED	-0.0136	**-0.0273**	**-0.0140**	-0.0099	-0.0107	**-0.0197**
	(0.0169)	(0.0076)	(0.0051)	(0.0064)	(0.0101)	(0.0068)
TSR3*G4	-0.1435	**-0.4125**	-0.1154	**-0.3218**	-0.2359	**-0.2754**
	(0.3528)	(0.1521)	(0.1023)	(0.1276)	(0.2064)	(0.1370)
TSR3*G58	-0.3591	**-0.4214**	**-0.2045**	-0.1528	-0.1538	**-0.2918**
	(0.2102)	(0.0944)	(0.0638)	(0.0796)	(0.1250)	(0.0848)
Relative teacher wage (RTW)	**-1.4479**	**-0.7990**	0.1334	**0.6984**	**1.3959**	-0.3871
	(0.7164)	(0.3232)	(0.2181)	(0.2719)	(0.4220)	(0.2897)
RTW*ED	**0.1390**	**0.0581**	-0.0182	**-0.0612**	**-0.1398**	0.0227
	(0.0533)	(0.0240)	(0.0161)	(0.0201)	(0.0313)	(0.0214)
RTW*G4	0.2004	0.3432	**-0.5755**	-0.3070	**-1.2043**	-0.0714
	(0.8931)	(0.3867)	(0.2557)	(0.3224)	(0.5214)	(0.3403)
RTW*G58	1.0563	**0.5511**	-0.1626	-0.3997	**-1.1985**	0.1978
	(0.6304)	(0.2827)	(0.1904)	(0.2369)	(0.3689)	(0.2530)
Psuedo R-squared/R-squared	0.0423	0.0765	0.1014	0.1042	0.0984	0.1251

All regressions include a quadratic function of experience, dummies for census year, nine year birth cohorts, and province of birth, and a constant. Standard errors are in parentheses and coefficients that are individually statistically significant at the 5% level are bold. Schools with teacher-school ratios of 4-7.99 are designated medium and large schools have teacher-school ratios of 8 or more. The sample size for all regressions is 73,337.

Table 2b. Policy experiments: A one standard deviation change

	10th quantile	25th quantile	Median	75th quantile	90th quantile	OLS
Class size: 2.3856 reduction						
<5 years of public schooling	**-0.1835**	-0.0422	**-0.0487**	**0.0215**	**0.0471**	**-0.0511**
5-8 years of public schooling	**-0.0894**	**-0.0571**	**-0.0166**	**0.0197**	**0.0587**	**-0.0184**
9 years of public schooling	**-0.0571**	**-0.0294**	**0.0117**	**0.0151**	**0.0584**	0.0021
10 years of public schooling	**-0.0422**	**-0.0298**	**0.0027**	**0.0032**	**0.0358**	-0.0023
11 years of public schooling	**-0.0274**	**-0.0303**	**-0.0063**	**-0.0087**	**0.0132**	-0.0068
12 years of public schooling	**-0.0125**	**-0.0308**	**-0.0153**	**-0.0207**	**-0.0095**	-0.0113
Medium schools: 0.4654 increase						
<5 years of public schooling	-0.1632	**-0.0601**	0.0448	-0.0226	-0.0152	-0.0185
5-8 years of public schooling	-0.0231	**-0.0238**	-0.0029	-0.0062	0.0014	-0.0080
9 years of public schooling	-0.0053	0.0072	0.0045	0.0042	0.0007	0.0038
10 years of public schooling	-0.0017	0.0027	0.0028	0.0008	-0.0006	0.0023
11 years of public schooling	0.0019	-0.0017	0.0011	-0.0026	-0.0019	0.0007
12 years of public schooling	0.0055	-0.0062	-0.0006	-0.0060	-0.0032	-0.0008
Large schools: 0.3971 increase						
<5 years of public schooling	-0.0030	**-0.0458**	**0.0187**	**-0.0840**	-0.0476	**-0.0235**
5-8 years of public schooling	**-0.0886**	**-0.0494**	**-0.0167**	-0.0169	-0.0150	**-0.0300**
9 years of public schooling	0.0055	**0.0205**	**0.0145**	0.0084	0.0079	**0.0157**
10 years of public schooling	0.0002	**0.0097**	**0.0090**	0.0045	0.0037	**0.0079**
11 years of public schooling	-0.0052	**-0.0012**	**0.0034**	0.0005	-0.0005	**0.0001**
12 years of public schooling	-0.0106	**-0.0120**	**-0.0021**	-0.0034	-0.0048	**-0.0077**
Teacher salaries: 0.1515 increase						
<5 years of public schooling	**-0.1890**	**-0.0691**	**-0.0670**	**0.0593**	**0.0290**	-0.0695
5-8 years of public schooling	-0.0593	**-0.0376**	-0.0044	**0.0453**	**0.0299**	-0.0287
9 years of public schooling	**-0.0298**	**-0.0419**	-0.0047	**0.0223**	**0.0208**	-0.0277
10 years of public schooling	**-0.0087**	**-0.0331**	-0.0074	**0.0130**	**-0.0004**	-0.0242
11 years of public schooling	**0.0123**	**-0.0243**	-0.0102	**0.0037**	**-0.0216**	-0.0208
12 years of public schooling	**0.0334**	**-0.0155**	-0.0130	**-0.0055**	**-0.0428**	-0.0173

