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# **The Impact of ESL Funding Restrictions on Student Academic Achievement\***

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## **Abstract**

### **The Impact of ESL Funding Restrictions on Student Academic Achievement**

ESL instruction is an important issue in Canada due to the large number of immigrants and has potentially impacts on both student academic progress and educational expenditures. In 1999, the province of British Columbia limited funding for ESL to five years per student but increased the annual ESL supplement. We explore the educational impact of these reforms using the results of standardized tests of numeracy, reading and writing proficiency for Grade 7 students. We compare differences in test scores, both before and after the policy change, among the following groups of Grade 7 students in the GVA: students with 5 or more years of ESL (those constrained by the new policy); students with one to four years of ESL; non-ESL students with a non-official home language; and non-ESL students with an official home language. No group of students experiences large changes in test scores due to the reform. The changes we do observe are usually increases for ESL students, and the few decreases are very small. Moreover, both before and after the reform, score differences between groups of students with different experiences of ESL, different neighbourhood socio-economic characteristics, and different home languages are modest in size.

JEL Classification: Health Education and Welfare

Keywords: English Second Language, Educational Funding

## **1. Introduction**

English as a Second Language (ESL) generally refers to the instruction in English only of students with limited English proficiency. The objective of ESL is to help students improve language skills, absorb all elements of the school curriculum and prepare for the labour market. Canada has a high rate of immigration and, especially in large urban areas, a substantial proportion of students whose first language is neither English nor French (Statistics Canada 2008). The provincial governments of British Columbia, Alberta, Saskatchewan, Manitoba and Ontario all provide school districts with targeted funding for ESL services mainly through the use of per student grants.

The special funding requirements for ESL services have raised concerns about costs and, in particular, the number of years that students spend in such programs. As a result, all five of the above provinces have restricted the number of years for which schools can claim special funding for each ESL student. In 1999, British Columbia limited schools to five years of supplementary ESL funding per student and increased the value of the annual supplement. (See Geva et al. 2009 for an excellent review of ESL policy in all provinces.) This five year cap affected a substantial number of ESL students and was opposed by both the Teachers Federation of British Columbia and the School Trustees Association of British Columbia (McCarthy and Foxx 2001). This policy change may have had implications for the academic performance of both ESL and non-ESL students. Some ESL students might have suffered academically due to fewer years of language support, but other ESL students may have benefited both from a higher annual supplement and from being shifted more quickly into a non-ESL classroom. The performance of

non-ESL students may have been influenced if their post-ESL classmates required more (or less) teaching resources in non-ESL classrooms.

Most ESL instruction in British Columbia takes place in the eleven school boards<sup>1</sup> that make up the Greater Vancouver Area (GVA). In our data, the GVA contains 40% to 50% of the Grade K-12 students in the province but 80% to 90% of the ESL students. From 15% to 24% of K-12 students in the GVA are enrolled in ESL but this is true of only 1% to 4% of the students in the rest of the province. In this paper, we explore the impact of the introduction of the 5-year funding limit in 1999 on the academic performance of Grade 7 students who attended school in the GVA. We measure academic performance using the results of standardized tests of numeracy, reading and writing proficiency. Policy impact is gauged by comparing differences in test scores, both before and after the policy change, among the following groups of Grade 7 students in the GVA: students with 5 or more years of ESL (those constrained by the new policy); students with one to four years of ESL; non-ESL students with a non-official home language; and non-ESL students with an official home language.

This paper is organized as follows. Section 2 contains a literature review. Section 3 describes the institutional and policy background in British Columbia. Section 4 describes the data and summary statistics. Section 5 contains the regression estimates and Section 6 is a summary and conclusion.

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<sup>1</sup> Langley, Surrey, Delta, Richmond, Vancouver, New Westminster, Burnaby, Maple Ridge-Pitt Meadows, Coquitlam, North Vancouver and West Vancouver.

## 2. Literature Review

The Canadian literature on immigrant children and ESL programs covers a number of dimensions. Some papers focus on the relationship between academic achievement and such characteristics of the student as age at arrival and years since arrival (Wright & Ramsey 1970, Cummins 1981 and Collier and Thomas 1989). There is also a substantial Canadian literature on the particular dimensions of reading and writing skills in which ESL students demonstrate strengths, such as phonological processing and letter-sound decoding, and weaknesses, such as syntactic processing and academic vocabulary (Geva et al. 2009).<sup>2</sup>

A third group of papers focuses on comparisons in academic outcomes between ESL and other students. Two recent reviews of the literature conclude that policies such as the five-year cap in BC may be unwise. Gunderson (2007) cites a series of studies (for example, Cummins, 1984; Early 1989; Gunderson and Carrigan, 1993) and concludes that “Many ESL students are not learning to read, especially in academic classes and the expectation that they can acquire the proficiency needed to succeed in just a few years is unrealistic.” Geva et al. (2009) cite research which indicates that, although newly arrived immigrant student can acquire language skills required for informal interaction in two to three years, additional years of targeted instruction may be needed to develop language skills for academic purposes similar to those of their native language peers (August and Shanahan, 2006; Biemiller, in press; Farnia and Geva, under

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<sup>2</sup> There is also a large US literature that compares ESL programs, in which all instruction is in English and the child's first language is used only to clarify English instruction, with bilingual programs in which there is instruction in the child's primary language, e.g., Lopez (2002) and Matsudaira (2004). This literature is not highly relevant for the current paper because bilingual education is generally not used in Canada due to the diversity of home languages among immigrants. In this regard, Gunderson (2007) provides an excellent description of this diversity among young immigrants in Vancouver.

review). Bussiere et al. (2000) use PISA/YITS data to show that the average performance of immigrant students on reading comprehension converges with that of their Canadian-born counterparts only after they have lived in Canada for about 14 years. A particular concern is failure to finish high school. Watt and Roessingh (1994) followed a sample of ESL students in Calgary between 1989 and 1997. The high school dropout rate among the ESL students from less advantaged families was 74% in contrast with a rate of 30% among the general population.

There is little Canadian literature that poses questions closely related to those which we pose below. Indeed, we have been unable to find readily available sources of information on the number of years that students spend in ESL in any province. We were able to find only one study that focuses, as does ours, on the impact of funding restrictions for ESL. In 1993, the Calgary school board restricted per pupil funding for ESL to six semesters of high school and concurrently eliminated 50% of ESL program offerings. Watt and Roessingh (2001) compare dropout rates before and after this policy change using a sample of 505 students who entered high school in Calgary in the years 1989-1996. The reform did not result in a higher proportion of students dropping out, but it did lead to drop outs earlier in the school career.

In summary, it is difficult to draw strong inferences from the literature for our study. Few papers concentrate on the policy issue of interest in this paper. The one study that does parallel our focus, namely Watt and Roessingh (2001), reports a negative impact of ESL funding restrictions on academic achievement but the sample was small, there were no comparisons with non-ESL students, and the outcome measure was not a standardized test score. The strengths of our study include a much larger sample, standardized test scores and a comparison of both ESL and non-ESL students.

### 3. Policy Background

Ninety percent of K-12 students in British Columbia attend public schools that are wholly funded by the provincial government. An additional 9% attend secular and religious “independent schools” that receive either 50% or 35% of the per student operating grant of the local school district.<sup>3</sup> Hence, less than 1% of K-12 students attend schools with no public funding. Publicly-funded independent schools are eligible for supplementary ESL funding on the same proportionate basis as regular funding. In January 1999, the Ministry of Education introduced a five-year limit on supplementary funding for ESL students. This restriction was accompanied by two other changes: an increase in supplementary funding from \$955 to \$1100 per year for each qualifying ESL student and the gradual phasing out of special assessment funding during a student’s first year in ESL. The assessment amount was \$250 per student in February 1997 after which it declined until being eliminated in 2001. The five-year limit on supplementary funding from the province did not prohibit school boards from keeping students in ESL for more than five years. Henceforth, we shall, for convenience, refer to this package of policy changes as the “five year cap” on supplementary funding.

There is no provincially-mandated method for identifying students that need ESL services. Some students are tested at a central reception area by trained specialists while others are identified by classroom teachers. Standardized tests are used but not relied upon exclusively

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<sup>3</sup> To receive public funding, independent schools funding must “employ BC certified teachers, have educational programs consistent with ministerial orders, provide a program that meets the learning outcomes of the British Columbia curriculum, and meet various administrative requirements.” The 2% of schools that receive 35% rather than 50% of public school funding do so because the school’s per-student operating costs exceed those of the local school district (British Columbian Ministry of Education 2009a) .



to determine ESL need.<sup>4</sup> The province also provides school districts with considerable freedom concerning the model or combination of models to use for their ESL students. In general, districts with a large number of ESL students tend to use a full-day, self-contained model whereas districts with fewer such students tend to use a part-day and/or pull-out model (British Columbia Ministry of Education 2009b). Finally, students can both enter and exit ESL programs at any time during the year but the school district receives ESL funding only for those students who are identified by the end of September. Hence, the number of students that are provincially funded for ESL does not exactly equal the number receiving such services.

#### **4. Data and Summary Statistics**

The Ministry of Education of British Columbia provided the authors with student level data for Grades K through 8 in the school years 91/92 through 04/05. Students are tracked in all years in which they attend a school in BC. The student records contain information on gender, birth date, school attended, home language, ESL support and standardized test scores. In this section, we first describe the factors used to select the subset of students for our analysis and then discuss the impact of these exclusions on the size of the sample.

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<sup>4</sup> In 1999, the Ministry of Education stated that the “use of standardized tests may yield helpful information but these should not be the sole basis for making an initial assessment. Initial assessments should include a combination of oral interviews (with students, parents), reviews of students' oral and unedited written language samples, and checks of students' reading and listening comprehension.” (British Columbia Ministry of Education 1999).

