The Impact of Educational First Steps on Student Success in Dallas ISD

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The Impact of Educational First Steps on Student Success in Dallas ISD

An analysis to assess the impact of EFS on student success in Dallas ISD using measures of academic achievement and school progress

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Final Report
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The analysis, opinions, and conclusions expressed herein are those of the authors, and do not necessarily represent the positions, opinions, or policies of either Educational First Steps or The University of Texas at Dallas.

Executive Summary

Research on early childhood intervention programs of the past few decades has shown that children who arrive at school already having mastered basic academic and social skills make better progress in school than children who lack such skills. Students without basic literacy, numeracy, and interpersonal skills often find it difficult to keep up with their peers. Experts cite early intervention through high-quality early childhood education programs as an excellent way for disadvantaged children to learn basic skills and regain lost ground.

Educational First Steps (EFS) is a nonprofit organization that has helped preschool age children from low-income families in the North Texas area for over two decades. The organization's primary goal is to help create and sustain nationally accredited early learning centers for economically disadvantaged children. EFS provides a number of services including one-on-one mentoring training and professional training for teachers, student enrichment programs, targeted financial assistance, and promotion of parental/guardian involvement..

In late 2006, EFS initiated a collaboration with researchers at the University of Texas at Dallas (UTD) on a long-term study on the impact of its program. UTD's field staff collected the names and birthdates of children who participated in EFS-assisted centers and linked them to academic records in elementary schools within the Dallas Independent School District (DISD). These records were compared to those for all children in DISD, controlling for a variety of demographic characteristics. Academic outcomes were assessed, using the results of standardized test scores collected by DISD as well as whether children had been retained in grade or were identified as having Limited English Proficiency (LEP). Finally, attendance patterns were compared to assess differences in absenteeism, a marker critical to sustaining school readiness skills.

The results indicate that student benefits from EFS assistance persist into the early grades in both reading and math. Students from EFS-assisted centers score higher than other DISD students in math in first and second grade. When controlling for accreditation, the results show that third grade reading assessment scores for students from EFS centers of accredited quality are over 5 percentile points higher than those from unaccredited centers, a persistent positive and significant effect infrequently found in similar intervention programs. EFS assisted students also had a lower probability of being retained in grade, were less like to be classified as LEP, and missed fewer days of school than DISD students. The results indicate that EFS affiliation has a positive effect on later student academic success, and that accreditation increases both the strength and extent to which the effect endures.

Introduction

Economically disadvantaged children face a wide array of obstacles on their paths to adulthood. One of the most defining factors in their development is whether or not they are academically successful, which prepares them for college, for meaningful employment, and for effective citizenship in our knowledge-based economy and complex society. Children from more advantaged households with stable income, whose parents/guardians have higher levels of education, often gain needed skills for academic success at home during their early years. Parents/guardians who have lower levels of education, often those with low-incomes or who are members of minority groups or recent immigrants, may find it difficult to provide their children with sufficient help in achieving the same basic language, literacy, and numeracy skills as those with more advantaged circumstances. The problem is exacerbated by the families' inability to provide for quality early childhood care, either due to a lack of access or to inadequate resources to pay for such care. Children without sufficient family support may enter the public school system with disadvantages that intensify and multiply without intervention, requiring expensive and often challenging remediation.

Social policy research suggests that children who arrive at school already having mastered basic academic and social skills are more likely to succeed in school, while those who lack such skills often find it difficult to keep up with their peers, are less likely to pass state-mandated standardized tests, and are at a higher risk of dropping out (Bowman et al. 2001; NICHD ECCRN 2005). Experts often cite early childhood education (ECE) as an excellent way to develop school readiness skills and later academic outcomes (Barnett 1995), and that a successful transition to school strengthens children's cognitive, social, and behavioral development (Kaufman et al. 2000). There is a general consensus among experts that the effectiveness of an ECE program is dependent upon the quality and that programs of lower quality are not associated with subsequent academic success for their graduates. While all children are likely to benefit from high quality ECE programs, much of the recent interest among researchers, policymakers, and the public is motivated by a desire to help advance the scholastic success of low income and other disadvantaged children, who are at a higher risk for poor academic performance (Brooks-Gunn 1997; Wertheimer and Croan 2003).

Region 10: Dallas ISD

Many children in Dallas County are less likely to be well prepared for school as a result of the prevailing family characteristics in this region, as Table 1 indicates.

Table 1. Characteristics of Individuals in Dallas County, Texas, and the U.S.

	Dallas County	Texas	U.S.
African Americans, percent	22.5	12.2	13.1
Persons of Hispanic or Latino Origin, percent	38.9	38.1	16.7
Caucasians not Hispanic, percent	32.8	44.8	63.4
Foreign born persons, percent, 2006-2010	23.0	16.1	12.7
Percent older than 5 who speak language other than English at home	38.8	34.2	20.1
High school graduates, percent of persons age 25+	76.5	80.0	85.0
Persons below poverty level, percent, 2006-2010	17.6	16.8	13.8
Persons under 5 years, percent	8.2	7.6	6.5

Source: U.S. Census Bureau, www.census.gov, "Quick Facts"

A child from a family where a language other than English is spoken in the home is disadvantaged if this results in the child having limited proficiency in English. When a language deficiency is combined with a family's low level of education and poverty-level income, the negative impact on these children's acquisition of scholastic skills can be intensified. Children in the Dallas area are more likely to suffer negative outcomes due to the combined effect of family characteristics and localized neighborhood poverty as seen above. Not only do a larger share of residents in Dallas County speak a language other than English in the home than do the populations of Texas and the U.S., they also have lower education levels and are more likely below the poverty level.

Additionally, there are a higher number of children under five years old - a substantial portion of the target population for early childhood education – in Dallas County than in Texas or the U.S. on average. If this age group is disproportionately represented among families with low education and income levels, Dallas parents/guardians and area educators face an even greater challenge than other districts in Texas, as well as the U.S. Dallas ISD must educate a student population more likely to experience poverty and language deficiencies that can lead to reduced levels of academic achievement and early dropout.

Educational First Steps and Research Partnership

Educational First Steps (EFS) is a private nonprofit organization that has been helping preschool age children from low-income families in the North Texas area for over two decades. EFS is dedicated to improving the quality of early childhood programs by assisting affiliated community-based child care centers through professional training, enrichment programs, targeted financial assistance, and promotion of parental involvement through literacy activities and parenting classes. EFS works with its affiliated ECE centers to enhance the quality of their programs and to support their progression to full accreditation through either the National Accreditation Commission of the Association for Early Learning Leaders or the National Association for the Education of Young Children (NAEYC). In 2012, EFS affiliates totaled approximately 100 ECE centers in low-income neighborhoods in the North Texas area.

In late 2006, EFS invited researchers at the University of Texas at Dallas (UTD) School of Economic, Political, and Policy Sciences to assist them in a long-term study of the impact of its program. UTD and EFS had previously collaborated on a 2003 study that, with limited data, had shown that students from EFS affiliates had done better than students in the Dallas Independent School District who had not attended EFS-supported centers. For the current study UTD is using administrative records through the 2010-2011 academic year that were provided directly by DISD through an ongoing research agreement with UTD. Student data are maintained on secure computer systems that guarantee the confidentiality of all student information, but which permit the matching of student data for the approved research project. This evaluation will help EFS understand the effects of its program by accreditation status, target areas for improvement, and enable them to be more responsive to stakeholder needs.

Objectives, Scope, and Methodology

The objective of this evaluation is to examine the impact of participation in EFS-affiliated early childhood centers on subsequent student success by addressing the following questions:

- *Does participation in EFS affiliated programs improve student academic achievement, as measured by performance on standardized test of reading and mathematics?*
- *Does participation in EFS affiliated programs increase daily attendance, as measured by days absent from days enrolled for the academic year?*

- *Does participation in EFS affiliated programs decrease the likelihood that a student will be retained in grade?*
- *Does participation in EFS affiliated programs decrease the likelihood that a student will be classified as an English Language Learner (ELL)?*
- *Does the impact of EFS differ by accreditation status of the center?*

For the purposes of this study, EFS students are defined as students from EFS-assisted programs for whom EFS data was provided, who also enrolled in DISD. DISD students are defined as all other students attending DISD with no known history of EFS participation.

Cohort Construction

Working with UTD researchers, EFS affiliates collected demographic data for both current and former students. These efforts yielded a total of 3,557 student records that were matched with administrative and academic records provided to UTD by the Dallas Independent School District. Achievement data are from a set of standardized tests including the Iowa Test of Basic Skills (ITBS), Logramos (the Spanish version of the ITBS), and the Texas Assessment of Knowledge and Skills (TAKS). These data and other measures of academic proficiency, taken from DISD data, were used to compare EFS participants to their DISD peers. The student sample ranged from kindergarten through eighth grade. Data was not available for all student participants in EFS programs, or for the preschool experience of the DISD comparison group. A number of EFS centers were unable to provide historical data on previously enrolled students, and students from those centers therefore could not be included in this study.

To improve the efficiency and accuracy of student matches to DISD data, UTD research assistants focused on collecting data from EFS centers within Dallas ISD boundaries. When available, both current and historical enrollment data from 1997-2010 was collected from 62 of the 94 north Texas area centers. Researchers recorded data for all students enrolled in an EFS program for at least 60 days. Incomplete record keeping across EFS centers limited the type and range of enrollment data collected. As a result, the final data elements used in linking EFS records to DISD records were restricted to student first name, last name, date of birth, and in some cases gender.

Assessment, enrollment, and demographic data from DISD for academic years 2003-2011 supplemented EFS center data. Test scores were matched by student name and date of birth, standardized by subject, year, and grade level to allow for comparisons, and the data were pooled by grade level. The data allowed for the construction of cohorts to span the 2003-2004 to 2010-2011 academic years and captured the prolonged educational effect for an EFS participant.