Based on the regression results from Table 2. Bold coefficients are jointly significant at the 10% level. All policy experiments are for a one standard deviation change.

Table 3. Quantile and OLS results including urban/rural, marital status, and occupation variables

	10th quantile	25th quantile	Median	75th quantile	90th quantile	OLS
Years of public school (ED)	**0.1399**	0.0294	-0.0114	**-0.0460**	**-0.0865**	0.0068
	(0.0411)	(0.0228)	(0.0161)	(0.0176)	(0.0300)	(0.0202)
Dummy for <5 years of public school (G4)	0.2768	-0.2294	**-0.6450**	**-0.6648**	-0.6095	-0.4824
	(0.6608)	(0.3641)	(0.2636)	(0.2894)	(0.4911)	(0.3314)
Dummy for 5-8 years of public school (G58)	**1.0495**	-0.0265	-0.3402	**-0.4280**	**-0.7357**	-0.1049
	(0.4885)	(0.2704)	(0.1915)	(0.2084)	(0.3561)	(0.2398)
Years of university	**0.0431**	**0.0530**	**0.0537**	**0.0530**	**0.0604**	**0.0506**
	(0.0028)	(0.0015)	(0.0010)	(0.0011)	(0.0019)	(0.0013)
Years of technical training	**0.0090**	**0.0155**	**0.0164**	**0.0154**	**0.0145**	**0.0149**
	(0.0033)	(0.0018)	(0.0013)	(0.0014)	(0.0024)	(0.0016)
Pupil-teacher ratio (PTR)	**0.0863**	0.0058	**-0.0246**	**-0.0487**	**-0.0806**	-0.0119
	(0.0258)	(0.0141)	(0.0099)	(0.0108)	(0.0185)	(0.0124)
PTR*ED	**-0.0070**	0.0001	**0.0025**	**0.0047**	**0.0074**	0.0012
	(0.0021)	(0.0011)	(0.0008)	(0.0009)	(0.0015)	(0.0010)
PTR*G4	-0.0139	0.0180	**0.0447**	**0.0500**	**0.0547**	**0.0334**
	(0.0342)	(0.0184)	(0.0132)	(0.0145)	(0.0251)	(0.0166)
PTR*G58	**-0.0578**	0.0079	**0.0287**	**0.0376**	**0.0613**	0.0139
	(0.0247)	(0.0135)	(0.0095)	(0.0104)	(0.0178)	(0.0119)
Dummy for medium school (TSR2)	-0.0229	0.0382	0.0023	0.0152	0.0251	0.0174
	(0.1078)	(0.0594)	(0.0426)	(0.0470)	(0.0805)	(0.0533)
TSR2*ED	0.0026	-0.0029	-0.0008	-0.0018	-0.0018	-0.0013
	(0.0092)	(0.0051)	(0.0037)	(0.0040)	(0.0069)	(0.0046)
TSR2*G4	-0.2146	-0.0635	0.0377	-0.0186	-0.1345	-0.0821
	(0.1836)	(0.1004)	(0.0714)	(0.0780)	(0.1323)	(0.0896)
TSR2*G58	0.0020	-0.0676	-0.0143	-0.0241	-0.0269	-0.0276
	(0.1118)	(0.0616)	(0.0441)	(0.0486)	(0.0832)	(0.0553)
Dummy for large school (TSR3)	**0.3512**	**0.1868**	**0.1438**	0.0293	0.1379	**0.1756**
	(0.1635)	(0.0880)	(0.0619)	(0.0677)	(0.1163)	(0.0775)
TSR3*ED	**-0.0312**	**-0.0156**	**-0.0136**	-0.0034	-0.0112	**-0.0157**
	(0.0139)	(0.0075)	(0.0053)	(0.0058)	(0.0099)	(0.0066)
TSR3*G4	-0.2644	-0.2383	-0.1859	-0.0968	-0.3790	-0.2472
	(0.2844)	(0.1490)	(0.1050)	(0.1146)	(0.2057)	(0.1324)
TSR3*G58	**-0.4807**	**-0.2541**	**-0.1633**	-0.0728	-0.1720	**-0.2252**
	(0.1725)	(0.0931)	(0.0655)	(0.0715)	(0.1226)	(0.0820)
Relative teacher wage (RTW)	**-2.1181**	-0.5794	0.1113	**0.6595**	**1.1353**	-0.3041
	(0.5861)	(0.3183)	(0.2240)	(0.2446)	(0.4175)	(0.2803)
RTW*ED	**0.1613**	0.0295	-0.0127	**-0.0618**	**-0.1163**	0.0147
	(0.0436)	(0.0236)	(0.0166)	(0.0181)	(0.0310)	(0.0207)
RTW*G4	0.5604	0.0844	-0.4172	**-0.6139**	-0.7444	-0.1519
	(0.7167)	(0.3740)	(0.2621)	(0.2872)	(0.5110)	(0.3292)
RTW*G58	**1.4505**	0.3228	-0.0698	-0.3725	**-0.9082**	0.1780
	(0.5170)	(0.2786)	(0.1955)	(0.2130)	(0.3656)	(0.2448)
Psuedo R-squared/R-squared	0.0986	0.1173	0.1366	0.1412	0.1394	0.1826