First, we selected students by school cohort. In the 99/00, the province began administering province-wide Foundation Skills Assessment (FSA) tests in grades 4, 7 and 10.<sup>5</sup> The students in our estimation sample are restricted to members of the five cohorts for which we have both Grade 7 test scores and records from Grade K through 7. These are the cohorts that entered Kindergarten in 92/93 through 96/97 and took the Grade 7 tests in 99/00 through 03/04. Throughout this paper, we shall refer, as in Table 1, to the two earlier of these cohorts as “Pre-Reform” in the sense that they did qualify for more than five years of ESL supplementary funding before the 1999 five-year limit was imposed. We shall refer to the three latter of cohorts as “Post-Reform” in the sense that they were eligible for only five years of ESL supplementary funding due to the 1999 five-year limit.

Second, we selected students by province of schooling. The treatment in this natural experiment is the five-year limit on supplementary ESL funding. We need to measure how many years the student has been in ESL and, therefore, have omitted those students who were absent from the BC school system at any time from Grade K through 7. Third, we have retained only those students who have followed the “normal” schooling path. In this regard, we have omitted any student who had an “early start” or “late start”, ever skipped or repeated a grade, or was ever in special or gifted education, home schooling or a non-standard school. An early (late) start is one in which the student started Kindergarten in September of the year in which the student turned four (six). Non-standard schools include Montessori, Waldorf, distance education, youth custody, etc. Fourth, we omitted any students for whom we lacked a valid Grade 7 test score.

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<sup>5</sup> The FSA tests are written in the spring and, hence, the first tests were in May 2000. The skills assessed by the FSA are most closely linked to prescribed learning outcomes in language arts and mathematics. The reading comprehension and numeracy components consisted of multiple-choice and written-response questions. The writing component consisted of a first draft of one extended writing task (British Columbia Ministry of Education 2009c).

Fifth, we restricted the sample by school district. Table 2 demonstrates that ESL schooling in British Columbia is highly concentrated in the Great Vancouver Area which contains 11 school districts. The GVA contains approximately 40%-50% of K-12 students in the province but approximately 80%-90% of the ESL students. Table 2 also demonstrates that ESL is common in the GVA. Fifteen to twenty-four per cent of the K-12 students in the GVA were in ESL during our data period. The GVA also constitutes a relatively homogeneous environment in terms of community characteristics and models of ESL delivery – variables for which we have few measures. For all of the foregoing reasons, the estimates presented below were obtained with a sample limited to those students who were ever in a school in the GVA (but always in BC) in Grades K-7 (the “ever GVA” sample). In results not shown, we have also estimated our regressions using two other sample restrictions: students who were in a GVA school in each year of Grades K-7 (the “always GVA” sample) and students who were ever in a school in the 10 largest metropolitan areas in the province (the “ever top ten MA” sample). Over 90% of students in the “ever GVA” sample were also in the “only GVA” sample and the “ever GVA” sample contained 90% of the ESL students in the “ever top ten MA” sample. The “always GVA” and the “ever top ten MA” samples yield regression estimates similar to those presented below and are available upon request.

There is one group of students for whom the area of residence cannot be identified and that is students in Francophone schools. A Francophone school (not French Immersion) is one in which the language of administration and instruction is French in all subjects except English. Less than one-percent of K-12 students in British Columbia are in Francophone schools. There is one Francophone school district that governs all such schools in the province. Our data

identify students in this Francophone school district but do not indicate if the school is in the GVA or not. Due to this reason and the fact that such schools occupy an unusual niche in the provincial system, we excluded all students in Francophone schools from our estimation sample.

We constructed an ESL status variable in order to distinguish among students based on exposure to ESL instruction and to separate the influence of ESL from that of a home language other than English or French. The categories of this ESL status (as of Grade 7) variable are the following three: a “Never ESL, Always Official Home Language” (henceforth OHL) student has never been in ESL and has always had English or French identified as home language; a “Never ESL, Ever Non-Official Home Language” (henceforth NOHL) student has never been in ESL and has had a home language other than English or French in at least one year; and an “Ever ESL” (henceforth ESL) student has been in ESL for at least one year.

In the above definitions, “in ESL” means “in ESL as of September” and, hence, eligible for supplementary funding from the province. Our data do not account for those students who entered into and exited from ESL after September of a given school year and, hence, this measure is the best ESL identifier available to the authors. The home language of the student is reported by the teacher based on information provided by the student and his or her family.

Table 1-A in the Appendix provides information concerning the size of the sample and the impact of the various sample restrictions that we have imposed. The top row of Table 1-A indicates the number of students in each of the three ESL status categories who were observed in a BC Kindergarten in 92/93 through 96/97 and in a GVA school at some point in Grades K through 7. The subsequent rows of Table 1-A indicate the proportion of students that exhibit various characteristics that were used to omit individuals from our estimation sample as

described above. Some students exhibit more than one of these characteristics and all rows refer to Grades K through 7. The penultimate row of Table 1-A shows the number of students remaining after these exclusions in what we will refer to as the final estimation sample. The last row indicates the ratio of the number of students in the last row to the number of students in the first row. This ratio demonstrates the collective impact of the various sample exclusions and is very similar in value (70% to 72%) across our three ESL-status categories.

Figures 1 and 2 provide information about how common ESL has been among students in our final estimation sample and about the impact of the five-year funding cap on the numbers of years that students spend in ESL. The line with the squares in Figure 1 shows the proportion of Grade 1 students who were in ESL (as measured on the left and bottom axes) for seven cohorts of Grade 1 students. Five of these cohorts are those in our final estimation sample (Grade 1 in 93/94 through 97/98). In addition, we have calculated this proportion for the cohort immediately preceding (Grade 1 in 92/93) and the cohort immediately following (Grade 1 in 98/99) the five cohorts in the final estimation sample. The samples for all seven cohorts in Figure 1 were drawn with the same characteristics. The proportion of Grade 1 students in ESL increases over this period from 17% to 26%. This line confirms the finding in Table 2 that ESL is quite common among students in the GVA.

The line with the diamonds in Figure 1 refers to these same seven cohorts and shows the proportion of students who have 6 years of ESL *among those Grade 5 students who have ever been in ESL*.<sup>6</sup> This proportion is measured on the top and right axes. In the three cohorts that reached Grade 5 before the five-year supplementary funding limit took effect in 99/00, 25% or

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<sup>6</sup> The sample sizes for the denominator in the line with the squares (diamonds) in Figure 1 range from 15,656 (3,559) for the earliest cohort to 17,118 (5,142) for the most recent cohort,

more of students ever in ESL are in their sixth year of ESL. This proportion falls to 5% or less for each of the cohorts that reached a potential sixth year of ESL in Grade 5 after the funding limit took effect. Hence, the diamond line demonstrates that six or more years of ESL had been common among students who had ever been in ESL but became much less likely after the imposition of the five-year funding limit. The five-year cap on supplementary funding clearly had a large impact and was limiting most ESL students to at most five years of such instruction.

One problem with using Figure 1 to assess the impact of the five year cap is that some students may have started ESL late and, for this reason, not yet be in their sixth year of ESL as of Grade 5. Figure 2 provides an alternative view of the policy impact. This figure contains the hazard rate for an exit from ESL by school cohort and completed number of years in ESL. The sample for Figure 2 includes only those students who started ESL in Kindergarten and have never both exited and then re-entered ESL.<sup>7</sup> Note first that annual exit rates from ESL are generally quite low (10% or less) and approximately two-thirds of the students in each cohort in Figure 2 are still in ESL in Grade 4. Hence, the provincial maximum of five years of supplementary funding for ESL affected a substantial proportion of the ever ESL population. The oldest cohort attended Grade 1 in 92/93 and completed its (potentially) seventh year of ESL at the end of Grade 6 in 98/99 before the funding limit had taken effect. For this cohort, the hazard rate gradually increases from less than 10% to 18% at the end of year 7 of ESL. The pattern for the next oldest cohort (Grade 1 in 93/94) is very similar until this group reaches the end of the seventh year of ESL at the end of Grade 6 in 99/00. At that point, the funding limit takes effect for this cohort and the exit rate soars from 18% to 95%. A similar pattern is also indicated for

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<sup>7</sup>The sample sizes for the Kindergarten cohorts in Figure 2 range from 2,068 for the earliest cohort to 3,888 for the most recent cohort,

each of the remaining cohorts in that there is a spike in the exit rate at the point when the five year spending limit first affects the cohort. This policy change is clearly having a very large impact on the conditional probability of a sixth year of ESL. The loss in supplementary funding has eliminated a sixth year (and beyond) of ESL for all but a few students.

Table 3 provides summary statistics for our final estimation sample as of Grade 7. Our initial analysis of the data revealed a clear difference in the test scores between students with one to four years of ESL by Grade 7 and students with 5 or more years.<sup>8</sup> Furthermore, the students most directly affected by the provincial cap on ESL supplementary funding are those with 5 or more years. For both reasons, we distinguish between these two groups of ESL students in Table 3 and subsequent tables.

As described in Table 1, two of the five cohorts in our final estimation sample are “Pre-Reform” and three are “Post-Reform”. Row 1 of Table 3 indicates that, as one would expect, approximately 60% of each of the now four ESL status groups are also “Post-Reform”. Rows 2 through 5 demonstrate that these four groups are also similar in terms of sex and quarter of birth although students with 5 or more years of ESL are a bit more likely to be males. The “Ever ESL” students, especially those with 5 or more years, are much less likely to enrol in French Immersion (row 6) which like reflects their need to improve English skills. Students in the “Never ESL, Ever NOHL” group are by far the most likely to have attended an Independent School (row 7) though we are not sure why this is so. Students from the “Never ESL, Always OHL” group are the most likely to have attended school outside the GVA (row 9) which reflects the concentration of immigrant families in the GVA. Row 10 indicates that students with 1 to 4

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<sup>8</sup> We tested for, and did not find, significant differences between students with 1-2 and 3-4 years of ESL.

years of ESL are much more likely to have had a “delayed start” (after Kindergarten) in ESL than those with 5 or more years. There is no substantial difference, however, in the proportion of each group that has experienced a gap in ESL training in row 11.