Analysis Plan and Measures

The methodological plan and statistical models are designed to determine the effect of EFS on students' academic performance as measured by compulsory standardized tests in math and reading given in kindergarten through 5th grade, as well the effect of EFS on students' academic progress including school attendance, grade retention, and language acquisition. The outcome measures are examined separately for EFS participants and non-EFS participants within DISD. Since DISD administers different tests at different grade levels to determine academic performance, varying forms of test type were used to assess scholastic achievement. DISD administers the Iowa Test of Basic Skills or Logramos in grades kindergarten through 2nd grade and the Texas Assessment of Knowledge and Skills for subsequent grades throughout the years studied.[1]

Historically, African American and Hispanic students score lower on standardized tests than Caucasian students, although the gap has narrowed in recent years (NAEP 2011). A variety of factors across ethnic groups contribute to this gap including family income, parental educational attainment, neighborhood influences, and school quality. Many DISD minority students live in neighborhoods where low income families are concentrated, and therefore both child care centers and neighborhood schools have difficulty in promoting educational attainment equivalent to centers and schools serving higher income neighborhoods. A lack of services and social networks in these areas of concentrated poverty intensify the effects of limited family resources on these children's academic preparation prior to entry into the public school system. The models used control for various ethnicities to address these issues.

Language acquisition plays an important role in students' academic performance. In order to control for this influence, a marker is used to indicate

[1] Texas Senate Bill 1031 initiates the process of replacing TAKS in favor of the State of Texas Assessments of Academic Readiness (STARR) beginning in 2012 and onwards. TAKS will be completely phased out by 2014.

students who have been identified by the district with limited English language proficiency (LEP). Decades of research have demonstrated that socioeconomic status is a major contributing factor in a child's academic performance. Participation in the Free and Reduced-Price Lunch Program is a means-tested program often used to indicate low-income households in education research, and is utilized in this evaluation as a proxy for low socioeconomic status. To control for campus differences across the district, fixed effects models were conducted separately.

Descriptive Statistics

Dallas Independent School District

Dallas ISD is the second largest school district in Texas and the 12th largest in the United States. It covers over 300 square miles and includes most of the city of Dallas as well portions of surrounding cities. In 2010-2011, Dallas ISD had 157,158 students, 225 schools, and a total budget of $1.47 billion (DISD 2011). The majority of students in DISD were Hispanic (61.5%) and slightly less than a third identified as African American (31%). Approximately seven of every eight students in the district sample participated in the Free and Reduced-Price Lunch Program and more than one-third (38%) were classified as having limited English proficiency. Table 2 displays the socioeconomic characteristics of the Dallas ISD pool, and the group of students who had attended EFS-assisted programs used in this analysis. The DISD matching pool total is larger than the reported DISD 2010-2011 enrollment by design. It represents the sum of all years studied, not simply the last year of enrollment.

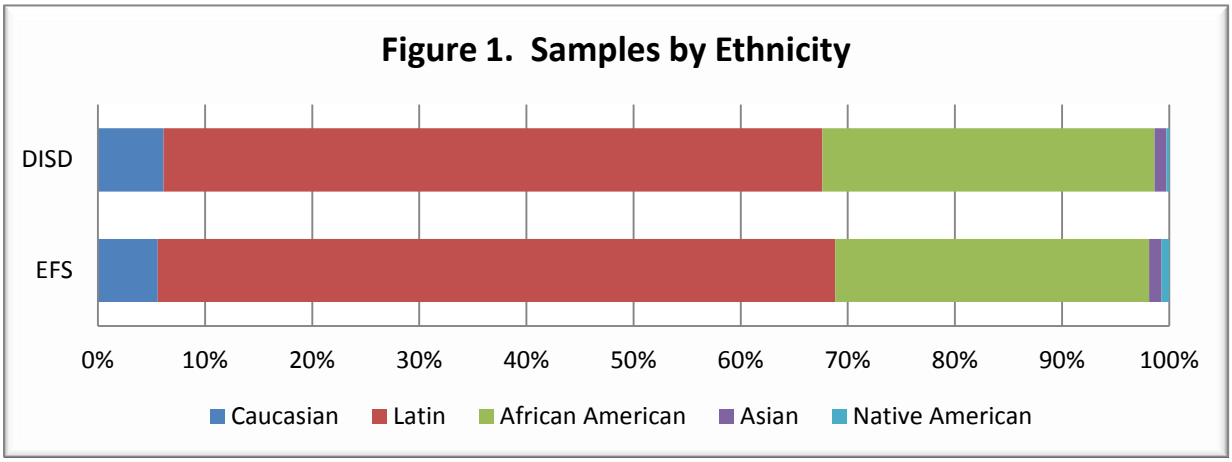
Table 2. Sample Characteristics for DISD and EFS Students

	DISD		EFS	
Total	179,850	100%	3,557	100%
Male	90,667	50.40%	1,740	48.90%
Asian	2,003	1.10%	42	1.18%
African American	55,727	31.0%	1,042	29.30%
Hispanic	110,586	61.50%	2,250	63.30%
White	11,056	6.10%	198	5.57%
Economically Disadvantaged	156,657	87.10%	3,170	89.12%
LEP	68,401	38.00%	1,353	38.03%
Special Education	11,694	6.50%	221	6.21%
Retained	12,782	7.10%	166	4.67%

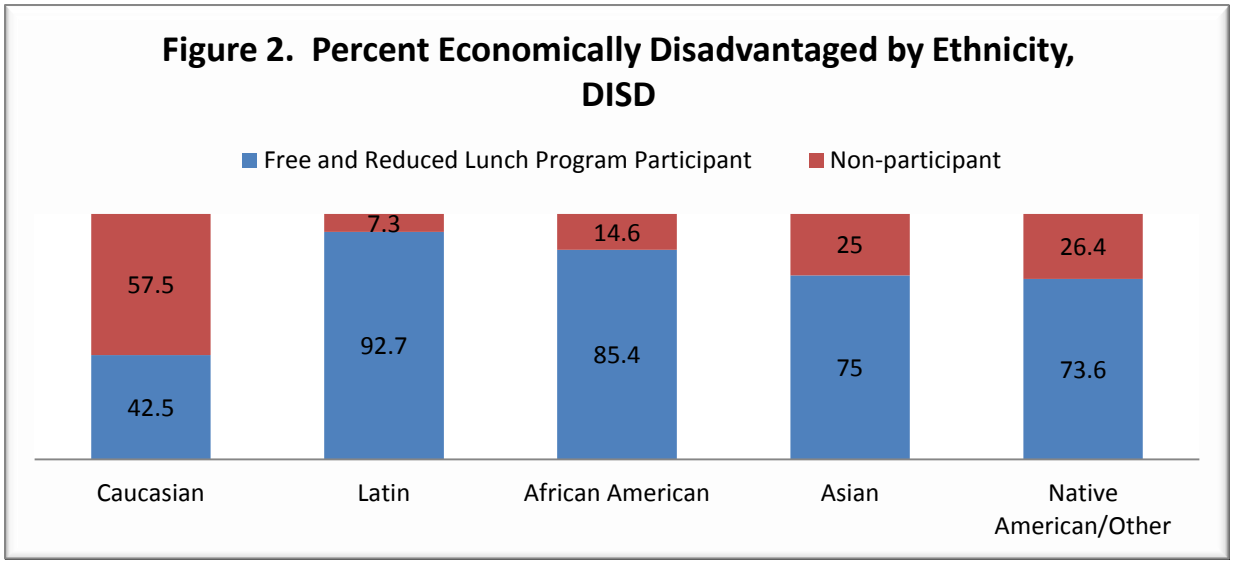
EFS Students and Affiliates

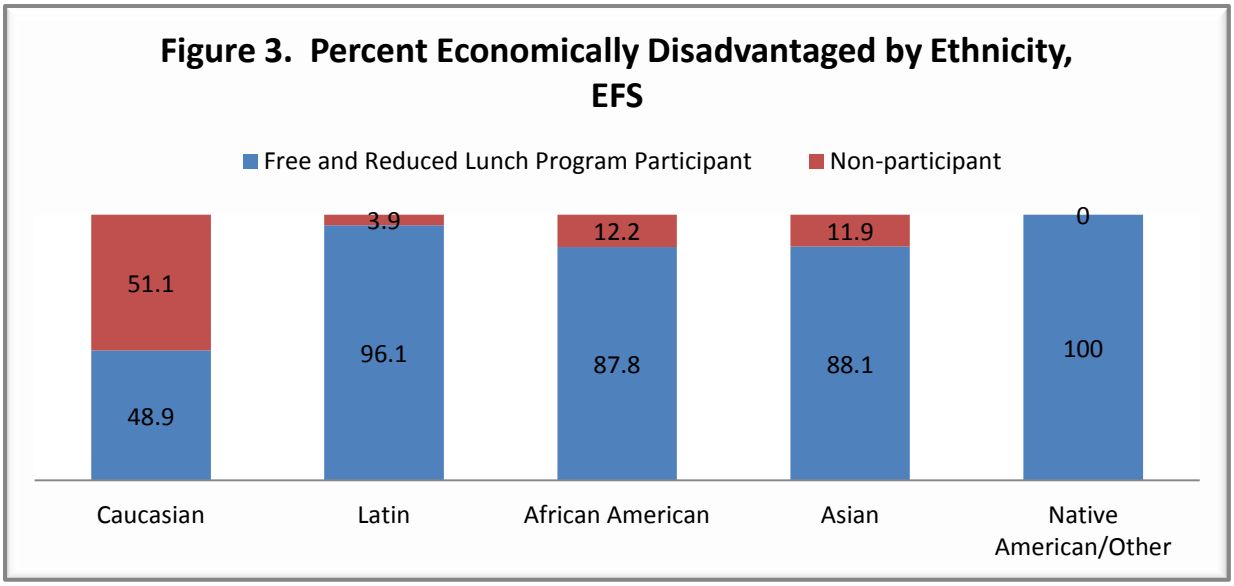
As the table above illustrates, both DISD and EFS serve a diverse student population. However, EFS students include a higher proportion of female students, a lower proportion of students retained, and fewer African Americans in the matched sample. More students in the EFS cohort were classified as economically disadvantaged, which is to be expected as most of the children served in the EFS affiliates come from low-income families.

Compared to the DISD sample, a slightly higher proportion of EFS students identified as Hispanic, and yet both samples share the same percent of students classified as Limited English Proficient (38%). The high proportion of economically disadvantaged children found in DISD and EFS cohorts contributes to an educationally at-risk student profile. Children from such backgrounds start with a greater risk for poor academic performance, and these disadvantages are likely to grow without intervention.



Several characteristics are spread disproportionately across various subgroups in both samples. For example, nearly all LEP students are also economically disadvantaged (96.69% of EFS vs. 96.07% of DISD). Furthermore, minority children disproportionately qualify for the Free and Reduced-Price Lunch Program (Figures 2 and 3). Language barriers and limited family resources among minorities can exacerbate potential early learning disparities.