All regressions include a quadratic function of experience, dummies for census year, nine year birth cohorts, province of birth, occupation, residence in a city, married, and a constant. Standard errors are in parentheses and coefficients that are individually statistically significant at the 5% level are bold. Schools with teacher-school ratios of 4-7.99 are designated medium and large schools have teacher-school ratios of 8 or more. The sample size for all regressions is 73,337.

Table 4. Quantile and OLS results including urban/rural, region of residence, marital status, and occupation variables

	10th quantile	25th quantile	Median	75th quantile	90th quantile	OLS
Years of public school (ED)	0.1180	0.0214	-0.0287	**-0.0479**	**-0.0954**	0.0013
	(0.0429)	(0.0230)	(0.0176)	(0.0173)	(0.0280)	(0.0202)
Dummy for <5 years of public school (G4)	-0.0388	-0.1521	**-0.8899**	**-0.6127**	-0.8076	-0.5373
	(0.6884)	(0.3693)	(0.2874)	(0.2844)	(0.4628)	(0.3316)
Dummy for 5-8 years of public school (G58)	0.7868	-0.0778	**-0.5250**	**-0.4511**	-0.8631	-0.1530
	(0.5094)	(0.2736)	(0.2084)	(0.2056)	(0.3318)	(0.2400)
Years of university	**0.0423**	**0.0529**	**0.0538**	**0.0536**	**0.0612**	**0.0507**
	(0.0029)	(0.0015)	(0.0011)	(0.0011)	(0.0018)	(0.0013)
Years of technical training	**0.0097**	**0.0154**	**0.0169**	**0.0161**	**0.0149**	**0.0152**
	(0.0034)	(0.0018)	(0.0014)	(0.0014)	(0.0023)	(0.0016)
Pupil-teacher ratio (PTR)	**0.0704**	-0.0001	**-0.0352**	**-0.0497**	**-0.0868**	-0.0153
	(0.0269)	(0.0143)	(0.0108)	(0.0107)	(0.0172)	(0.0125)
PTR*ED	**-0.0058**	0.0006	**0.0035**	**0.0046**	**0.0078**	0.0014
	(0.0022)	(0.0012)	(0.0009)	(0.0009)	(0.0014)	(0.0010)
PTR*G4	0.0011	0.0166	**0.0568**	**0.0458**	**0.0618**	**0.0360**
	(0.0356)	(0.0187)	(0.0144)	(0.0142)	(0.0237)	(0.0166)
PTR*G58	-0.0431	0.0121	**0.0391**	**0.0377**	**0.0677**	0.0165
	(0.0258)	(0.0137)	(0.0104)	(0.0102)	(0.0165)	(0.0120)
Dummy for medium school (TSR2)	-0.0823	0.0086	-0.0066	0.0064	0.0329	0.0056