Row 12 shows that over 59% of students with 1 to 4 years of ESL and 27% of students with 5 or more years of ESL have ever reported an official home language and that most, but not all, of the students in these two groups have ever reported a non-official home language (row 13). Row 16 indicates that changes from official to non-official home language (or vice-versa) are fairly common especially among students in the Never ESL, Ever NOHL and 1 to 4 years of ESL groups. Rows 17 through 22 show that the most common non-official home languages among Ever ESL students are East Asian and South Asian. These categories, which came with the data from the BC Ministry of Education, are not exhaustive, that is, there are students with non-official home languages that do not fall into any of these categories. Furthermore, the same student can have fall into more than one of these categories if the home language changed from Grades K through 7.

Rows 23 through 25 indicate that only 1% to 3% of students in our final estimation sample lacked a valid score for one of the tests. (Students lacking all three tests scores have already been dropped from the sample. See Table 1-A.) Rows 26 through 28 show that a slightly greater proportion (6% to 10%) of all students in the schools which our final sample respondents attend lacked a valid score for one of the tests. In other words, our final estimation sample selects for students who are less likely to lack a valid test score than is the typical student in their schools.



Throughout this paper, we use not raw test scores, but rather scores that are standardized (mean = 0 and standard deviation = 1) using the provincial mean and standard deviation (henceforth SD) in raw test scores from each year.<sup>9</sup> This means that the students in our sample can only show an improvement or worsening in their scores relative to the average student in the province. This approach is common in the literature and provides a control for variation in unmeasured year-specific determinants of raw test scores such as difficulty of content, scheduling of the tests, etc. In our particular case, furthermore, the overwhelming concentration of ESL students in the GVA means that the five year cap placed on supplementary funding by the province should have had only very indirect effects on students outside this area. Hence, any effects of the policy among either ESL or non-ESL students in the GVA should be observed in test score changes relative to the provincial average. Of course, other unobserved factors may have influenced only test scores outside the GVA but the approach taken below represents the best available set of controls available to the authors. In Table 3, the mean test scores in rows 29 through 31 slightly exceed the provincial average in 11 out of 12 cases. Students in the Never ESL, Ever NOHL groups have the highest average scores on each test and students with 5 or more years of ESL have the lowest.

We do not have access to information concerning the socioeconomic status of the individual families of the students in our sample. We are, however, able to link each individual record to data for the 2001 Census Dissemination Area (DA) in which the student lives using the family's postal code. Each DA contains 500 to 700 households.<sup>10</sup> The final panel of Table 3

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<sup>9</sup> The raw test scores for numeracy, reading and writing range from 0-40, 0-60 and 0-12 respectively.

<sup>10</sup> A few students have a missing or improper postal code that we replace with the postal code of their school. Some DAs have missing census measures. For students living in such DAs, we use the census measures of the closest DA

contains the sample means of five neighbourhood socioeconomic characteristics.<sup>11</sup> With regard to the first three characteristics, the differences between groups are generally small though students with 5 or more years of ESL show a slight disadvantage in terms of the proportion of families headed by two parents, the proportion of persons age 20+ with a bachelors degree, and the unemployment rate. For the last two characteristics, distinctions are more apparent. As one moves from left (Never ESL, Always OHL) to right (5 or More Years of ESL), there is a clear decline in both mean household income and the proportion of Canadian-born residents in the average neighbourhood.

Table 4 presents mean standardized test scores separately for the Pre-Reform and Post-Reform cohorts. The Pre-Reform and Post-Reform group means are below the provincial average (negative) only in two instances, specifically the reading scores for the “5 or More Years of ESL” group. This same group had the lowest means among the GVA groups on each test. The “1 to 4 Years of ESL” group, however, often had the second highest mean scores (in two instances, the highest scores) ahead of the “Never ESL, Always OHL” group. The key issue for this paper is the difference in scores between Pre-Reform and Post-Reform cohorts. As the penultimate column shows, the changes were negative in only three out of twelve instances all of which were small in absolute size, i.e., -0.02 and -0.03 of a SD for numeracy and reading scores of the “Never ESL, Always OHL” group and -0.08 of a SD for numeracy score of the “Five Years or More of ESL” group. All of the other differences are positive though often less than 0.10 of a SD in absolute size. Hence, these unconditional differences do not indicate any general worsening of scores among either ESL or non-ESL groups in the GVA as a result of the five-

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with non-missing data.

<sup>11</sup> There is substantial variation in these characteristics. For example, variation in average neighbourhood household income accounts for one-third of the overall variation in household income in Canada.

year cap on supplementary funding. The biggest increases were for the “Never ESL, Ever NOHL” group which also had the highest scores on each test among the Post-Reform Cohorts. As an illustration of the size of these differences, an increase of 0.05, 0.10 and 0.20 of a SD will move a score from the 50<sup>th</sup> percentile to the 52<sup>nd</sup>, 54<sup>rd</sup> and 58<sup>th</sup> percentiles respectively. For more insight into the effects of the reform we turn to multivariate analysis.

## 5. Regression Results

### 5.1 Basic Model

The coefficients presented in Table 5 below were estimated using the following empirical model of the Grade 7 test scores:

$$TS = \beta_0 + \beta_1 \text{Never ESL, Ever NOHL} + \beta_2 \text{1 to 4 Years ESL} + \beta_3 \text{5 or More Years ESL} + \beta_4 \text{Post-Reform} + \beta_5 (\text{Post-Reform}) \times (\text{Never ESL, Ever NOHL}) + \beta_6 (\text{Post-Reform}) \times (\text{1 to 4 Years ESL}) + \beta_7 (\text{Post-Reform}) \times (\text{5 or More Years ESL}) + \beta_8 X + \beta_9 S + \varepsilon \quad (1)$$

where TS is standardized test score (numeracy, reading, or writing); “Never ESL, Ever NOHL”, “1 to 4 Years ESL” and “5 or More Years ESL” are dummy variables for three of the four ESL status groups; “Post-Reform” is a dummy variable equal to 1 for the three cohorts that took the Grade 7 test in 2001/2002, 2002/2003 or 2003/2004; X is a vector of variables defined in Table 3 that may influence test performance and be correlated with the Post-Reform variable; S is a

vector of school fixed effects; and  $\varepsilon$  is a disturbance term. The omitted case is a female from a Pre-Reform cohort, never in ESL, always OHL, never schooled outside the GVA, never in French Immersion, born in January through March and never in one of the listed home language groups. We use the Huber/White/sandwich estimator of variance and adjust standard errors for intra-school correlation.

In Tables 5 and 6, the numbered rows contain the estimates of the individual regression coefficients in Equation 1 and the lettered rows contain sums of coefficients from various numbered rows. The parentheses contain p-values and we shall refer to a value of 0.10 or less as “statistically significant”. Rows 1, 2 and 3 contain the conditional differences among our ESL-status groups for the Pre-Reform cohorts which differ in some ways from the unconditional differences in Table 4. There are four salient features of the Pre-Reform differences in Table 5. First, in no case, does the omitted group (Never ESL, Always OHL) have scores that are significantly lower than those of the other three ESL status groups. Second, the reading score for each listed group is significantly lower than that of the omitted group. Third, all three test scores for students with 5 years of more of ESL are significantly lower than those of the omitted group. Fourth, these conditional differences are less than one-fifth of a SD (in absolute value) in all cases save one.

The key results for our study are the estimated differences Pre-Reform and Post-Reform cohorts which are contained in Rows 4, A, B and C. Row 4 presents the differences between Pre-Reform and Post-Reform scores for the omitted (Never ESL, Always OHL) group. In Row A, we sum the coefficients from Rows 4 and 5 to get the total difference between Post- and Pre-Reform scores for the “Never ESL, Ever NOHL” group. In Row B (C), we sum the coefficients

from Rows 4 and 6 (4 plus 7) to get the total difference between Post- and Pre-Reform scores for the "1 to 4 Years of ESL" ("5 Years or More of ESL") group. In general, these differences in conditional scores are similar to the differences in unconditional mean scores in Table 4.

As the penultimate column shows, the changes were significantly negative in only three out of twelve instances all of which were small in absolute size, i.e., -0.03 of a SD for numeracy and reading scores of the "Never ESL, Always OHL" group and -0.06 of a SD for numeracy score of the "Five Years or More of ESL" group. All of the other differences are positive and usually significant though typically less than 0.10 of a SD in absolute size. The biggest increases were for the "Never ESL, Ever NOHL" group. Most importantly, we infer from these results that the five-year cap on supplementary funding was not having a major or even noticeable impact either in the test scores of the students with 5 or more years of ESL relative to other ESL status groups or in the test scores of students in GVA relative to the provincial average.

Rows D, E and F show that the conditional differences among the Post-Reform cohorts. The decline in the scores of the omitted group (Never ESL, Always OHL) relative to the scores of the other three groups had the following impacts on the four features of the Pre-Reform differences upon which we commented above. First, the omitted category (Never ESL, Always OHL) now has scores that are significantly lower than those of another ESL status group in the following three instances: writing scores for the Never ESL, Ever NOHL students and both numeracy and writing scores for the 1 to 4 Years of ESL students. Second, now only the 5 Years or More of ESL group has a reading score that is significantly lower than that of the omitted group. Third, all three test scores for students with 5 years of more of ESL are still significantly lower than those of the omitted group. Fourth and still most saliently, all of these conditional

differences are still less than one-fifth of a SD (in absolute value) in all cases save one. In summary, the scores of the Ever NOHL and Ever ESL groups did generally increase over time relative to the scores of the large Never ESL, Always OHL group omitted category but the conditional differences between ESL status groups are quite modest in size for both Pre-Reform and Post-Reform cohorts.