The matched sample of EFS students is drawn from 62 centers representing 87% of the 71 EFS centers in Dallas County operating while data was being collected. Of the sample drawn from these 62 centers, 2.33% of which were Step 1 participants, 42.6% were Step 2 participants, about 1% were Step 3 participants, and 54.1% were drawn from 'Community Partners' or Step 4 Affiliates.[2] The centers have been affiliated for an average of 9.73 years.

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[2] Until September 2012, EFS used the *Four Steps To Excellence* approach to assist its affiliated child care centers on the path to national accreditation. Step 1: "Introduction" and Step 2: "Working Toward Excellence" centers are non-accredited but are working to improve quality of care to the standards of accreditation. Step 3: "Maintaining Accreditation Standards" centers and Step 4: "Community Partners" have achieved accreditation. Going forward,

Table 3. Students by Grade & Step Level					
Grade	Step 1	Step 2	Step 3	Step 4	Total
K	8	137	7	254	406
1	26	212	7	312	557
2	12	156	16	214	398
3	9	212	0	247	468
4	10	186	4	105	305
5	6	182	0	171	359
6	2	139	0	120	261
7	3	116	0	184	303
8	7	177	0	316	500
Total	83	1517	34	1923	3557

Over half of EFS students in this study participated at accredited Step 3 and Step 4 centers. These centers have achieved accreditation by one of the two established national bodies in early childhood education, the National Association for the Education of Young Children (NAEYC) or the National Accreditation Commission of the Association for Early Learning Leaders.

Results of the Analysis

Statistical analysis using linear regression was performed to determine the effect of EFS participation by accreditation on student success as measured by academic achievement on Dallas ISD-administered reading and mathematics tests. Probit analysis was used to determine the effect of EFS participation on student progress as assessed by on-time grade-to-grade transition and continuing classification as limited English proficient (LEP). EFS students were compared to all DISD students for a given grade level, as well as DISD students at the same campus.

Math and Reading Scores

EFS has introduced Four Steps to Excellence 2.0, a program designed to accelerate the achievement of accredited quality at assisted centers to a target of 40 months from inception of the EFS partnership.

Math and reading scores were standardized for each grade level and year to allow for comparisons across time. Scores were pooled across years by grade level. The number of scores exceeds the number of students because each student has multiple test scores during his or her enrollment in Dallas ISD.

The ordinary least squares regression technique was used to predict the change in standardized test scores for EFS participants, while controlling for other characteristics such as gender, ethnicity, campus, and test type. The analysis utilized Iowa Basic Skills (ITBS) or Logramos in grades K-2 and the Texas Assessment of Knowledge and Skills (TAKS) for subsequent grades.

The estimated effect on standardized scores is found on the first and fourth rows of Table 4. The *t-statistic*, an index of the reliability of the relationship between the two variables, is listed in parentheses on the second line. The absolute value of a *t-statistic* of 1.96 or greater indicates that the probability of obtaining the result by random chance is less than 5%. A *t-statistic* of 2.58 or greater indicates strong statistical significance at the 1% level and a *t-statistic* of less than 1.96 but greater than 1.64 indicates weak statistical evidence of an association at the 10% level of significance. Detailed results for each regression are included in the Appendix.

Table 4. Estimated Effect of EFS Participation on Standardized Math and Reading Scores

	KG	Grade 1	Grade 2	Grade 3
EFS: Math	0.045	0.072	0.088	0.008
t-statistic	(-1.13)	(2.72)***	(3.40)***	(-0.27)
Percentile points		**1.44**	**1.76**	
EFS: Reading	0.103	0.076	0.047	-0.068
t-statistic	(3.05)***	(2.82)***	(1.86)*	(2.57)**
Percentile points	**2.06**	**1.52**	**0.94**	**-1.36**

* significant at 10%; ** significant at 5%; *** significant at 1%

The analysis on students that combines both accredited and non-accredited programs indicate that EFS students score higher than all other Dallas ISD students in both math and reading for the first and second grades. In kindergarten, students who participated in EFS scored on average 2.06 percentile points higher in reading than all other DISD students. In the first grade, EFS students score 1.44 percentile points higher than all other DISD students in math and 1.52 percentile points higher in reading. In the second grade, EFS

students score 1.76 percentile points higher in math and approximately 1 percentile point higher in reading.

The estimated effect of EFS participation appears to reverse in direction for third grade reading, with students from EFS-assisted programs scoring 1.36 percentile points lower than all other DISD students. However, the analysis for third grade in particular is better explored by looking at the differential effect of EFS accreditation. Combining the two groups of students, those who had attended accredited programs and those who had attended non-accredited programs, seems to mask the important effect early childhood program quality has on student outcomes in later academic years.

The Effect of Accreditation

The second analysis on the math and reading scores focused on the effect of EFS program step level. As the results below indicate, reaching accredited quality (i.e., participation at a Step 3 or 4 accredited EFS affiliate) had a larger positive effect on math and reading scores in the early grades overall. The estimated effect of accreditation is shown in Table 5 followed by the corresponding *t-statistic* and significance level. Percentile points were calculated for effects that reached statistical significance.

Students who attended accredited programs affiliated with EFS scored 1.9 percentile points higher on kindergarten reading assessments and 2.3 percentile points higher in second grade reading assessments, compared to all other DISD students. Since reading scores for students in the second grade who had attended (unaccredited) Step 1 and 2 centers were 2.58 percentile points below those of all other DISD students, the overall benefit in second grade student reading scores from moving from Step 1 to achieving accredited quality was a 2.3 percentile point increase. These findings point out that programs' successful progression through the accreditation process explains all of the advantage EFS participation had on second grade reading skills. The results may also underscore the caveat in the ECE research literature that lower quality programs are less likely to be associated with subsequent academic success than higher quality programs.

This positive differential was higher for student outcomes in third grade reading assessments. The students from accredited EFS-affiliated programs tested at the third grade level were found to score 5.64 percentile points higher than all others at DISD. When students from non-accredited EFS programs were added to the

analysis, however, the net effect for third grade EFS students overall was reduced to nearly zero by those non-accredited students. (Reaching the mean of DISD in third grade reading might represent the EFS selection process, which intentionally targets academically at-risk children in the most economically disadvantaged neighborhoods.) It is reasonable to conclude from our analysis that accreditation, or ECE program quality, is particularly important in the development of reading skills as measured by performance on standardized reading tests.

Accreditation had a positive effect on math scores as well but not at any statistically significant level. This finding can be interpreted to mean that accreditation is not a significant contributor to the overall positive effect EFS participation had on the math skills assessments for this sample.

Table 5. Estimated Effect of EFS Accreditation on Standardized Math and Reading Scores

	KG	Grade 1	Grade 2	Grade 3
EFS: Math	0.028	0.052	0.063	-0.066
t-statistic	(-0.35)	(-.98)	(-1.3)	(-1.23)
EFS Accreditation: Math	0.022	0.026	0.034	0.1
t-statistic	(-0.23)	(-.043)	(-0.60)	(-1.62)
Net effect	0.05	0.078	0.097	0.034

	KG	Grade 1	Grade 2	Grade 3
EFS: Reading	0.131	0.027	-0.128	-0.279
t-statistic	(1.87)*	(-0.50)	(2.69)***	(5.40)***
EFS Accreditation: Reading	-0.036	0.065	0.243	0.282
t-statistic	(-0.45)	(-1.05)	(4.35)***	(4.75)***
Net effect	0.095	0.092	0.115	0.003
Percentile points	**1.9**		**2.3**	**0.006**

* significant at 10%; ** significant at 5%; *** significant at 1%

It is also worth noting that DISD uses the TAKS, a criterion-referenced test, to evaluate their third graders, a switch from the ITBS that is used for grades K-2. State-level TAKS are not initially devised for native Spanish-speakers and are "transadapted" from assessments written in English, which may result in a bias against LEP classified students (Guerrero 2002). Logramos, the Spanish version of

ITBS, on the other hand, is a norm-referenced test used to assess how students are competing on a national level. Adjustment to a new test type, format, and a high number of LEP-classified EFS students in third grade may partially explain this directional shift in effect for students from non-accredited programs. Furthermore, current academic literature on the prolonged effects of ECE programs suggests that programmatic effects "fade-out" five years after center-based intervention (Barnett 1995; Deming 2009; McLoyd 1998). Unlike results from accredited centers, the point estimates for non-accredited reading scores appear to follow a "fade-out" effect from kindergarten through the second grade.

Percentile points have the disadvantage of being unequal units of measurement. For example, a difference of 2 percentile points between two student's scores will have a different meaning depending on its position on the percentile scale, as the scale tends to amplify differences near the mean and collapse differences at the extremes. For this reason, it is helpful to graphically explore the distributions of scores for EFS participants over the sample's standard normal distribution of scores for grades K-3.