	(0.1124)	(0.0601)	(0.0463)	(0.0462)	(0.0751)	(0.0533)
TSR2*ED	0.0082	-0.0005	0.0001	-0.0008	-0.0027	-0.0003
	(0.0096)	(0.0052)	(0.0040)	(0.0040)	(0.0065)	(0.0046)
TSR2*G4	-0.1834	-0.0288	0.0438	-0.0114	-0.1731	-0.0761
	(0.1911)	(0.1013)	(0.0776)	(0.0768)	(0.1237)	(0.0896)
TSR2*G58	0.0696	-0.0269	-0.0024	-0.0062	-0.0351	-0.0168
	(0.1165)	(0.0624)	(0.0480)	(0.0478)	(0.0776)	(0.0553)
Dummy for large school (TSR3)	0.2531	0.1597	0.0946	0.0348	0.1309	**0.1571**
	(0.1708)	(0.0893)	(0.0674)	(0.0667)	(0.1082)	(0.0776)
TSR3*ED	-0.0223	-0.0134	-0.0090	-0.0039	-0.0111	**-0.0141**
	(0.0145)	(0.0076)	(0.0057)	(0.0057)	(0.0092)	(0.0066)
TSR3*G4	-0.1981	-0.2245	-0.1453	-0.1204	-0.3360	-0.2354
	(0.2960)	(0.1506)	(0.1143)	(0.1127)	(0.1925)	(0.1324)
TSR3*G58	**-0.3717**	**-0.2362**	-0.1169	-0.0649	-0.1580	**-0.2070**
	(0.1800)	(0.0943)	(0.0713)	(0.0705)	(0.1141)	(0.0821)
Relative teacher wage (RTW)	**-1.7626**	-0.4370	0.3382	**0.6057**	**1.1378**	-0.2147
	(0.6128)	(0.3232)	(0.2442)	(0.2414)	(0.3884)	(0.2811)
RTW*ED	**0.1387**	0.0171	-0.0283	**-0.0571**	**-0.1204**	0.0100
	(0.0457)	(0.0240)	(0.0181)	(0.0178)	(0.0288)	(0.0208)
RTW*G4	0.3691	-0.0347	**-0.5823**	-0.5167	-0.7649	-0.1956
	(0.7463)	(0.3792)	(0.2862)	(0.2825)	(0.4796)	(0.3298)
RTW*G58	**1.1633**	0.1753	-0.2595	-0.3598	**-1.0021**	0.1227
	(0.5405)	(0.2827)	(0.2130)	(0.2100)	(0.3398)	(0.2453)
Psuedo R-squared/R-squared	0.0994	0.1184	0.1378	0.1424	0.1405	0.1838

All regressions include a quadratic function of experience, dummies for census year, nine year birth cohorts, province of birth, region of residence, occupation, residence in a city, married, and a constant. Standard errors are in parentheses and coefficients that are statistically significant at the 5% level are bold. Schools with teacher-school ratios of 4-7.99 are designated medium and large schools have teacher-school ratios of 8 or more. The sample size for all regressions is 73,216.

Table 5. Quantile and OLS results including urban/rural, marital status, occupation, and field of study variables