We estimated two alternative specification of the model as in Table 5. In the first, we substituted dummy variables and interaction terms for each test year (2000, 2001, 2002 and 2003) in place of the Post-Reform dummy variable. In the second, we estimated quantile regressions for the 10<sup>th</sup>, 25<sup>th</sup> and 75<sup>th</sup> percentiles. In each case, the general pattern of differences among ESL status groups and over time was very similar to that in Table 5.

Our principal interest is in the impact of the policy reform on the various ESL-status groups of students and, hence, we presented the parsimonious specification in Table 5 with a limited set of interactions. We have, however, also estimated a separate regression equation for each of the four different ESL status groups, that is, we interact the ESL status dummies with all of the other control variables in Table 5. These more detailed results are presented in Tables 2-A, 3-A, 4-A and 5-A in the Appendix. Below, we comment on the remaining results in Table 5 and, where appropriate, we comment in the text on differences between the estimates in Table 5 and the estimates in Tables 2-A through 5A.

In Table 5, males have significantly higher math scores and significantly lower reading and writing scores than do females. French Immersion is associated is higher scores on all three tests which may signal a selection of more able students into this language program. This French Immersion effect, however, is only significant in the case of the “Never ESL, Always OHL”

group. The dummy variables for quarter of birth reveal systematically higher scores for older children as also found by Smith (2008). The number of years in an Independent School has a small positive impact on reading and writing scores but again this is generally only true of the “Never ESL, Always OHL” students. Voluntary school moves are associated with somewhat lower test scores for all types of students which is a result commonly found in the literature (Kohen, Hertzman and Wiens 1998). Attendance at a school outside of the GVA is linked to slightly higher performance but again only for “Never ESL, Always OHL” students. The coefficients for this variable in the separate regressions for the two ESL groups (Table 4-A and 5-A) are usually negative but not significant.

Students with an East Asian or European Non-Romance Home Language tend to have higher scores on each test although the differences for the latter group are mainly true of the estimates for the 5 or more Years of ESL students in Table 5-A. What is most important to note is that the Home Language coefficients very likely reflect differences among individual students in the levels of parental income and education, important factors for which we are unable to control. There appears to be no relationship between test performance and the proportion of students in a school that lack a valid score.

The coefficients for the neighbourhood characteristic variables in Table 5 are usually statistically significant and of the expected sign, that is, more two parent families, income, education and employment are all associated with higher scores. The one exception is the proportion of persons born in Canada which was significant only for the numeracy test. In Tables 2-A through 5-A, however, we find that the neighbourhood variables are usually significant only for the “Never ESL, Always OHL” students. Regardless of statistical

significance, the coefficients of the neighbourhood variables are very small. Specifically, a one-thousand dollar increase in average neighbourhood income or a one percentage point improvement in the other independent neighbourhood variables (such as a decrease in the case of the unemployment rate) are associated with an increase of less than 0.005 of a SD in each test score. In results not shown here, we also found that the omission of the census neighbourhood variables from the regression had very little effect on the other estimates.

## **5.2 Further Regressions for ESL Students**

Table 6 contain additional regression estimates for the subsample of students who have had ESL. We have done this for two reasons. The first is to focus more closely on the differences between those ESL students who were more likely to be affected by the 5 year cap on supplementary funding (5 or more years of ESL) and those less likely to be affected (1 to 4 years of ESL). The second is to assess the possible influence of the following variables of particular relevance to ESL students: delayed entry (after Kindergarten) to ESL, ever both exited and re-entered ESL, and ever reported an official home language. Each of these new variables is also interacted with the Post-Reform cohort dummy. Summary statistics for these measures were provided in Table 3. The omitted case is now a girl from a Pre-Reform cohort with 1 to 4 years of ESL who started ESL in Kindergarten, never exited and re-entered ESL, never OHL, always schooled in GVA, never in French Immersion, born in January through March, and never in one of the listed home language groups.



Row 1 demonstrates that students in the Pre-Reform Cohorts with 1 to 4 years of ESL have scores that are one-fourth to one-third of a SD higher than the scores of students with 5 or more years of ESL. Row 2 indicates that the Post-Reform cohorts for the 1 to 4 Years of ESL group had reading and writing scores that were 0.13 and 0.10 of an SD higher than the scores of their Pre-Reform counterparts. Row A shows that the same is true for the students with 5 or more years of ESL though the size of the effects are a bit smaller (0.07 of a SD). Hence, these results, like those in Table 5, indicate that any impact of the 5 year cap on the test scores of ESL students was a positive one. Row B demonstrates that the differences between the scores of students 1 to 4 years and 5 or more years of ESL were a bit larger for the Post-Reform Cohorts than for the Pre-Reform Cohorts (Row 1).

Starting ESL after Kindergarten is linked with lower numeracy and reading scores in Row 4 implying that delayed entry to ESL may put students at a disadvantage. Neither of the other two new variables (exited and re-entered ESL in row 5 and ever official home language in row 6) has a significant coefficient. Row C shows that the differences in Pre-Reform and Post-Reform scores for those who had a delayed start in ESL are similar to the differences for those who did not (Row 2) but the writing estimate for the former misses statistical significance. The interaction terms in row 8 for the students who exited and then re-entered ESL are negative and significant in the case of the reading and writing tests. As a result, Row D indicates that there are no significant differences in Pre-Reform and Post-Reform scores for this group unlike other ESL students. Perhaps, a premature exit from ESL creates a learning deficit that offsets the positive effect that the policy change appeared to have on other students with no ESL-gap. The interaction coefficients for Ever OHL in row 9 are all significantly negative. Hence, for this

group also, there are no significant differences between the Pre-Reform and Post-Reform test scores in Row E. Most ESL students who ever had an OHL also experienced a change in home language and possibly family and household composition. One possible interpretation of Row E, then, is that students with less stable families and households also have a learning deficit that offsets the positive effect that the policy change appeared to have on students who never experienced an OHL.

Among the remaining variables in Table 6, the coefficients for Male, Quarter of Birth, Number of Voluntary School Moves, Proportion in Student's School Missing Test Score, and Home Language are generally similar to those in Table 5. Ever in French Immersion has a significantly positive coefficient only in the case of the reading score in Table 6. Number of Years of Independent School has very small (negative) and usually non-significant coefficients for the ESL students. Ever Schooled Outside GVA has significantly negative coefficients in the reading and writing regressions in Table 6 unlike the uniformly positive and significant coefficients in Table 5 and 2-A (for the Never ESL, Always OHL group). The negative coefficients for this variable in Table 6 may reflect the fact ESL services outside the GVA are less available and of lower quality. Finally, the coefficients for the neighbourhood characteristics are significant much less often in Table 6 than in Table 5. However, the most salient feature of the coefficients for the neighbourhood variables in both Tables 5 and 6 is their very small absolute size.

## **6. Summary and Conclusion**

Canada has a high rate of immigration and ESL programs play an important role in helping young immigrants to adapt to their new home. The special funding requirements for ESL services have raised concerns about costs and, in particular, the number of years that students spend in such programs. In 1999, British Columbia introduced a package of reforms that limited supplementary funding for ESL students to five years, increased the annual ESL supplement, and eliminated special assessment funding during a student's first year in ESL. These reforms may have influenced not only educational expenditures but also the educational progress of both ESL students and those in the regular stream.

We explore the educational impact of this package of reforms using a sample of Grade 7 students who attended school in the Greater Vancouver Area (GVA), an area that contains most of the ESL students in the province. We measure academic performance using the results of province wide standardized tests of numeracy, reading and writing proficiency. Policy impact is gauged by comparing differences in test scores, both before and after the policy change, among the following groups of Grade 7 students in the GVA: students with 5 or more years of ESL (those constrained by the new policy); students with one to four years of ESL; non-ESL students with a non-official home language; and non-ESL students with an official home language.

Our data make clear that ESL is common in the Greater Vancouver Area and that the 1999 reforms had a major impact on ESL enrolments beyond five years. Over our sample period, the proportion of Grade 1 students in the GVA enrolled ESL rose from 20% to 25%. Furthermore, among students who started ESL in Kindergarten almost two-thirds are still in ESL after five years. Subsequent to the reform, the exit rate from ESL after 5 years of this program

rose from 12% to 85%. Six or more years of ESL clearly went from being a common to a very uncommon phenomenon.

Our regression estimates reveal that, prior to the reform, the non-ESL students with an official home language had the highest test scores and students with 5 or more years of ESL had the lowest but that differences among the groups were small, specifically about one-fifth or less of a SD. The key results for our study are the estimated differences between Pre-Reform and Post-Reform cohorts. The scores declined over time relative to the provincial mean in only three instances and two of those were for the Never ESL, Always OHL group. Most noteworthy though may be the fact that differences in cohort scores were small being at most 0.12 of a SD. Hence, we infer from these results that the five-year cap on supplementary funding was not having a major or even noticeable impact upon either in the test scores of the students with 5 or more years of ESL relative to other ESL status groups or in the test scores of students in GVA relative to the provincial average.

Further investigation that there may have been no improvement in the scores of two types of ESL students: those students who exited and then re-entered ESL and those we ever had an official home language. The absence of improvement may reflect the effect of a premature exit from ESL in the first instance and the effect of a change in home language and, possibly, family and household composition in the second instance. The most salient feature of the estimates for other control variables is that the coefficients for neighbourhood socioeconomic characteristics, though usually of the expected sign and often significantly different from zero, were extremely small in size.