Figure 4a. Distribution of EFS Math Test Scores, K-3rd Grade

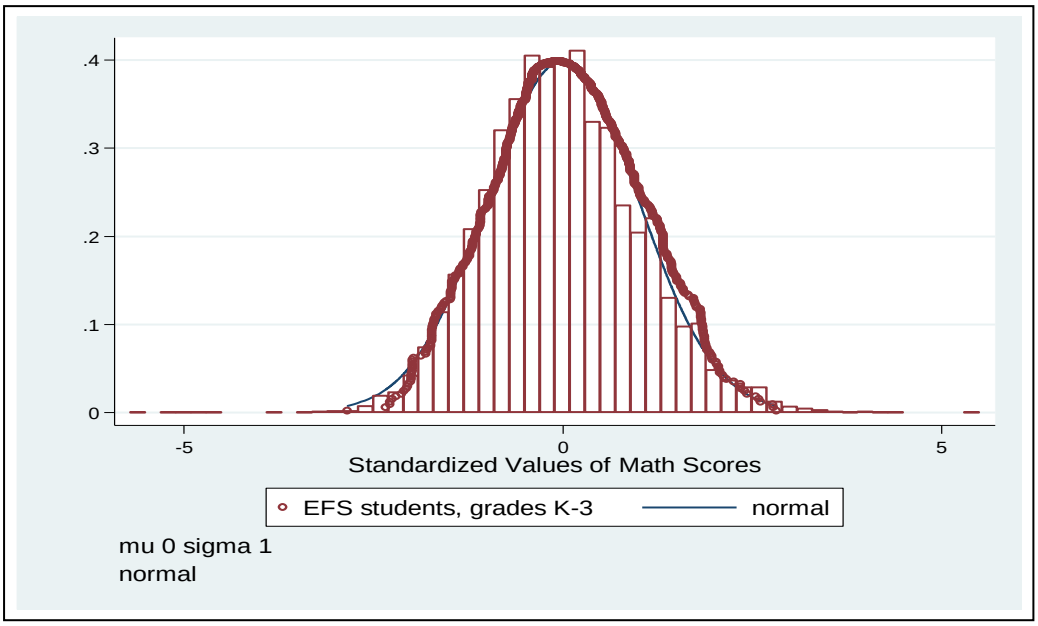
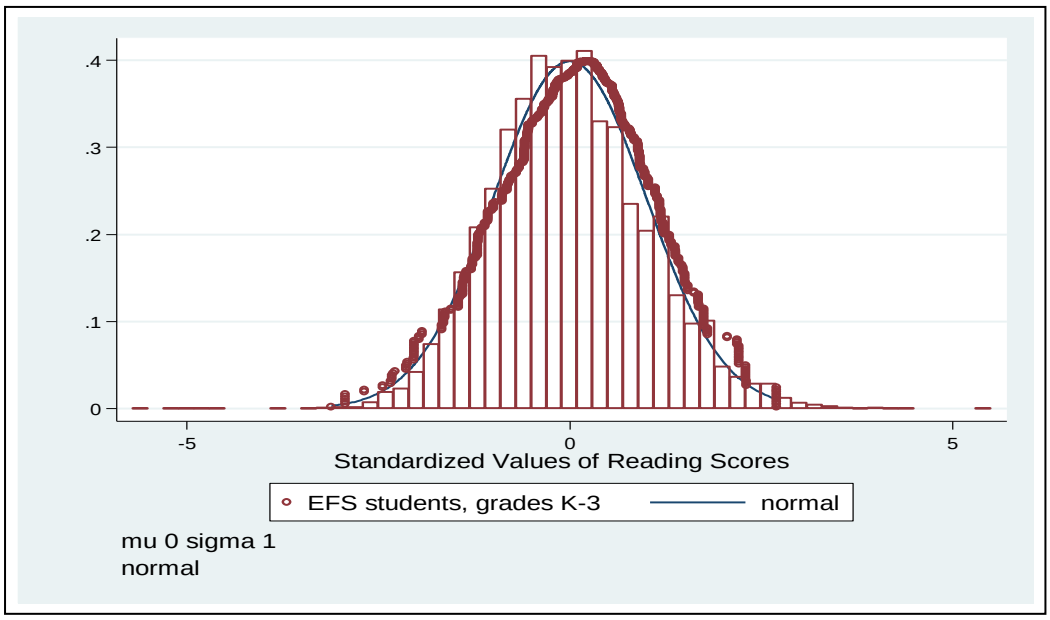


Figure 4b. Distribution of EFS Reading Test Scores, K-3rd Grade



For math, the distribution of students from EFS-assisted programs is positively skewed, indicating that these students score less below the average math score for both samples studied. For reading, on the other hand, EFS participation actually shifts the mean score above the normally distributed mean. If a student scores at the 50th percentile, then that individual's score is the same as or higher than the scores of 50% of those who took the test. Students from EFS-affiliated programs in first and second grade math and reading scored on average (combining students from both accredited and non-accredited centers) 1 to 1.76 percentile points higher than all other DISD students.

EFS Impact on Retention and LEP Classification

Probit analysis was used to determine the effect of EFS participation on academic progress as measured by grade retention and LEP classification. The results are presented below. The first line contains the coefficients of the models, which are used to calculate the predicted probabilities of grade retention and LEP classification. Below that are the standard errors used to develop confidence intervals for the estimates, and the third line are the changes in predicted value for an EFS student while holding all other variables constant.

Table 6. Predicted Probability of Retention and LEP by EFS Program Participation

	Retained	Classified as LEP
EFS	-0.175 0.037***	-0.302 0.012***
Average change in predicted probability for EFS participation	-1.92%	-7.19%

* significant at 10%; ** significant at 5%; *** significant at 1%

EFS students had a lower probability of being retained in class than all other DISD students at a highly statistically significant level, and this effect did not vary significantly by accreditation. Similarly, EFS students had a lower probability of being classified as LEP than all other DISD students, which is especially noteworthy considering the proportion of LEP students is about the same across samples. This can be interpreted to mean that while holding all other students' traits constant, the likelihood of being classified as LEP for EFS students is less than the likelihood of those without the EFS program experience. Students from accredited EFS-assisted programs experienced a slightly lower likelihood in LEP classification but the effect was not robust, demonstrating that attending either an accredited or non-accredited EFS program is beneficial to a child's language acquisition skills. The positive effect for LEP classification was consistent across campuses under the fixed effects models, implying that there is no unmeasured difference between campuses that is correlated with grade retention and LEP referrals.

The interpretation of the coefficients in a probit regression is not as straightforward as the interpretation of the coefficients in a linear regression. Probit models transform the probability of a dichotomous event into index scores based on the cumulative standard normal distribution. They relate the probability of experiencing an event while simultaneously controlling for all other variables such as test year, ethnicity, and gender.

Calculating the discrete change, which is the change in the probability of observing a certain outcome for a one-unit change in the independent variable, helps illustrate the impact of EFS participation on grade retention and LEP classification. In this case, the independent variable of interest was whether

or not the student was an EFS participant. Computing these predicted probabilities, while holding all other variables constant, shows that EFS students on average were 1.92% less likely to be retained in grade and 7.19% less likely to be classified as LEP than their DISD counterparts.

Attendance

Research in early childhood education is increasingly focusing on school attendance in the early grades as a predictor of student success. Early student achievement, especially in reading and mathematics, is sensitive to daily attendance. Attendance patterns are a fundamental but often overlooked variable in the current literature. The effect that regular attendance has on student success may be even greater than historically thought (Borland and Howsen 1998; Ready 2010). Children who are chronically absent, particular those from low income families, have lower standardized test scores than students who attend regularly, and are at a higher risk for dropping out (Barnett 1995; Chang and Romero 2008). Attendance and on-time grade-to-grade transition are also strongly correlated (Connolly and Olson 2012). Theory suggests that early childhood education promotes higher attendance by preparing children for the academic environment and decreases the likelihood of dropping out due to poor academic performance.

Attendance data on a limited sample of both populations were analyzed to determine if participation in EFS increased daily school presence as measured by days absent from the number of days enrolled by year. Average days absent were calculated by child for each semester reported for all available student data. These averages were used to perform yearly and grade level comparisons.

Table 7. Average Number Days Absent and Percent Attended, by Year

	2003	2004	2005	2006	2007	2008	2009	2010	2011
DISD (days absent)	8.815	8.319	8.246	8.083	8.615	8.68	8.52	8.311	8.319
DISD (percent attended)	0.951	0.954	0.954	0.955	0.952	0.952	0.953	0.954	0.954
EFS (days absent)	10.877	6.484	8.262	7.292	7.127	7.916	6.435	9.935	8.299
EFS (percent attended)	0.939	0.964	0.954	0.96	0.96	0.956	0.964	0.945	0.9539
t statistic	-2.855***	3.303***	-.0248	.1173	2.133***	1.011	3.011***	-2.671***	.0369

* significant at 10%; ** significant at 5%; *** significant at 1%

Over most of the years studied, EFS students had fewer average days absent than children who did not participate in the EFS program. Only in 2003 and 2010

did EFS students have worse attendance rates than all other DISD students at statistically significant levels. In 2005, the percent attended was approximately equal but for years 2004, 2007, and 2009, EFS students attended school more often at highly statistically significant levels. This effect held true across socioeconomic classifications.

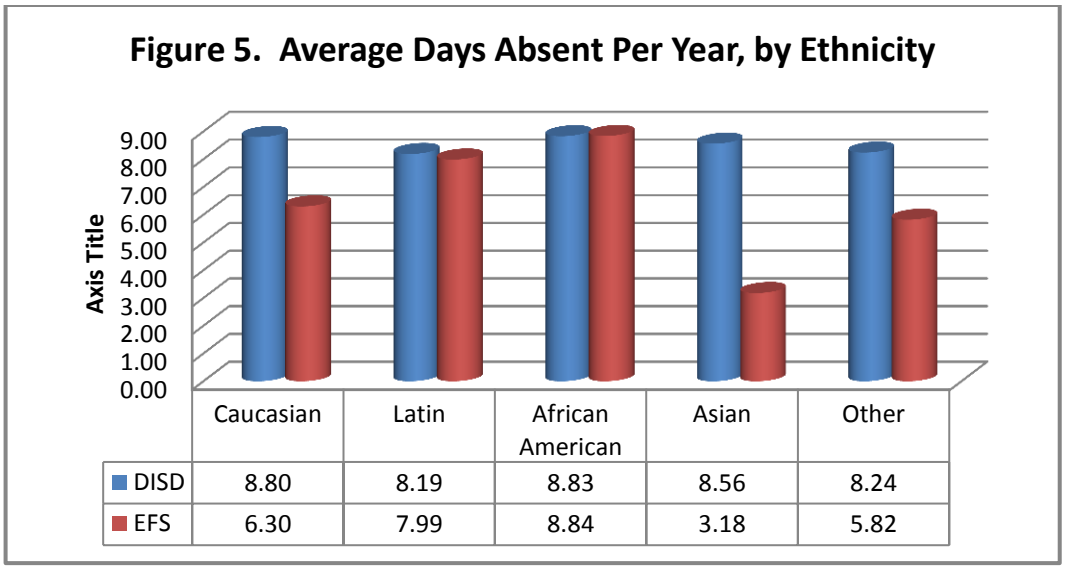
Table 8. Average Number Days Absent and Percent Attended, by Grade

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
DISD (days absent)	8.186	8.3304	8.194	8.677	8.49	8.865	8.693	8.455	8.298
DISD (percent attended)	95.45%	95.39%	95.45%	95.18%	95.28%	95.07%	95.17%	95.30%	95.39%
EFS (days absent)	8.523	9.418	6.672	7.356	7.211	9.411	9.078	8.719	6.264
EFS (percent attended)	95.27%	94.77%	96.29%	95.91%	95.99%	94.77%	94.96%	95.16%	96.52%
t statistic	-0.545	-2.134***	2.560***	2.082***	1.681*	-.8050	-.4916	-.3512	3.521***

* significant at 10%; ** significant at 5%; *** significant at 1%

Daily attendance in the early grades is associated with better academic readiness skills, so it is promising to see that EFS children in grades two, three, and four had better attendance patterns at statistically significant levels. For students in the first grades, EFS students attended fewer days than DISD students overall. Attendance data was only available for approximately one-third of the sample and inconsistent attendance patterns by year and grade could be reflective of sample size. Although effect size is meant to estimate a "true" effect in the population, it is important to recognize that effect size estimates can be highly influenced by smaller samples. Because of the statistical power, variability, and validity limitations of smaller samples, results of the attendance analysis must be interpreted with caution.