	10th quantile	25th quantile	Median	75th quantile	90th quantile	OLS
Years of public school (ED)	**0.1469**	0.0177	-0.0342	-0.0391	-0.0618	0.0065
	(0.0570)	(0.0293)	(0.0216)	(0.0238)	(0.0358)	(0.0275)
Dummy for <5 years of public school (G4)	1.2016	-0.3126	**-0.9324**	-0.8094	-0.7020	-0.8220
	(1.0379)	(0.5726)	(0.4268)	(0.4668)	(0.6750)	(0.5498)
Dummy for 5-8 years of public school (G58)	0.8580	-0.2936	**-0.6728**	-0.5174	-0.5575	-0.2129
	(0.6881)	(0.3548)	(0.2619)	(0.2875)	(0.4312)	(0.3324)
Years of university	**0.0453**	**0.0515**	**0.0500**	**0.0497**	**0.0596**	**0.0495**
	(0.0037)	(0.0018)	(0.0013)	(0.0014)	(0.0021)	(0.0016)
Years of technical training	**-0.0091**	-0.0003	0.0023	0.0000	0.0003	-0.0010
	(0.0047)	(0.0024)	(0.0018)	(0.0020)	(0.0030)	(0.0023)
Pupil-teacher ratio (PTR)	**0.1218**	0.0076	**-0.0315**	**-0.0419**	**-0.0697**	-0.0057
	(0.0383)	(0.0195)	(0.0143)	(0.0157)	(0.0236)	(0.0181)
PTR*ED	**-0.0089**	-0.0002	**0.0029**	**0.0036**	**0.0061**	0.0005
	(0.0029)	(0.0015)	(0.0011)	(0.0012)	(0.0018)	(0.0014)
PTR*G4	-0.0724	0.0271	**0.0578**	**0.0588**	0.0550	0.0533
	(0.0556)	(0.0311)	(0.0230)	(0.0244)	(0.0349)	(0.0297)
PTR*G58	-0.0630	0.0160	**0.0391**	**0.0359**	**0.0544**	0.0134
	(0.0357)	(0.0183)	(0.0135)	(0.0148)	(0.0222)	(0.0171)
Dummy for medium school (TSR2)	-0.0732	0.0556	0.0785	0.0553	-0.0176	0.0559
	(0.1451)	(0.0750)	(0.0559)	(0.0615)	(0.0933)	(0.0709)
TSR2*ED	0.0074	-0.0039	-0.0064	-0.0050	0.0002	-0.0040
	(0.0124)	(0.0064)	(0.0048)	(0.0053)	(0.0080)	(0.0061)
TSR2*G4	**-0.5978**	-0.1752	-0.0132	0.0816	-0.0759	-0.0882
	(0.2538)	(0.1328)	(0.0996)	(0.1047)	(0.1552)	(0.1275)
TSR2*G58	0.0947	-0.0293	-0.0511	-0.0209	0.0411	-0.0332
	(0.1507)	(0.0779)	(0.0580)	(0.0637)	(0.0962)	(0.0735)
Dummy for large school (TSR3)	**0.4693**	**0.2713**	**0.1671**	0.0280	0.1059	0.1971
	(0.2206)	(0.1100)	(0.0811)	(0.0891)	(0.1361)	(0.1029)
TSR3*ED	**-0.0384**	**-0.0210**	**-0.0140**	-0.0035	-0.0113	-0.0165
	(0.0187)	(0.0093)	(0.0069)	(0.0075)	(0.0115)	(0.0087)
TSR3*G4	**-0.9320**	-0.1929	-0.0746	0.0211	-0.3394	-0.1078
	(0.3759)	(0.2215)	(0.1573)	(0.1587)	(0.2337)	(0.2006)
TSR3*G58	-0.4440	**-0.2390**	-0.1609	-0.0300	-0.1126	-0.1806
	(0.2312)	(0.1162)	(0.0856)	(0.0937)	(0.1420)	(0.1086)
Relative teacher wage (RTW)	**-2.2972**	**-0.9095**	-0.2704	0.1425	**1.2259**	-0.6052
	(0.8252)	(0.4204)	(0.3105)	(0.3419)	(0.5164)	(0.3940)
RTW*ED	**0.2321**	**0.0696**	0.0153	-0.0216	**-0.0987**	0.0499
	(0.0613)	(0.0311)	(0.0228)	(0.0252)	(0.0381)	(0.0290)
RTW*G4	1.5874	-0.3336	-0.5778	-0.8289	-0.5478	-0.5394
	(1.1347)	(0.6314)	(0.4583)	(0.4577)	(0.6624)	(0.5896)
RTW*G58	**1.9419**	0.4473	0.0781	-0.1580	**-0.9146**	0.4075
	(0.7379)	(0.3752)	(0.2754)	(0.3019)	(0.4542)	(0.3494)
Psuedo R-squared/R-squared	0.1015	0.1174	0.1330	0.1316	0.1307	0.1774

All regressions include a quadratic function of experience, dummies for census year, nine year birth cohorts, province of birth, occupation, residence in a city, married, university field of study, and a constant. Standard errors are in parentheses and coefficients that are individually statistically significant at the 5% level are bold. Schools with teacher-school ratios of 4-7.99 are designated medium and large schools have teacher-school ratios of 8 or more. The sample size for all regressions is 45,505.