Our results have several policy implications for assessing the impact of this package of policy changes on test scores. First, no group of students in our study experiences what we would characterize as large changes in test scores. Second, the changes are usually increases relative to the provincial mean for ESL students and those with a non-official home language. Third, both before and after the reform, average test score differences between groups of students with different experiences of ESL, different neighbourhood characteristics, and official versus non-official home languages are modest in size. In summary, as judged by the data available for this paper, the reform is associated with only modest and often positive effects, and the remaining test score differences, especially the difference between those between ESL and non-ESL students, are not substantial.

Several cautionary comments are in order and suggest avenues for further research. First, we had access to only a limited set of control variables. For example, we were not able to control for the official language capacity of the individual students or the socioeconomic characteristics of the individual families. Second, we used all years of pre-reform and post-reform test scores that were available but the longer run effects of these policy changes may be different from those which we have observed. It would be very useful for future researchers to expand the set of control variables and use additional years of post-reform data.

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Table 1: Cohorts in Regression Samples

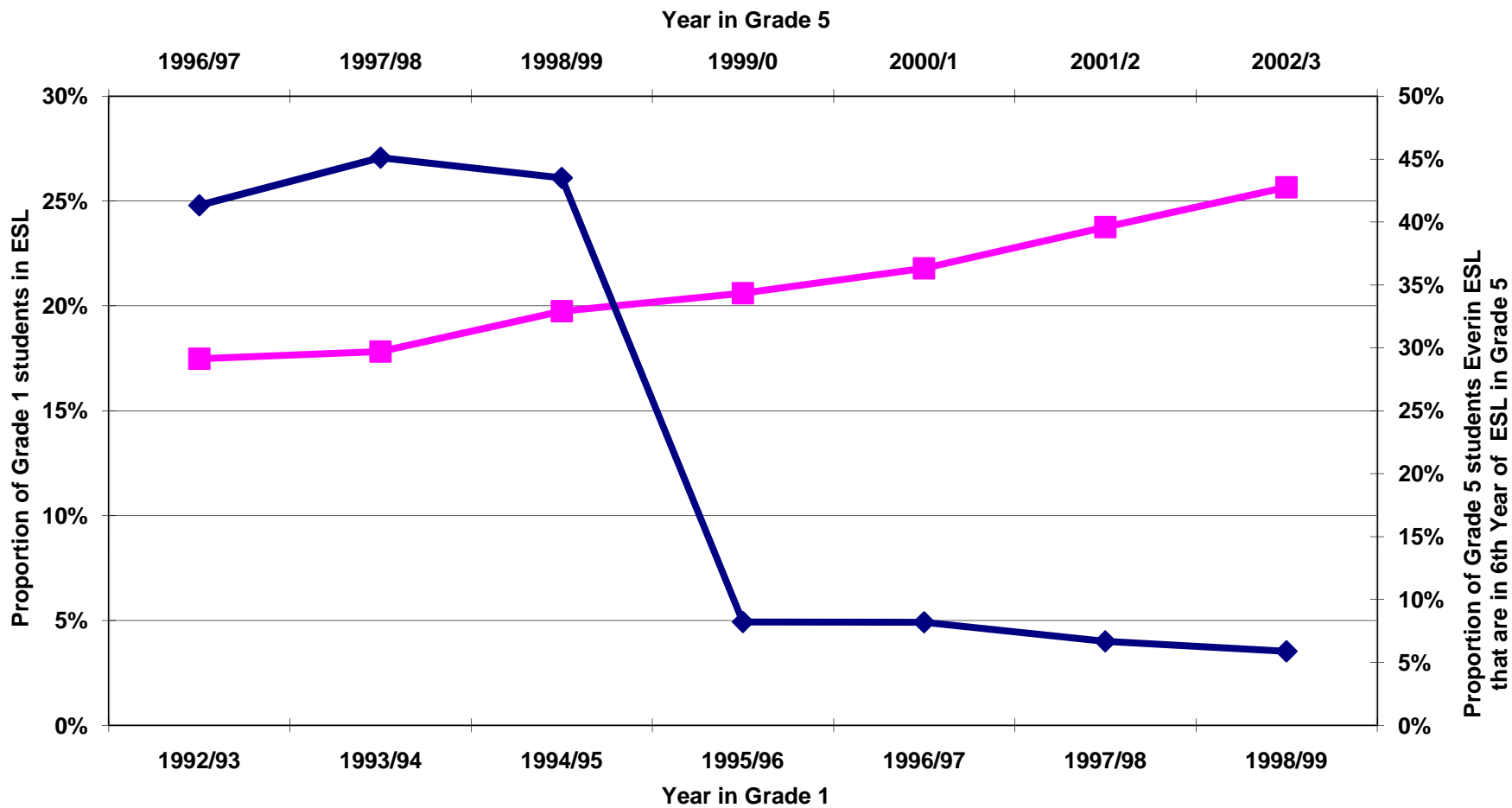
	Kindergarten	Grade 1	Grade 5: First Possible 6th Year of ESL	Grade 7: Test Year	Maximum Number Funded Years ESL by Grade 7
Pre-Reform Cohort	1992/1993	1993/1994	1997/1998	1999/2000	7
Pre-Reform Cohort	1993/1994	1994/1995	1998/1999	2000/2001	6
Post-Reform Cohort	1994/1995	1995/1996	1999/2000	2001/2002	5
Post-Reform Cohort	1995/1996	1996/1997	2000/2001	2002/2003	5
Post-Reform Cohort	1996/1997	1997/1998	2001/2002	2003/2004	5



Table 2 Number and Proportion of Students in Grades K-12 in ESL by Year

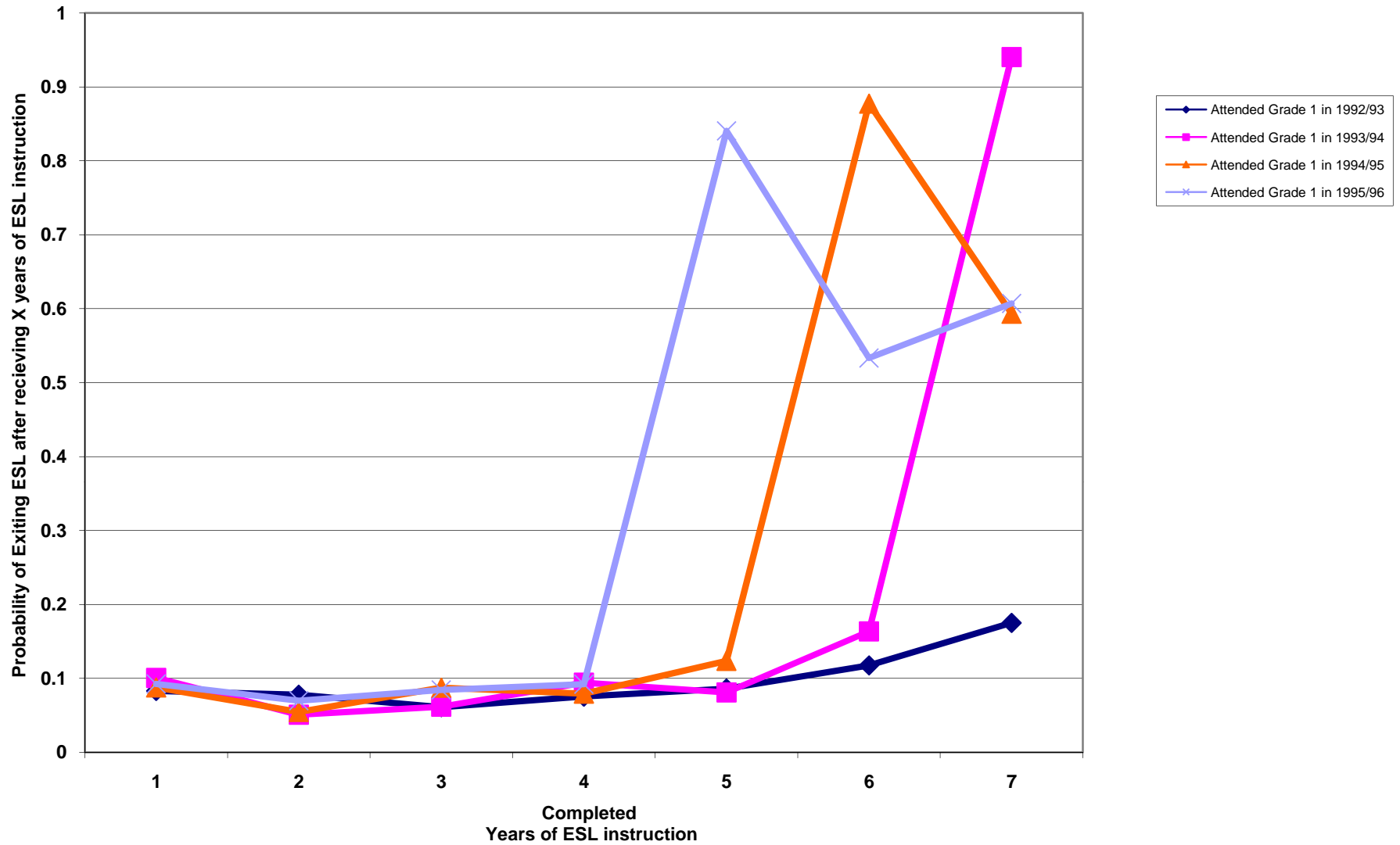
Year	Greater Vancouver Area			Rest of British Columbia			All of British Columbia			
	% ESL	# ESL	# Total	% ESL	# ESL	# Total	% ESL	# ESL	# Total	% ESL in GVA
1991	15%	28,308	186,826	1%	3,247	236,772	7%	31,555	423,598	90%
1992	18%	34,252	192,843	2%	3,977	243,452	9%	38,229	436,295	90%
1993	19%	37,676	200,208	2%	4,172	249,804	9%	41,848	450,012	90%
1994	20%	41,648	206,304	2%	4,908	254,716	10%	46,556	461,020	89%
1995	22%	45,557	211,185	2%	5,437	255,251	11%	50,994	466,436	89%
1996	23%	48,985	214,487	2%	6,065	255,992	12%	55,050	470,479	89%
1997	24%	52,599	218,495	3%	6,452	256,740	12%	59,051	475,235	89%
1998	24%	52,228	218,849	2%	6,244	250,671	12%	58,472	469,520	89%
1999	20%	43,640	219,448	2%	5,978	245,035	11%	49,618	464,483	88%
2000	20%	43,690	221,113	3%	6,571	240,813	11%	50,261	461,926	87%
2001	20%	43,610	222,729	3%	7,549	236,593	11%	51,159	459,322	85%
2002	19%	42,624	222,479	4%	8,475	230,894	11%	51,099	453,373	83%
2003	19%	42,070	223,398	4%	9,356	225,240	11%	51,426	448,638	82%
2004	19%	41,028	219,057	5%	10,108	219,363	12%	51,136	438,420	80%