Attendance also varied by ethnicity and shows a positive trend for students who had attended EFS affiliates, but with wide variability due to the small samples used to comprise these averages.



Additional analysis by ethnicity was not possible because of this limitation.

To estimate the effect attendance patterns had on test scores, EFS participants were collapsed into quartiles by the number of days absent compared to days enrolled for grades kindergarten through 3rd. Test scores were pooled by grade to create a sufficient sample size for analysis. Children in the bottom quartile, those with the poorest attendance records, missed on average 22 days per year and attended 87.60% of the year while those in the top quartile missed on average 1 day per year and attended 99.63% of the academic year.

Table 9. Comparison of Test Scores Between Top and Bottom Quartiles of Days Absent for EFS students in Grades K-3

	Math		Reading	
	Top 25%	Bottom 25%	Top 25%	Bottom 25%
Observations	225	186	220	192
Mean	0.1125	-0.1382	0.2109	0.0501
t statistic	-2.399***		-1.548	
Percentile points	5.014		3.215	

*** significant at 1%

The *t* test of means for both math and reading between children in the top quartile and children in the bottom quartile show that EFS participants in kindergarten through grade three with excellent daily attendance had higher standardized test scores than the children who had poor attendance, and this effect was statistically significant for math. These results indicate that EFS

students who attend school on a regular basis do better than EFS students who have more absences. The attendance analysis suggests that children who participated in the EFS program had overall better daily attendance, and that regular attendance and scholastic performance are strongly correlated among EFS participants.

Table 10. Comparison of Top Quartiles of Days Absent for EFS and DISD students in Grades K-3

	Math		Reading	
	DISD	EFS	DISD	EFS
Observations	10044	225	12885	220
Mean	-0.0993	0.1125	-0.0413	0.2109
t statistic	-3.078***		-3.574***	
Percentile points	4.237		5.045	

*** significant at 1%

Further analysis shows that EFS students in the top quartile of days absent, those with excellent attendance records, outperformed their DISD counterparts in both math and reading test scores through third grade, at highly statistically significant levels. Based on this limited sample, it can be said with caution that the EFS program has a positive effect on attendance in select early years of compulsory school, and that better attendance possibly helped EFS children acquire school readiness skills.

Conclusions

The results indicate that the EFS program overall has a positive impact on student academic success. Students who attended EFS centers score better than their DISD classmates on math and reading assessments in the early grades. Perhaps more importantly, students who attended accredited centers, on average, scored better than those from the non-accredited programs, particularly on third grade reading assessments where the differential exceeded five percentile points at high levels of statistical significance. Accreditation appears to be an important factor in the sustained effects through grade 3, but less of a contributor to the positive impact EFS has grade retention and LEP classification. The persistence of the effect on test score data is significant given that evaluations of early childhood programs do not consistently find effects beyond kindergarten.

EFS attendees had better attendance rates than all other DISD students overall. They experienced less absenteeism on the whole, and those who missed the fewest days of school scored significantly higher than DISD students with similar patterns of low absenteeism.

The EFS programs and affiliates studied also showed positive results regarding LEP classification and on-time grade-to-grade transitions. The likelihood of LEP classification and grade retention for EFS student was significantly lower than that of DISD. This was also true for the economically disadvantaged children among EFS students. While this does not provide conclusive evidence that the EFS program contributed to students' success in grade transitions and language acquisition, it is possible that in the absence of exposure to the EFS program, these rates would have been equal to, or even worse than, those of DISD.

Increasing the probability of on-time grade transitions and decreasing the probability of LEP classification is a significant program advantage to both individual students and taxpayers. Retention in grade and LEP classifications are viewed by educators as predictors for dropping out of school. In addition, they create added costs to taxpayers which must be weighed against the costs of providing early childhood education.

The lack of impact which accreditation has on LEP classification and grade retention indicates that the EFS program experience is effective across Step Levels in improving academic progress, as measured in this evaluation.

Study Limitations and Future Steps

Data were not available to control for the self-selection of the students into the EFS program, nor was data available to control for the preschool experiences, if any, of the DISD comparison group. For this reason, it is not possible to rule out selection bias arising from the families that select their children into a preschool environment. However, EFS does seem to be producing improvements in both math and reading that lead to better academic performance when compared to other Dallas ISD students.

Incomplete data provided many obstacles in the analysis. A sizable number of affiliates did not retain files for children who attended in the past. Others who did retain files often had little information to report, or there were reported inaccuracies. There was also no information available on the affiliates'

individual programs or on their staff to include in the analysis. The inclusion of center-specific data would allow for future evaluations to gauge impact by center, increase confidence in the findings, and allow the results to be generalized to the population of EFS. Further analysis on center program data, teacher training, employment duration, and staff certifications would provide helpful information into the affiliate's development, but also serve as control measures when evaluating outcomes of the children attending those centers.

Many benefits of early childhood education are unmeasured through test score outcomes and compulsory school program placements. Over the past few of decades, a growing body of research has shown that children's social and behavioral skills are connected to their early scholastic success (Vitaro et al. 1999; Wentzel and Asher 1995). Social-emotional skill sets such as cooperation, taking directions, self-management, and getting along with others, are often acquired through early childhood intervention programs, and these skills are positively correlated with later academic achievement. Future research on the EFS program should aim to include measures of success outside what is available in administrative data. A broader definition of success consistent with theories found in the professional literature and an inclusion of center characteristics in future evaluations will allow for a more extensive analysis of the EFS program, its affiliates, and child outcomes.

Appendix A: List of Included EFS Centers

A New Beginning Child Development
A Step Ahead Learning Center
ABC # 3
Aisha's Learning Center
Avance
Betty Lin Early Learning Center
Braswell Kids Too!
Braswell, A.A., CDC
Building Blocks Christian Learning Center
CBMC Learning Center
CCF Academy
Casa View Christian Academy
Children's Beginning
Christianland Preparatory School
Cliff Temple CDC
Comunidad Child Care Center
Concordia Lutheran Learning Center
Creative Academy
Customize Learning Center
Dallas Bethlehem Center
Discovery House Learning Center
El Kinder Bilingual Academy
Future Leader's Learning Center
G & J Learning Center
Good Street Baptist Church Childcare
Gwen's Place
H.H. Banks Learning Center
Hamilton Park
Heavenly Care CDC
Heavenly Joy Day Care
Jefferson Place
Kendall's Korner
The Kids Kingdom
Kiddie Kare DCC
Kids Concepts
Kidz Kollege
La Marina Daycare
Little Tots Christian Center
Margie Faye Foundation
Mi Escuelita
Miss Sue's Christian Daycare
Moore's Faithful Learning Academy
Ms. Sue's Christian Daycare
Neighborhood Christian Learning Center
NeNe's Playpen Childcare Center
New Life Fellowship
Oak Cliff UMC Child Care Group
Olive's Lil' Angels Learning Center
Pee Wee Angels Day Care
Poppa's Place
Rainbow Academy
The Redeemer's Child Care Center
Salvation Army CDC
Saner Child Development Center
Simply Smarts Learning Center
Simply Unique Child Care I
The Open Door Preschool
The Ranch
Vogel Alcove

Appendix B: Estimated Effect of EFS on Standardized Math Scores by Grade Level

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
EFS	0.045	0.072	0.088	0.008	0.011	0.012
	-1.13	(2.72)***	(3.40)***	-0.27	-0.36	-0.43
Limited English (LEP)	-0.158	-0.182	-0.094	-0.336	-0.474	-0.558
	(6.55)***	(16.01)***	(8.69)***	(34.06)***	(44.87)***	(50.12)***
Special Education	-0.465	-0.506	-0.791	-0.458	-0.586	-0.462
	(11.47)***	(25.22)***	(44.52)***	(22.90)***	(29.00)***	(23.11)***
Ever Retained in Grade	-0.801	-0.742	-0.619	-0.734	-0.577	-0.573
	(29.81)***	(64.53)***	(56.46)***	(63.52)***	(40.91)***	(40.80)***
Native American	-0.178	-0.083	-0.328	-0.196	-0.311	-0.021
	-1.21	-0.93	(4.57)***	(2.36)**	(3.76)***	-0.28
Asian	-0.199	-0.018	0.218	0.244	0.108	0.28
	(1.99)**	-0.44	(5.28)***	(5.81)***	(2.38)**	(6.78)***
African American	-0.57	-0.521	-0.515	-0.668	-0.65	-0.554
	(13.04)***	(27.28)***	(27.42)***	(34.44)***	(33.04)***	(28.98)***
Latin	-0.481	-0.301	-0.276	-0.294	-0.314	-0.179
	(10.98)***	(15.48)***	(14.27)***	(15.04)***	(16.08)***	(9.45)***
Economically Disadvantaged	-0.187	-0.285	-0.279	-0.217	-0.296	-0.284
	(6.23)***	(19.39)***	(20.06)***	(15.51)***	(20.83)***	(20.83)***
Male	-0.042	0.008	0.078	0.065	0.071	0.013
	(3.36)***	-1.06	(10.36)***	(8.41)***	(8.73)***	-1.55
Logramos Test	0.168	0.111	0.069	0.102	0.121	0.275
	(6.64)***	(9.65)***	(6.10)***	-0.65	-0.82	(1.80)*
Year: 2004	-0.057	0.012	0.007	0.018	0.012	0.033
	(1.80)*	-0.71	-0.41	-1.04	-0.69	(1.80)*
Year: 2005	-0.183	0.094	0.03	-0.026	0.055	0.068
	(5.91)***	(5.46)***	(1.77)*	-1.52	(3.15)***	(3.80)***
Year: 2006	0.012	0.114	-0.013	-0.008	-0.042	0.087
	-0.38	(6.49)***	-0.73	-0.45	(2.31)**	(4.73)***
Year: 2007	-0.124	0.072	0.111	0.001	0.014	0.107
	(4.03)***	(4.19)***	(6.63)***	-0.08	-0.78	(5.86)***
Year: 2008	-0.092	0.059	0.054	0.022	-0.081	0.063
	(3.16)***	(3.42)***	(3.19)***	-1.31	(4.51)***	(3.46)***
Year: 2009	-0.141	0.033	0.041	0.076	0.033	0.132
	(5.08)***	(1.96)**	(2.43)**	(4.45)***	(1.82)*	(7.29)***
Year: 2010	-0.166	0.037	0.015	0.052	-0.01	0.072
	(5.77)***	(2.14)**	-0.92	(3.12)***	-0.55	(4.09)***
Year: 2011	-0.13	-0.015	0.016	0.039	0.034	0.084
	-1.62	-0.91	-1.03	(2.53)**	(2.10)**	(5.08)***
Constant	0.854	0.715	0.657	0.792	0.819	0.642
	(17.82)***	(32.88)***	(31.27)***	(36.36)***	(36.67)***	(29.51)***
Observations	24651	60180	62454	58806	53805	52742
R-squared	0.06	0.11	0.11	0.13	0.13	0.13