Table 6. Reduced form results

	10th quantile	25th quantile	Median	75th quantile	90th quantile	OLS
Pupil-teacher ratio	0.0159	0.0110	**0.0208**	**0.0150**	0.0109	**0.0127**
	(0.0122)	(0.0061)	(0.0050)	(0.0054)	(0.0077)	(0.0052)
Dummy for medium school	0.0083	-0.0078	-0.0138	**-0.0194**	-0.0188	-0.0089
	(0.0214)	(0.0108)	(0.0089)	(0.0096)	(0.0136)	(0.0092)
Dummy for large school	-0.0071	-0.0201	-0.0190	**-0.0379**	**-0.0375**	**-0.0246**
	(0.0298)	(0.0149)	(0.0124)	(0.0133)	(0.0190)	(0.0128)
Relative teacher wage	0.4615	0.2317	**0.3998**	0.1718	-0.1105	0.1876
	(0.3434)	(0.1713)	(0.1415)	(0.1519)	(0.2175)	(0.1460)
Psuedo R-squared/R-squared	0.0068	0.0113	0.0165	0.0188	0.0104	0.0189

All regressions include a quadratic function of age, dummies for census year, nine year birth cohorts, and province of birth, and a constant. Standard errors are in parentheses and coefficients that are individually statistically significant at the 5% level are bold. Schools with teacher-school ratios of 4-7.99 are designated medium and large schools have teacher-school ratios of 8 or more. The sample size for all regressions is 73,337.

Notes

[1] The 1960 B.C. Royal Commission on Education reports that it is common practice, in large schools, to separate students into groups based on ability in order to create classes with homogeneous ability levels.
[2] Note that school input measures are for years of public school rather than total schooling. Card and Krueger(1992) and Betts (1995) apply public school input measures to total education rather than to public schooling.
[3] New Brunswick, Nova Scotia, Newfoundland, and Prince Edward Island are excluded due to small sample sizes. Saskatchewan is excluded because school size data are unavailable. There are no individuals born in Quebec beyond 1948 because I was unable to locate school input measures beyond 1960.
[4] This sampling criteria is identical to that of Card and Krueger (1992). Relaxing the sampling rule to include male employees earning less than $40 per week in 1986 dollars does not significantly alter any of the results.
[5] This assumes that individuals attend school in their province of birth. Although this assumption is less than desirable, Heckman, Layne-Farrar and Todd (1996) show that non-random migration biases the school quality estimates unless all relevant factors are included in the earning equation, it is difficult to adjust for child migration. Further, Card and Krueger (1992) find that adjusting for the inter-state mobility of American children born between 1920 and 1949 has only a minor impact on the estimated relationship between average earnings and school quality.
[6] Public school enrollment is assumed to be continuous from the point of entry.
[7] All school input data are averaged across provincially regulated elementary and secondary schools. Provincially regulated institutions may be fully or partially supported by public funds. For example, during the period of interest all Quebec schools were partially supported by religious denominations, but were provincially regulated. Fully private schools are excluded.
[8] The average wage of electricians is not available for Calgary or Edmonton, the Winnipeg average is used instead. Electrician salaries were chosen because they are available throughout the period.
[9] The quality indices used in this paper are based on Catholic schools exclusively. Protestant school data are not available for all years. Since approximately 90 percent of Quebec students attended Roman Catholic institutions, omitting Protestant school data is inconsequential. For example, 87% and 91% of Quebec students were enrolled in Catholic schools in 1932 and 1960 respectively.
[10] Nuns and brothers account for 60%, 32%, and 31% of teachers in 1935, 1945, and 1955 respectively.
[11] All results are similar when Quebec is excluded.
[12] The occupations are based on the 1980 Canadian occupation categories: management; engineering, mathematics, sciences, and medicine; social sciences, teaching, art, literature, and recreation; clerical; sales; services; processing; machining, fabricating, assembling, and repairing; construction; transportation and equipment operating; and other.
[13]Major field of study is collapsed into three groups: education, fine arts, humanities, and social sciences; commerce and business administration; and sciences, engineering, health professions, and mathematics, for cell size reasons.
[14] The results are also similar if the sample is restricted to individuals currently living in their province of birth, persons living in an urban area, persons living in a non-urban area, or individuals currently living in their province of residence. The small number of people living in a province other than their province of birth (16 percent of the sample) makes estimating a model with only these people impossible.
[15] This approach is similar to that of Card and Krueger (1992) and Betts (1995).
[16] While large schools generate a positive return for high school dropouts, it is important to remember that the average school size does not exceed 11.3. At the individual school level there may well be urban schools that are sufficiently large to generate a negative return for these students as well.