**Figure 1 Proportion of Grade 1 Students in ESL and Proportion of Grade 5 Students Ever in ESL that are in 6th Year of ESL in Grade 5**



■ Proportion of Grade 1 students in ESL (Left Axis)  
◆ Proportion of Grade 5 students ever in ESL that are in 6th year of ESL in Grade 5 (Right Axis)

**Figure 2 Exit Rates from ESL by Years of ESL: Students Who Started ESL in Kindergarten and Have Never Both Exited and Re-entered ESL**



**Table 3: Summary Statistics - Final Estimation Sample as of Grade 7**

		Never ESL, Always Official Home Language	Never ESL, Ever Non-Official Home Language	1 to 4 Years ESL	5 or More Years ESL
1	% Limited to Five Years ESL Supplementary Funding (Post-Reform)	60%	61%	63%	62%
2	% Male	47%	48%	48%	53%
3	% Born April - June	28%	27%	25%	23%
4	% Born July - September	26%	24%	27%	26%
5	% Born October - December	22%	23%	24%	27%
6	% Ever in French Immersion	13%	9%	8%	2%
7	Mean Number of Years in Independent Schools	0.83	3.64	0.85	0.24
8	Mean Number of Voluntary (not required by district) School Moves	0.79	0.68	0.99	0.80
9	% Ever in School Outside Greater Vancouver Area	14%	6%	8%	3%
10	% Started ESL after Kindergarten			33%	10%
11	% Ever Exited and Re-entered ESL			13%	15%
12	% Ever Reported Official Home Language		63%	59%	27%
13	% Ever Reported Non-Official Home Language		100%	84%	98%
14	% Never Reported Official Home Language		38%	41%	73%
15	% Never Reported Non-Official Home Language		0%	16%	2%
16	% Ever Switched Between Official and non-Official Home Language		63%	43%	25%
17	% Ever Reported South Asian Home Language		18%	24%	35%
18	% Ever Reported East Asian Home Language		33%	42%	54%
19	% Ever Reported Romance Home Language		31%	8%	4%
20	% Ever Reported European non-Romance Home Language		16%	9%	3%
21	% Ever Reported African or Middle Eastern Home Language		5%	4%	3%
22	% Ever Reported First Nations Home Language		1%	0%	0%
23	% Students Without Valid Numeracy Score	2%	1%	2%	3%
24	% Students Without Valid Reading Score	2%	1%	2%	3%
25	% Students Without Valid Writing Score	2%	1%	2%	3%
26	% Students In This School Without Valid Numeracy Test	6%	7%	8%	9%
27	% Students In This School Without Valid Reading Test	6%	7%	8%	9%
28	% Students In This School Without Valid Writing Test	7%	7%	8%	10%
29	Mean Numeracy Test Score (normalized)	0.12	0.27	0.27	0.05
30	Mean Reading Test Score (normalized)	0.20	0.27	0.18	-0.17
31	Mean Writing Test Score (normalized)	0.15	0.40	0.33	0.09
32	% Neighborhood Families Headed by Two Parents	86%	85%	84%	83%
33	% Neighborhood Age 20+ with At Least Bachelors Degree	20%	20%	20%	18%
34	Neighborhood Unemployment Rate, Age 25-64	5%	6%	6%	8%
35	Mean Neighborhood Household Income (2000 Canadian Dollars)	\$74,263	\$70,461	\$65,447	\$59,824
36	% Neighbourhood Born in Canada	72%	62%	57%	52%
	Proportion of Total Sample	70%	5%	9%	16%
	Number of Observations	55,736	3,504	7,637	12,870

**Table 4: Mean Standardized Test Scores for Pre-Reform and Post-Reform Cohorts\***

<b>Numeracy</b>				
ESL Status	Pre-Reform Cohorts	Post- Reform Cohorts	Difference: Post-Reform minus Pre-Reform	Number Observations
Never ESL, Always Official Home Language	0.13	0.11	-0.02	55,274
Never ESL, Ever Non Official Home Language	0.20	0.31	0.10	3,487
1 to 4 Years ESL	0.26	0.27	0.01	7,472
5 or More Years ESL	0.10	0.02	-0.08	12,523
<b>Reading</b>				
Never ESL, Always Official Home Language	0.22	0.19	-0.03	55,276
Never ESL, Ever Non Official Home Language	0.19	0.32	0.13	3,485
1 to 4 Years ESL	0.13	0.21	0.08	7,472
5 or More Years ESL	-0.20	-0.16	0.04	12,523
<b>Writing</b>				
Never ESL, Always Official Home Language	0.14	0.16	0.02	55,274
Never ESL, Ever Non Official Home Language	0.31	0.46	0.14	3,487
1 to 4 Years ESL	0.31	0.35	0.04	7,474
5 or More Years ESL	0.07	0.11	0.04	12,521

\*These scores are standardized (mean = 0 and standard deviation = 1) using the provincial mean and standard deviation. Pre-reform cohorts took Grade 7 test in 1999/2000 and 2000/20001. Post-reform cohorts took Grade 7 test in 2000/20001, 2001/20002, and 2002/20003.

**Table 5 Basic Regression For Test Scores\***

		Numeracy	Reading	Writing
1	Never ESL, Ever NOHL	-0.053 (0.201)	-0.167*** (0.000)	-0.021 (0.622)
2	1 to 4 Years of ESL	0.049 (0.112)	-0.139*** (0.000)	0.020 (0.555)
3	5 or more Years of ESL	-0.161*** (0.000)	-0.440*** (0.000)	-0.153*** (0.000)
4	Post-Reform Cohort	-0.033** (0.012)	-0.031*** (0.003)	0.007 (0.639)
5	Post-Reform Cohort*(Never ESL, Ever NOHL)	0.108*** (0.005)	0.145*** (0.000)	0.117** (0.021)
A	Sum of (4) + (5) Total Impact of Reform on Never ESL, Ever NOHL	0.075** (0.050)	0.114*** (0.001)	0.124** (0.023)
6	Post-Reform Cohort*(1 to 4 Years ESL)	0.010 (0.709)	0.103*** (0.000)	0.053* (0.071)
B	Sum of (4) + (6) Total Impact of Reform on 1 to 4 Years ESL	-0.023 (0.641)	0.072*** (0.004)	0.060 (0.482)
7	Post-Reform Cohort*( 5 or more Years ESL)	-0.027 (0.316)	0.076*** (0.000)	0.036 (0.172)
C	Sum of (4) + (7) Total Impact of Reform on 5 or more Years ESL	-0.060*** (0.001)	0.045*** (0.003)	0.043*** (0.002)
D	Sum of (1) + (5) Post-Reform Difference Between Never ESL, Always OHL and Never ESL, Ever NOHL	0.055 (0.125)	-0.022 (0.502)	0.096** (0.013)
E	Sum of (2) + (6) Post-Reform Difference Between Never ESL, Always OHL and 1 to 4 Years ESL	0.059** (0.032)	-0.036 (0.152)	0.073* (0.013)
F	Sum of (3) + (7) Post-Reform Difference Between Never ESL, Always OHL and 5 or more Years ESL	-0.188*** (0.001)	-0.364*** (0.002)	-0.117*** (0.003)
8	Male	0.114*** (0.000)	-0.171*** (0.000)	-0.422*** (0.000)
9	Ever French Immersion	0.143*** (0.000)	0.174*** (0.000)	0.054** (0.018)
10	Born April - June	-0.041*** (0.000)	-0.055*** (0.000)	-0.045*** (0.000)
11	Born July - September	-0.104*** (0.000)	-0.105*** (0.000)	-0.090*** (0.000)
12	Born October - December	-0.144*** (0.000)	-0.164*** (0.000)	-0.139*** (0.000)
13	Number Years Independent School	0.013*** (0.001)	0.013*** (0.000)	0.012*** (0.001)
14	Number Voluntary School Moves	-0.095*** (0.000)	-0.077*** (0.000)	-0.062*** (0.000)
15	Ever in School Outside Greater Vancouver Area	0.031* (0.079)	0.046*** (0.009)	-0.020 (0.257)
16	South Asian Home Language	-0.182*** (0.000)	-0.080*** (0.004)	0.000 (0.998)
17	East Asian Home Language	0.368*** (0.000)	0.250*** (0.000)	0.230*** (0.000)
18	Romance Home Language	-0.175*** (0.000)	-0.001 (0.974)	-0.056 (0.108)
19	European Non-Romance Home Language	0.071** (0.048)	0.175*** (0.000)	0.090** (0.013)
20	African or Middle Eastern Home Language	-0.140*** (0.001)	-0.061 (0.140)	0.030 (0.447)
21	Aboriginal Home Language	0.100 (0.336)	0.107 (0.284)	0.156 (0.142)