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix C: Estimated Effect of EFS on Standardized Reading Scores by Grade Level

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
EFS	0.103	0.076	0.047	-0.068	-0.001	0.007
	(3.05)***	(2.82)***	(1.86)*	(2.57)**	-0.04	-0.24
Limited English (LEP)	-0.03	-0.141	-0.312	-0.456	-0.586	-0.719
	(1.93)*	(12.22)***	(29.38)***	(45.82)***	(56.08)***	(64.38)***
Special Education	-0.332	-0.593	-0.959	-0.563	-0.545	-0.49
	(11.51)***	(31.69)***	(58.79)***	(26.21)***	(22.23)***	(20.61)***
Ever Retained in Grade	-0.518	-0.835	-0.729	-0.782	-0.672	-0.585
	(29.89)***	(75.16)***	(68.55)***	(67.54)***	(50.38)***	(41.63)***
Native American	-0.236	-0.24	-0.117	-0.337	-0.136	-0.008
	(2.09)**	(3.19)***	-1.31	(4.68)***	-1.64	-0.1
Asian	0.195	0.038	-0.088	0.003	-0.015	0.139
	(3.80)***	-0.94	(2.16)**	-0.07	-0.35	(3.15)***
African American	0.006	-0.312	-0.489	-0.512	-0.522	-0.495
	-0.23	(17.01)***	(26.47)***	(26.85)***	(26.38)***	(25.56)***
Latin	-0.094	-0.25	-0.32	-0.154	-0.348	-0.25
	(3.60)***	(13.46)***	(16.99)***	(8.01)***	(17.83)***	(13.09)***
Economically Disadvantaged	-0.135	-0.314	-0.344	-0.339	-0.25	-0.298
	(7.21)***	(22.55)***	(25.30)***	(23.83)***	(17.80)***	(22.14)***
Male	-0.078	-0.178	-0.095	-0.064	-0.12	-0.083
	(8.49)***	(24.02)***	(12.96)***	(8.24)***	(14.85)***	(10.21)***
Logramos Test	0.102	0.155	0.187	0.164	-0.223	0.127
	(6.49)***	(14.04)***	(17.27)***	-1.22	-1.31	-0.8
Year: 2004	0.044	0.061	-0.049	-0.023	-0.037	-0.013
	(2.42)**	(3.63)***	(3.01)***	-1.38	(2.11)**	-0.72
Year: 2005	-0.007	0.035	-0.016	-0.025	0.037	0.031
	-0.39	(2.12)**	-1.02	-1.51	(2.13)**	(1.73)*
Year: 2006	-0.022	-0.04	-0.016	-0.018	0.068	0.015
	-1.17	(2.24)**	-0.95	-1.02	(3.76)***	-0.81
Year: 2007	-0.016	0.031	0.041	0.019	-0.075	0.05
	-0.87	(1.85)*	(2.53)**	-1.08	(4.28)***	(2.74)***
Year: 2008	-0.031	-0.011	-0.009	-0.02	-0.009	0.047
	-1.63	-0.65	-0.57	-1.16	-0.52	(2.53)**
Year: 2009	-0.047	-0.007	-0.018	0.031	-0.044	0.125
	(1.87)*	-0.43	-1.12	(1.81)*	(2.50)**	(7.02)***
Year: 2010	-0.086	-0.017	-0.026	0.046	0.007	0.068
	(3.60)***	-1.01	-1.62	(2.76)***	-0.39	(3.91)***
Year: 2011	-0.072	-0.082	-0.073	0	0.141	0.077
	(3.45)***	(5.40)***	(4.99)***	-0.03	(8.84)***	(4.68)***
Constant	0.267	0.782	1.003	0.911	0.854	0.78
	(10.09)***	(37.32)***	(48.66)***	(42.43)***	(39.18)***	(35.56)***
Observations	45939	63548	62205	58205	53313	51895
R-squared	0.03	0.13	0.17	0.16	0.16	0.16

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix D: Estimated Effect of Accreditation on Standardized Math Scores by Grade Level

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
EFS	0.028	0.052	0.063	-0.066	-0.054	-0.013
	-0.35	-0.98	-1.3	-1.23	-0.94	-0.22
Accreditation	0.022	0.026	0.034	0.1	0.087	0.033
	-0.23	-0.43	-0.6	-1.62	-1.32	-0.49
Limited English (LEP)	-0.158	-0.182	-0.094	-0.336	-0.474	-0.558
	(6.55)***	(16.01)***	(8.69)***	(34.05)***	(44.87)***	(50.12)***
Special Education	-0.466	-0.506	-0.791	-0.457	-0.586	-0.462
	(11.47)***	(25.21)***	(44.52)***	(22.89)***	(29.00)***	(23.11)***
Ever Retained in Grade	-0.801	-0.742	-0.619	-0.734	-0.577	-0.573
	(29.81)***	(64.53)***	(56.46)***	(63.52)***	(40.91)***	(40.80)***
Native American	-0.178	-0.083	-0.329	-0.196	-0.311	-0.02
	-1.21	-0.93	(4.58)***	(2.36)**	(3.77)***	-0.27
Asian	-0.199	-0.018	0.218	0.244	0.107	0.28
	(1.99)**	-0.44	(5.28)***	(5.80)***	(2.37)**	(6.78)***
African American	-0.57	-0.521	-0.515	-0.668	-0.651	-0.554
	(13.04)***	(27.29)***	(27.42)***	(34.44)***	(33.06)***	(28.98)***
Latin	-0.481	-0.301	-0.276	-0.294	-0.315	-0.179
	(10.98)***	(15.48)***	(14.27)***	(15.04)***	(16.10)***	(9.45)***
Economically Disadvantaged	-0.187	-0.285	-0.279	-0.217	-0.296	-0.284
	(6.23)***	(19.39)***	(20.05)***	(15.53)***	(20.82)***	(20.83)***
Male	-0.042	0.008	0.078	0.065	0.071	0.013
	(3.36)***	-1.06	(10.36)***	(8.42)***	(8.72)***	-1.55
Logramos Test	0.168	0.111	0.069	0.1	0.115	0.272
	(6.64)***	(9.65)***	(6.11)***	-0.63	-0.78	(1.78)*
Year: 2004	-0.058	0.012	0.007	0.018	0.012	0.032
	(1.80)*	-0.71	-0.41	-1.03	-0.69	(1.80)*
Year: 2005	-0.183	0.094	0.03	-0.026	0.055	0.068
	(5.92)***	(5.47)***	(1.77)*	-1.53	(3.14)***	(3.80)***
Year: 2006	0.012	0.115	-0.013	-0.008	-0.042	0.087
	-0.38	(6.50)***	-0.72	-0.46	(2.32)**	(4.73)***
Year: 2007	-0.124	0.072	0.111	0.001	0.014	0.107
	(4.03)***	(4.19)***	(6.63)***	-0.07	-0.78	(5.86)***
Year: 2008	-0.092	0.059	0.054	0.023	-0.081	0.063
	(3.16)***	(3.42)***	(3.19)***	-1.32	(4.49)***	(3.46)***
Year: 2009	-0.141	0.034	0.041	0.077	0.033	0.132
	(5.08)***	(1.97)**	(2.43)**	(4.45)***	(1.82)*	(7.29)***
Year: 2010	-0.166	0.037	0.015	0.052	-0.01	0.072
	(5.77)***	(2.14)**	-0.92	(3.12)***	-0.55	(4.10)***
Year: 2011	-0.13	-0.015	0.016	0.039	0.035	0.084
	-1.62	-0.91	-1.03	(2.53)**	(2.11)**	(5.08)***
Constant	0.854	0.715	0.657	0.792	0.819	0.642
	(17.82)***	(32.87)***	(31.26)***	(36.37)***	(36.68)***	(29.51)***
Observations	24651	60180	62454	58806	53805	52742
R-squared	0.06	0.11	0.11	0.13	0.13	0.13

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix E: Estimated Effect of Accreditation on Standardized Reading Scores by Grade Level