**Table 5 Basic Regression For Test Scores (contin.)**

22	% in Student's School Missing Test Score	0.001 (0.227)	0.001 (0.293)	-0.000 (0.771)
23	% Neighbourhood Families Headed by Two Parents	0.003*** (0.000)	0.002*** (0.000)	0.001*** (0.003)
24	% Neighbourhood Population Age 20+ with Bachelors Degree	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.001)
25	Mean Neighbourhood Household Income (thousands of Canadian Dollars measured in \$2000)	0.000*** (0.001)	0.000* (0.052)	0.000** (0.032)
26	Neighbourhood Unemployment Rate, Age 25-64	-0.002* (0.077)	-0.001* (0.085)	-0.003*** (0.002)
27	% Neighbourhood Born in Canada	-0.001** (0.018)	0.000 (0.480)	-0.000 (0.677)
28	Constant	-0.080 (0.110)	0.140*** (0.004)	0.300*** (0.000)
	R-squared	0.17	0.14	0.16
	Number of Schools	1087	1087	1088
	Number of Observations	78756	79022	78778
	P-values in parentheses: *p<0.10, **p<0.05, ***p<0.01			
<p>*These scores are standardized (mean = 0 and standard deviation = 1) using the provincial mean and standard deviation. School fixed effects are included in this regression. The omitted case is a girl from Pre-Reform cohort, never in ESL, always official home language, never schooled outside the GVA, never French Immersion and born January - March.</p>				

**Table 6 Sensitivity Checks with Ever ESL Sample\***

		Numeracy	Reading	Writing
1	5 or more Years of ESL	-0.273***	-0.348***	-0.221***
		(0.000)	(0.000)	(0.000)
2	Post-Reform Cohort	0.018	0.129***	0.102***
		(0.625)	(0.000)	(0.010)
3	Post-Reform Cohort*( 5 or more Years ESL)	-0.054	-0.053*	-0.029
		(0.125)	(0.089)	(0.392)
A	Sum of (2) + (3) Total Impact of Reform on 5 or more Years ESL	-0.036	0.076***	0.073**
		(0.241)	(0.001)	(0.012)
B	Sum of (1) + (3) Post-Reform Difference Between 1 to 4 Years ESL and 5 or more Years ESL	-0.327***	-0.401***	-0.250**
		(0.000)	(0.000)	(0.000)
4	Started ESL after Kindergarten	-0.114***	-0.101***	-0.035
		(0.000)	(0.001)	(0.239)
5	Ever Exited and Re-entered ESL	0.018	0.048	0.029
		(0.556)	(0.102)	(0.369)
6	Ever Official Home Language	-0.025	0.005	0.010
		(0.367)	(0.845)	(0.719)
7	Post-Reform Cohort*( Started ESL after Kindergarten)	-0.004	0.000	-0.032
		(0.922)	(0.989)	(0.383)
C	Sum of (2) + (7) Total Impact of Reform on Started ESL after Kindergarten	0.014	0.129***	0.070
		(0.753)	(0.002)	(0.132)
8	Post-Reform Cohort*( Ever Exited and Re-entered ESL)	-0.043	-0.094***	-0.080*
		(0.273)	(0.010)	(0.052)
D	Sum of (2) + (8) Total Impact of Reform on Ever Exited and Re-entered ESL	-0.025	0.035	0.022
		(0.593)	(0.432)	(0.682)
9	Post-Reform Cohort*( Ever Official Home Language)	-0.068*	-0.083**	-0.061*
		(0.060)	(0.010)	(0.085)
E	Sum of (2) + (9) Total Impact of Reform on Ever Official Home Language	-0.054	0.046	0.041
		(0.153)	(0.142)	(0.262)
10	Male	0.107***	-0.161***	-0.411***
		(0.000)	(0.000)	(0.000)
11	Ever French Immersion	0.008	0.089*	-0.002
		(0.882)	(0.078)	(0.962)
12	Born April - June	-0.051**	-0.068***	-0.054***
		(0.014)	(0.001)	(0.003)
13	Born July - September	-0.100***	-0.120***	-0.085***
		(0.000)	(0.000)	(0.000)
14	Born October - December	-0.129***	-0.142***	-0.119***
		(0.000)	(0.000)	(0.000)
15	Number Years Independent School	-0.001	-0.002	-0.014*
		(0.890)	(0.815)	(0.075)
16	Number Voluntary School Moves	-0.079***	-0.058***	-0.049***
		(0.000)	(0.000)	(0.000)
17	Ever in School Outside Greater Vancouver Area	0.006	-0.075*	-0.089**
		(0.878)	(0.098)	(0.039)



**Table 6 Sensitivity Checks with Ever ESL Sample (contin.)**

18	South Asian Home Language	-0.208***	-0.120***	-0.030
		(0.000)	(0.000)	(0.294)
19	East Asian Home Language	0.354***	0.245***	0.210***
		(0.000)	(0.000)	(0.000)
21	Romance Home Language	-0.237***	-0.062	-0.113***
		(0.000)	(0.110)	(0.002)
22	European Non-Romance Home Language	0.037	0.137***	0.064
		(0.362)	(0.001)	(0.119)
23	African or Middle Eastern Home Language	-0.194***	-0.087*	0.025
		(0.000)	(0.066)	(0.581)
24	Aboriginal Home Language	0.066	0.141	0.103
		(0.579)	(0.273)	(0.432)
25	% in Student's School Missing Test Score	0.001	0.000	0.001
		(0.755)	(0.769)	(0.805)
26	% Neighbourhood Families Headed by Two Parents	0.002**	0.001	0.001
		(0.033)	(0.161)	(0.144)
27	% Neighbourhood Population Age 20+ with Bachelors Degree	0.002**	0.003***	0.001
		(0.035)	(0.005)	(0.133)
28	Mean Neighbourhood Household Income (thousands of Canadian Dollars measured in \$2000)	0.000	0.000	-0.000
		(0.416)	(0.494)	(0.618)
29	Neighbourhood Unemployment Rate, Age 25-64	-0.001	-0.001	-0.002*
		(0.516)	(0.369)	(0.097)
30	% Neighbourhood Born in Canada	-0.002***	-0.000	0.000
		(0.003)	(0.479)	(0.883)
31	Constant	0.259***	0.150	0.412***
		(0.005)	(0.101)	(0.000)
	R-squared	0.25	0.18	0.18
	Number of Schools	674	675	673
	Number of Observations	19995	20047	19992
	P-values in parentheses: *p<0.10, **p<0.05, ***p<0.01			
	*These scores are standardized (mean = 0 and standard deviation = 1) using the provincial mean and standard deviation. School fixed effects are included in this regression. The omitted case is a girl from Pre-Reform cohort, never in ESL, always official home language, never schooled outside the GVA, never French Immersion and born January - March.			

Table 1-A Potential and Final Estimation Samples

Exclusion Characteristics	Never ESL, Official Home Language	Never ESL, Non-Official Home Language	Ever ESL
Potential Estimation Sample: Attended BC Kindergarten in 1992/1993 through 1996/1997 and Ever Attended School in Greater	78,703	4,874	27,839
Exited and reentered BC schooling	2.8%	3.2%	3.6%
Exited BC schools and no re-entry	8.5%	11.3%	10.9%
Early schooling start*	0.1%	0.3%	0.1%
Late schooling start*	2.1%	3.6%	1.0%
Ever classified as gifted	3.5%	3.2%	2.8%
Ever in special education	13.8%	7.2%	11.0%
Ever in non-standard school*	2.2%	1.8%	1.3%
In ungraded or home school	1.9%	2.1%	0.8%
Skipped any grades	2.2%	3.9%	1.3%
Repeated any grades	2.7%	1.9%	1.5%
Attended Grade 7 But No Valid Test Score	4.9%	3.1%	4.7%
Final Estimation Sample	55,736	3,504	20,100
Ratio of Final Estimation Sample to Potential Estimation	71%	72%	72%
*Students usually start Kindergarten in September of the calendar year in which they turn five. An “early” (“late”) schooling start means that the student started Kindergarten in September of the calendar year in which he or she turned four (six). Non-standard schools include alternate (Montessori and Waldorf), distance ed, youth custody, etc.			

**Table 2-A Test Score Regression for Never ESL, Always OHL\***

	Numeracy	Reading	Writing
Post-Reform Cohort	-0.034*** (0.010)	-0.033*** (0.002)	0.008 (0.617)
Male	0.118*** (0.000)	-0.174*** (0.000)	-0.426*** (0.000)
Ever French Immersion	0.171*** (0.000)	0.190*** (0.000)	0.065*** (0.009)
Born April - June	-0.036*** (0.000)	-0.046*** (0.000)	-0.038*** (0.000)
Born July - September	-0.106*** (0.000)	-0.100*** (0.000)	-0.090*** (0.000)
Born October - December	-0.151*** (0.000)	-0.174*** (0.000)	-0.140*** (0.000)
Number Years Independent School	0.015*** (0.001)	0.018*** (0.000)	0.016*** (0.000)
Number Voluntary School Moves	-0.098*** (0.000)	-0.083*** (0.000)	-0.065*** (0.000)
Ever in School Outside Greater Vancouver Area	0.038* (0.061)	0.075*** (0.000)	0.003 (0.884)
% in Student's School Missing Test Score	0.002 (0.223)	0.001 (0.426)	-0.001 (0.411)
% Neighbourhood Families Headed by Two Parents	0.003*** (0.000)	0.002*** (0.000)	0.001** (0.016)
% Neighbourhood Population Age 20+ with Bachelors Degree	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.002)
Mean Neighbourhood Household Income (thousands of Canadian Dollars measured in \$2000)	0.000*** (0.000)	0.000** (0.033)	0.000*** (0.008)
Neighbourhood Unemployment Rate, Age 25-64	-0.002* (0.063)	-0.001 (0.206)	-0.003*** (0.008)
% Neighbourhood Born in Canada	-0.000 (0.687)	0.000 (0.323)	-0.000 (0.436)
Constant	-0.188*** (0.002)	0.102 (0.117)	0.296*** (0.000)
R-squared	0.15	0.13	0.17
Number of Schools	1064	1064	1064
Number of Observations	55274	55478	55290
P-values in parentheses: *p<0.10, **p<0.05, ***p<0.01			

\*These scores are standardized (mean = 0 and standard deviation = 1) using the provincial mean and standard deviation. School fixed effects are included in this regression. The omitted case is a girl from Pre-Reform cohort, never schooled outside the GVA, never French Immersion and born January - March.