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
EFS	0.131	0.027	-0.128	-0.279	-0.065	-0.066
	(1.87)*	-0.5	(2.69)***	(5.40)***	-1	-1.17
Accreditation	-0.036	0.065	0.243	0.282	0.082	0.095
	-0.45	-1.05	(4.35)***	(4.75)***	-1.11	-1.47
Limited English (LEP)	-0.03	-0.141	-0.312	-0.456	-0.586	-0.719
	(1.93)*	(12.22)***	(29.39)***	(45.82)***	(56.08)***	(64.38)***
Special Education	-0.332	-0.593	-0.958	-0.561	-0.545	-0.49
	(11.52)***	(31.68)***	(58.75)***	(26.12)***	(22.21)***	(20.61)***
Ever Retained in Grade	-0.518	-0.835	-0.729	-0.782	-0.672	-0.585
	(29.89)***	(75.16)***	(68.57)***	(67.55)***	(50.38)***	(41.63)***
Native American	-0.236	-0.24	-0.118	-0.337	-0.136	-0.008
	(2.09)**	(3.19)***	-1.32	(4.68)***	-1.64	-0.11
Asian	0.195	0.038	-0.088	0.003	-0.015	0.14
	(3.80)***	-0.93	(2.16)**	-0.06	-0.35	(3.15)***
African American	0.006	-0.312	-0.489	-0.512	-0.522	-0.495
	-0.23	(17.00)***	(26.46)***	(26.85)***	(26.38)***	(25.56)***
Latin	-0.094	-0.25	-0.32	-0.154	-0.348	-0.25
	(3.60)***	(13.45)***	(16.98)***	(8.01)***	(17.83)***	(13.09)***
Economically Disadvantaged	-0.135	-0.314	-0.343	-0.339	-0.25	-0.298
	(7.21)***	(22.55)***	(25.28)***	(23.83)***	(17.79)***	(22.13)***
Male	-0.078	-0.178	-0.095	-0.064	-0.12	-0.083
	(8.48)***	(24.01)***	(12.93)***	(8.25)***	(14.85)***	(10.21)***
Logramos Test	0.102	0.155	0.187	0.15	-0.228	0.121
	(6.48)***	(14.04)***	(17.27)***	-1.11	-1.34	-0.77
Year: 2004	0.044	0.061	-0.048	-0.023	-0.037	-0.013
	(2.41)**	(3.63)***	(3.01)***	-1.38	(2.10)**	-0.72
Year: 2005	-0.007	0.035	-0.016	-0.025	0.037	0.031
	-0.39	(2.12)**	-0.98	-1.51	(2.13)**	(1.73)*
Year: 2006	-0.022	-0.039	-0.015	-0.018	0.068	0.015
	-1.17	(2.23)**	-0.88	-1.02	(3.77)***	-0.82
Year: 2007	-0.016	0.031	0.042	0.019	-0.075	0.05
	-0.87	(1.85)*	(2.58)***	-1.07	(4.28)***	(2.74)***
Year: 2008	-0.031	-0.011	-0.009	-0.019	-0.009	0.047
	-1.63	-0.65	-0.54	-1.11	-0.51	(2.54)**
Year: 2009	-0.047	-0.007	-0.018	0.031	-0.044	0.125
	(1.87)*	-0.43	-1.12	(1.84)*	(2.49)**	(7.03)***
Year: 2010	-0.086	-0.017	-0.026	0.046	0.007	0.069
	(3.60)***	-1.02	-1.64	(2.76)***	-0.4	(3.93)***
Year: 2011	-0.072	-0.082	-0.073	0	0.141	0.078
	(3.45)***	(5.40)***	(4.99)***	0	(8.86)***	(4.69)***
Constant	0.267	0.782	1.002	0.911	0.854	0.78
	(10.09)***	(37.31)***	(48.62)***	(42.42)***	(39.17)***	(35.55)***
Observations	45939	63548	62205	58205	53313	51895
R-squared	0.03	0.13	0.18	0.16	0.16	0.16

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix F: Estimated Effect of EFS on Standardized Math Scores by Grade Level: Fixed Effects by Campus

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
EFS	0.061	0.075	0.109	0.03	0.017	-0.011
	-1.58	(2.96)***	(4.32)***	-1.08	-0.6	-0.42
Limited English (LEP)	-0.13	-0.151	-0.059	-0.351	-0.512	-0.574
	(5.44)***	(13.55)***	(5.51)***	(35.95)***	(48.97)***	(52.12)***
Special Education	-0.505	-0.518	-0.793	-0.482	-0.555	-0.461
	(12.84)***	(26.71)***	(45.73)***	(25.00)***	(28.39)***	(23.84)***
Ever Retained in Grade	-0.772	-0.746	-0.606	-0.701	-0.56	-0.546
	(29.41)***	(66.52)***	(56.26)***	(62.64)***	(40.79)***	(39.74)***
Native American	-0.107	0.028	-0.253	-0.12	-0.301	0.047
	-0.75	-0.32	(3.60)***	-1.49	(3.77)***	-0.65
Asian	-0.145	0.059	0.303	0.222	0.16	0.35
	-1.49	-1.42	(7.32)***	(5.36)***	(3.59)***	(8.48)***
African American	-0.372	-0.501	-0.482	-0.686	-0.657	-0.55
	(7.92)***	(24.06)***	(23.21)***	(32.17)***	(30.76)***	(25.75)***
Latin	-0.372	-0.224	-0.213	-0.27	-0.223	-0.124
	(8.23)***	(10.93)***	(10.46)***	(13.18)***	(10.87)***	(6.11)***
Economically Disadvantaged	-0.154	-0.207	-0.207	-0.161	-0.216	-0.219
	(5.11)***	(13.87)***	(14.62)***	(11.42)***	(14.99)***	(15.80)***
Male	-0.04	0.01	0.085	0.073	0.082	0.019
	(3.32)***	-1.37	(11.54)***	(9.72)***	(10.46)***	(2.36)**
Logramos Test	0.15	0.079	0.036	0.054	0.089	0.369
	(5.86)***	(6.79)***	(3.12)***	-0.36	-0.63	(2.53)**
Year: 2004	-0.099	0.004	-0.006	0.024	0.009	0.031
	(3.19)***	-0.25	-0.37	-1.42	-0.52	(1.80)*
Year: 2005	-0.243	0.081	0.016	-0.009	0.057	0.066
	(8.05)***	(4.87)***	-1	-0.52	(3.34)***	(3.82)***
Year: 2006	-0.041	0.078	-0.017	0.009	-0.041	0.104
	-1.28	(4.56)***	-1.02	-0.54	(2.33)**	(5.82)***
Year: 2007	-0.18	0.048	0.099	0.009	0.005	0.103
	(6.00)***	(2.86)***	(6.06)***	-0.55	-0.27	(5.83)***
Year: 2008	-0.14	0.043	0.051	0.032	-0.068	0.047
	(4.89)***	(2.55)**	(3.11)***	(1.93)*	(3.94)***	(2.66)***
Year: 2009	-0.171	0.024	0.041	0.097	0.044	0.124
	(6.29)***	-1.48	(2.45)**	(5.83)***	(2.48)**	(7.11)***
Year: 2010	-0.184	0.029	0.006	0.074	-0.008	0.092
	(6.57)***	(1.71)*	-0.36	(4.52)***	-0.45	(5.35)***
Year: 2011	-0.272	-0.007	0.047	0.098	0.03	0.096
	(3.27)***	-0.4	(3.06)***	(6.35)***	(1.89)*	(5.90)***
Constant	0.733	0.593	0.525	0.71	0.691	0.543
	(14.48)***	(25.41)***	(23.21)***	(30.34)***	(29.26)***	(23.14)***
Observations	24651	60180	62454	58806	53805	52742
R-squared	0.14	0.19	0.17	0.21	0.21	0.21

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix G: Estimated Effect of EFS on Standardized Reading Scores by Grade Level: Fixed Effects by Campus

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
EFS	0.095	0.067	0.07	-0.06	-0.013	-0.012
	(2.87)***	(2.54)**	(2.81)***	(2.28)**	-0.43	-0.43
Limited English (LEP)	-0.004	-0.136	-0.285	-0.459	-0.591	-0.725
	-0.26	(11.81)***	(26.91)***	(45.65)***	(56.64)***	(64.97)***
Special Education	-0.326	-0.601	-0.967	-0.571	-0.553	-0.512
	(11.62)***	(32.84)***	(60.40)***	(27.04)***	(23.21)***	(22.09)***
Ever Retained in Grade	-0.488	-0.833	-0.71	-0.765	-0.66	-0.577
	(28.83)***	(76.14)***	(67.54)***	(67.17)***	(50.34)***	(41.64)***
Native American	-0.237	-0.193	-0.099	-0.333	-0.041	-0.022
	(2.15)**	(2.61)***	-1.13	(4.70)***	-0.5	-0.3
Asian	0.144	0.046	-0.029	0.045	0.052	0.153
	(2.82)***	-1.15	-0.72	-1.03	-1.23	(3.47)***
African American	-0.102	-0.309	-0.387	-0.499	-0.501	-0.512
	(3.64)***	(15.24)***	(18.94)***	(23.53)***	(23.17)***	(24.15)***
Latin	-0.146	-0.216	-0.205	-0.127	-0.266	-0.216
	(5.42)***	(10.94)***	(10.30)***	(6.19)***	(12.98)***	(10.70)***
Economically Disadvantaged	-0.125	-0.26	-0.265	-0.259	-0.176	-0.22
	(6.63)***	(18.23)***	(19.08)***	(17.63)***	(12.46)***	(16.11)***
Male	-0.07	-0.181	-0.096	-0.063	-0.112	-0.072
	(7.78)***	(24.95)***	(13.23)***	(8.26)***	(14.28)***	(9.10)***
Logramos Test	0.066	0.15	0.156	0.044	-0.349	0.117
	(4.18)***	(13.43)***	(14.03)***	-0.33	(2.14)**	-0.77
Year: 2004	0.05	0.038	-0.055	-0.018	-0.028	-0.016
	(2.79)***	(2.30)**	(3.48)***	-1.1	(1.66)*	-0.92
Year: 2005	0.003	0.03	-0.025	-0.02	0.029	0.029
	-0.2	(1.87)*	-1.58	-1.24	(1.75)*	(1.66)*
Year: 2006	0.001	-0.055	-0.019	-0.016	0.076	0.005
	-0.08	(3.19)***	-1.17	-0.91	(4.36)***	-0.26
Year: 2007	0.01	0.034	0.054	0.028	-0.085	0.038
	-0.57	(2.06)**	(3.36)***	(1.65)*	(4.99)***	(2.15)**
Year: 2008	-0.004	-0.014	-0.013	-0.022	-0.037	0.03
	-0.23	-0.87	-0.81	-1.28	(2.15)**	(1.69)*
Year: 2009	-0.002	-0.007	-0.017	0.049	-0.056	0.116
	-0.07	-0.44	-1.08	(2.94)***	(3.26)***	(6.65)***
Year: 2010	-0.039	-0.009	-0.016	0.054	-0.006	0.053
	(1.66)*	-0.56	-1.02	(3.26)***	-0.36	(3.06)***
Year: 2011	-0.008	-0.068	-0.056	0.009	0.114	0.08
	-0.41	(4.48)***	(3.82)***	-0.58	(7.18)***	(4.82)***
Constant	0.293	0.711	0.814	0.809	0.736	0.697
	(10.29)***	(31.38)***	(36.75)***	(34.56)***	(31.77)***	(30.20)***
Observations	45939	63548	62205	58205	53313	51895
R-squared	0.1	0.19	0.22	0.21	0.23	0.22