**Table 3-A Test Score Regression for Never ESL, Ever NOHL\***

	Numeracy	Reading	Writing
Post-Reform Cohort	0.067 (0.125)	0.084* (0.061)	0.098 (0.108)
Male	0.076** (0.025)	-0.184*** (0.000)	-0.412*** (0.000)
Ever French Immersion	0.061 (0.493)	0.113 (0.217)	0.063 (0.481)
Born April - June	-0.067 (0.159)	-0.101** (0.012)	-0.082 (0.111)
Born July - September	-0.083 (0.153)	-0.044 (0.327)	-0.076 (0.167)
Born October - December	-0.106** (0.043)	-0.129*** (0.003)	-0.190*** (0.000)
Number Years Independent School	-0.004 (0.785)	-0.012 (0.423)	0.005 (0.714)
Number Voluntary School Moves	-0.059** (0.015)	-0.046** (0.039)	-0.027 (0.248)
Ever in School Outside Greater Vancouver Area	0.071 (0.492)	0.063 (0.576)	-0.167 (0.140)
South Asian Home Language	-0.380*** (0.006)	-0.188* (0.095)	-0.076 (0.530)
East Asian Home Language	0.049 (0.669)	0.058 (0.527)	0.196* (0.085)
Romance Home Language	-0.352*** (0.007)	-0.140 (0.192)	-0.143 (0.291)
European Non-Romance Home Language	-0.186 (0.102)	-0.037 (0.712)	-0.069 (0.546)
African or Middle Eastern Home Language	-0.385*** (0.007)	-0.193* (0.084)	-0.055 (0.676)
Aboriginal Home Language	-0.088 (0.676)	-0.018 (0.910)	0.122 (0.579)
% in Student's School Missing Test Score	0.003 (0.561)	0.008 (0.132)	0.008 (0.291)
% Neighbourhood Families Headed by Two Parents	-0.000 (0.918)	-0.002 (0.372)	0.001 (0.609)
% Neighbourhood Population Age 20+ with Bachelors Degree	-0.000 (0.841)	0.002 (0.360)	-0.002 (0.425)
Mean Neighbourhood Household Income (thousands of Canadian Dollars measured in \$2000)	0.000 (0.483)	0.000 (0.697)	0.000 (0.800)
Neighbourhood Unemployment Rate, Age 25-64	-0.000 (0.922)	0.001 (0.871)	-0.002 (0.652)
% Neighbourhood Born in Canada	-0.002 (0.240)	0.001 (0.350)	0.003* (0.092)
Constant	0.596** (0.014)	0.449** (0.034)	0.364 (0.171)
R-squared	0.28	0.24	0.32
Number of Schools	490	490	490
Number of Observations	3487	3495	3496
P-values in parentheses: *p<0.10, **p<0.05, ***p<0.01			
*These scores are standardized (mean = 0 and standard deviation = 1) using the provincial mean and standard deviation. School fixed effects are included in this regression. The omitted case is a girl from Pre-Reform cohort, never schooled outside the GVA, never French Immersion, born January - March. and never reporting one of the indicated home languages.			

**Table 4-A Test Score Regression for 1-4 Years ESL\***

	Numeracy	Reading	Writing
Post-Reform Cohort	-0.017 (0.533)	0.072*** (0.004)	0.043 (0.155)
Male	0.110*** (0.000)	-0.152*** (0.000)	-0.416*** (0.000)
Ever French Immersion	-0.070 (0.256)	0.076 (0.261)	-0.020 (0.698)
Born April - June	-0.064** (0.048)	-0.024 (0.393)	-0.024 (0.437)
Born July - September	-0.119*** (0.000)	-0.123*** (0.000)	-0.103*** (0.001)
Born October - December	-0.145*** (0.000)	-0.170*** (0.000)	-0.152*** (0.000)
Number Years Independent School	-0.025** (0.044)	-0.010 (0.351)	-0.014 (0.217)
Number Voluntary School Moves	-0.091*** (0.000)	-0.063*** (0.000)	-0.062*** (0.000)
Ever in School Outside Greater Vancouver Area	-0.049 (0.474)	-0.099 (0.113)	-0.064 (0.336)
South Asian Home Language	-0.146*** (0.000)	-0.107*** (0.003)	-0.020 (0.583)
East Asian Home Language	0.360*** (0.000)	0.293*** (0.000)	0.256*** (0.000)
Romance Home Language	-0.209*** (0.000)	-0.043 (0.416)	-0.103** (0.046)
European Non-Romance Home Language	0.010 (0.839)	0.096** (0.044)	0.065 (0.216)
African or Middle Eastern Home Language	-0.131** (0.037)	-0.055 (0.394)	-0.031 (0.605)
Aboriginal Home Language	0.075 (0.639)	0.173 (0.268)	0.160 (0.369)
% in Student's School Missing Test Score	0.000 (0.885)	-0.000 (0.916)	-0.000 (0.913)
% Neighbourhood Families Headed by Two Parents	0.002 (0.105)	0.000 (0.759)	0.001 (0.545)
% Neighbourhood Population Age 20+ with Bachelors Degree	0.002 (0.152)	0.003** (0.017)	0.001 (0.504)
Mean Neighbourhood Household Income (thousands of Canadian Dollars measured in \$2000)	0.000 (0.759)	0.000 (0.996)	-0.000 (0.484)
Neighbourhood Unemployment Rate, Age 25-64	-0.003 (0.119)	-0.004 (0.139)	-0.005** (0.037)
% Neighbourhood Born in Canada	-0.002** (0.032)	0.001 (0.387)	0.000 (0.850)
Constant	0.235* (0.092)	0.134 (0.334)	0.511*** (0.002)
R-squared	0.28	0.21	0.22
Number of Schools	618	618	618
Number of Observations	7472	7507	7477
P-values in parentheses: *p<0.10, **p<0.05, ***p<0.01			

\*These scores are standardized (mean = 0 and standard deviation = 1) using the provincial mean and standard deviation. School fixed effects are included in this regression. The omitted case is a girl from Pre-Reform cohort, never schooled outside the GVA, never French Immersion, born January - March. and never reporting one of the indicated home languages.

**Table 5-A Test Score Regression for 5 or more Years ESL\***

	Numeracy	Reading	Writing
Post-Reform Cohort	-0.057** (0.031)	0.043** (0.033)	0.043* (0.095)
Male	0.105*** (0.000)	-0.161*** (0.000)	-0.408*** (0.000)
Ever French Immersion	0.134 (0.127)	0.106 (0.162)	0.061 (0.401)
Born April - June	-0.039 (0.163)	-0.080*** (0.003)	-0.067*** (0.004)
Born July - September	-0.086*** (0.000)	-0.107*** (0.000)	-0.072*** (0.001)
Born October - December	-0.123*** (0.000)	-0.129*** (0.000)	-0.109*** (0.000)
Number Years Independent School	0.032** (0.017)	0.013 (0.268)	-0.009 (0.457)
Number Voluntary School Moves	-0.081*** (0.000)	-0.055*** (0.000)	-0.045*** (0.000)
Ever in School Outside Greater Vancouver Area	0.046 (0.430)	-0.075 (0.239)	-0.148** (0.014)
South Asian Home Language	-0.173*** (0.001)	-0.094* (0.074)	-0.059 (0.196)
East Asian Home Language	0.420*** (0.000)	0.257*** (0.000)	0.163*** (0.001)
Romance Home Language	-0.205*** (0.003)	-0.037 (0.547)	-0.163*** (0.001)
European Non-Romance Home Language	0.153** (0.027)	0.249*** (0.001)	0.048 (0.437)
African or Middle Eastern Home Language	-0.192*** (0.007)	-0.105 (0.147)	0.043 (0.526)
Aboriginal Home Language	0.049 (0.771)	0.145 (0.427)	0.061 (0.749)
% in Student's School Missing Test Score	0.000 (0.902)	0.001 (0.720)	0.001 (0.691)
% Neighbourhood Families Headed by Two Parents	0.002 (0.142)	0.002 (0.125)	0.001 (0.442)
% Neighbourhood Population Age 20+ with Bachelors Degree	0.002 (0.182)	0.002 (0.115)	0.002* (0.062)
Mean Neighbourhood Household Income (thousands of Canadian Dollars measured in \$2000)	0.000 (0.321)	0.000 (0.328)	0.000 (0.929)
Neighbourhood Unemployment Rate, Age 25-64	0.001 (0.769)	-0.000 (0.901)	-0.001 (0.515)
% Neighbourhood Born in Canada	-0.002* (0.067)	-0.001 (0.415)	-0.000 (0.972)
Constant	-0.118 (0.312)	-0.278** (0.028)	0.207* (0.092)
R-squared	0.25	0.16	0.17
Number of Schools	505	505	505
Number of Observations	12523	12540	12515
P-values in parentheses: *p<0.10, **p<0.05, ***p<0.01			

\*These scores are standardized (mean = 0 and standard deviation = 1) using the provincial mean and standard deviation. School fixed effects are included in this regression. The omitted case is a girl from Pre-Reform cohort, never schooled outside the GVA, never French Immersion, born January - March. and never reporting one of the indicated home languages.