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix H: Estimated Effect of Accreditation on Standardized Math Scores by Grade Level: Fixed Effects by Campus

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
EFS	0.034	0.061	0.096	-0.031	-0.03	-0.029
	-0.44	-1.19	(2.03)**	-0.6	-0.54	-0.53
Accreditation	0.035	0.019	0.018	0.083	0.063	0.023
	-0.39	-0.33	-0.32	-1.4	-1	-0.37
Limited English (LEP)	-0.13	-0.151	-0.059	-0.351	-0.512	-0.574
	(5.44)***	(13.55)***	(5.51)***	(35.94)***	(48.97)***	(52.12)***
Special Education	-0.505	-0.518	-0.793	-0.482	-0.555	-0.461
	(12.85)***	(26.71)***	(45.73)***	(24.99)***	(28.39)***	(23.84)***
Ever Retained in Grade	-0.772	-0.746	-0.606	-0.701	-0.56	-0.546
	(29.42)***	(66.52)***	(56.26)***	(62.65)***	(40.79)***	(39.74)***
Native American	-0.107	0.028	-0.253	-0.12	-0.302	0.047
	-0.75	-0.33	(3.61)***	-1.49	(3.77)***	-0.66
Asian	-0.145	0.059	0.303	0.222	0.16	0.35
	-1.48	-1.41	(7.32)***	(5.36)***	(3.58)***	(8.47)***
African American	-0.372	-0.502	-0.482	-0.687	-0.658	-0.55
	(7.91)***	(24.06)***	(23.21)***	(32.17)***	(30.77)***	(25.75)***
Latin	-0.372	-0.224	-0.213	-0.27	-0.223	-0.124
	(8.23)***	(10.93)***	(10.46)***	(13.18)***	(10.88)***	(6.11)***
Economically Disadvantaged	-0.154	-0.207	-0.207	-0.161	-0.216	-0.219
	(5.11)***	(13.87)***	(14.62)***	(11.43)***	(14.98)***	(15.81)***
Male	-0.04	0.01	0.085	0.073	0.082	0.019
	(3.32)***	-1.37	(11.54)***	(9.72)***	(10.45)***	(2.36)**
Logramos Test	0.15	0.079	0.036	0.051	0.085	0.367
	(5.86)***	(6.79)***	(3.12)***	-0.34	-0.6	(2.51)**
Year: 2004	-0.099	0.004	-0.006	0.024	0.009	0.031
	(3.19)***	-0.25	-0.37	-1.41	-0.51	(1.80)*
Year: 2005	-0.243	0.081	0.016	-0.009	0.056	0.066
	(8.05)***	(4.87)***	-1	-0.53	(3.34)***	(3.82)***
Year: 2006	-0.041	0.078	-0.017	0.009	-0.041	0.104
	-1.29	(4.57)***	-1.02	-0.53	(2.34)**	(5.82)***
Year: 2007	-0.18	0.048	0.099	0.009	0.005	0.103
	(6.01)***	(2.86)***	(6.06)***	-0.55	-0.28	(5.83)***
Year: 2008	-0.14	0.043	0.051	0.032	-0.068	0.047
	(4.89)***	(2.55)**	(3.12)***	(1.94)*	(3.93)***	(2.67)***
Year: 2009	-0.171	0.024	0.041	0.097	0.044	0.124
	(6.29)***	-1.48	(2.45)**	(5.83)***	(2.47)**	(7.10)***
Year: 2010	-0.185	0.029	0.006	0.073	-0.008	0.092
	(6.57)***	(1.71)*	-0.36	(4.52)***	-0.45	(5.35)***
Year: 2011	-0.272	-0.007	0.047	0.098	0.03	0.096
	(3.27)***	-0.4	(3.06)***	(6.35)***	(1.89)*	(5.90)***
Constant	0.733	0.593	0.525	0.71	0.691	0.543
	(14.48)***	(25.41)***	(23.21)***	(30.34)***	(29.27)***	(23.14)***
Observations	24651	60180	62454	58806	53805	52742
R-squared	0.14	0.19	0.17	0.21	0.21	0.21

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix I: Estimated Effect of Accreditation on Standardized Reading Scores by Grade Level: Fixed Effects by Campus

	KG	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
EFS	0.124	0.031	-0.094	-0.261	-0.071	-0.086
	(1.83)*	-0.59	(2.02)**	(5.18)***	-1.13	-1.56
Accreditation	-0.038	0.048	0.228	0.27	0.074	0.096
	-0.49	-0.79	(4.18)***	(4.67)***	-1.05	-1.55
Limited English (LEP)	-0.004	-0.136	-0.285	-0.458	-0.591	-0.725
	-0.26	(11.81)***	(26.93)***	(45.64)***	(56.64)***	(64.97)***
Special Education	-0.327	-0.601	-0.966	-0.57	-0.553	-0.512
	(11.63)***	(32.84)***	(60.36)***	(26.97)***	(23.19)***	(22.09)***
Ever Retained in Grade	-0.488	-0.833	-0.711	-0.765	-0.66	-0.577
	(28.82)***	(76.14)***	(67.57)***	(67.18)***	(50.35)***	(41.64)***
Native American	-0.237	-0.193	-0.1	-0.334	-0.041	-0.022
	(2.15)**	(2.61)***	-1.14	(4.71)***	-0.5	-0.3
Asian	0.144	0.046	-0.029	0.044	0.052	0.154
	(2.82)***	-1.15	-0.73	-1.01	-1.23	(3.47)***
African American	-0.102	-0.309	-0.387	-0.499	-0.501	-0.512
	(3.64)***	(15.23)***	(18.94)***	(23.52)***	(23.17)***	(24.15)***
Latin	-0.147	-0.215	-0.204	-0.127	-0.266	-0.216
	(5.42)***	(10.94)***	(10.29)***	(6.21)***	(12.98)***	(10.70)***
Economically Disadvantaged	-0.125	-0.26	-0.265	-0.259	-0.176	-0.22
	(6.63)***	(18.22)***	(19.07)***	(17.63)***	(12.46)***	(16.10)***
Male	-0.07	-0.181	-0.095	-0.063	-0.112	-0.072
	(7.78)***	(24.94)***	(13.21)***	(8.27)***	(14.29)***	(9.10)***
Logramos Test	0.066	0.15	0.156	0.03	-0.354	0.112
	(4.18)***	(13.44)***	(14.02)***	-0.23	(2.17)**	-0.73
Year: 2004	0.05	0.038	-0.055	-0.018	-0.028	-0.016
	(2.78)***	(2.30)**	(3.47)***	-1.1	(1.65)*	-0.93
Year: 2005	0.003	0.03	-0.024	-0.02	0.03	0.029
	-0.19	(1.87)*	-1.54	-1.24	(1.75)*	(1.66)*
Year: 2006	0.001	-0.055	-0.018	-0.016	0.076	0.005
	-0.08	(3.18)***	-1.1	-0.91	(4.37)***	-0.26
Year: 2007	0.01	0.034	0.055	0.028	-0.085	0.038
	-0.57	(2.06)**	(3.41)***	(1.65)*	(5.00)***	(2.14)**
Year: 2008	-0.004	-0.014	-0.012	-0.021	-0.037	0.031
	-0.23	-0.87	-0.77	-1.23	(2.14)**	(1.70)*
Year: 2009	-0.002	-0.007	-0.017	0.05	-0.056	0.116
	-0.07	-0.43	-1.07	(2.97)***	(3.26)***	(6.67)***
Year: 2010	-0.039	-0.009	-0.016	0.054	-0.006	0.053
	(1.66)*	-0.56	-1.03	(3.26)***	-0.35	(3.08)***
Year: 2011	-0.008	-0.068	-0.056	0.009	0.114	0.08
	-0.4	(4.48)***	(3.80)***	-0.59	(7.19)***	(4.84)***
Constant	0.293	0.711	0.813	0.809	0.735	0.697
	(10.29)***	(31.38)***	(36.72)***	(34.57)***	(31.76)***	(30.19)***
Observations	45939	63548	62205	58205	53313	51895
R-squared	0.1	0.19	0.22	0.21	0.23	0.22

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix J: Predicted Probability of Retention and LEP by EFS Participation

	Retained	Retained, Fixed Effect by Campus	Classified LEP	LEP, Fixed Effect by Campus
EFS	-0.175	-0.175	-0.302	-0.302
	0.037***	0.043***	0.012***	0.032***
Limited English (LEP)	0.383	0.383		
	0.012***	0.034***		
Special Education	0.178	0.178	0.244	0.244
	0.019***	0.051***	0.009***	0.038***
Native American	-0.035	-0.035	0.268	0.268
	0.107	0.283	0.044***	0.136*
Asian	-0.484	-0.484	1.283	1.283
	0.068***	0.178**	0.019***	0.101***
African American	0.105	0.105	-0.741	-0.741
	0.024***	0.076	0.016***	0.070***
Latin	0.051	0.051	1.566	1.566
	0.024*	0.075	0.013***	0.076***
Economically Disadvantaged	0.305	0.305	0.603	0.603
	0.018***	0.045***	0.007***	0.031***
Male	0.203	0.203	0.039	0.039
	0.009***	0.026***	0.003***	0.010***
Logramos Test	-0.173	-0.173	1.959	1.959
	0.014***	0.041***	0.008***	0.041***
Year: 2004	-0.018	-0.018	0.023	0.023
	0.021	0.05	0.008**	0.021
Year: 2005	0.23	0.23	0.03	0.03
	0.020***	0.059***	0.007***	0.025
Year: 2006	0.147	0.147	-0.002	-0.002
	0.021***	0.058*	0.008	0.027
Year: 2007	0.269	0.269	-0.095	-0.095
	0.021***	0.057***	0.008***	0.026***
Year: 2008	0.265	0.265	-0.099	-0.099
	0.021***	0.051***	0.008***	0.030**
Year: 2009	0.248	0.248	-0.176	-0.176
	0.020***	0.055***	0.008***	0.034***
Year: 2010	0.206	0.206	-0.154	-0.154
	0.020***	0.053***	0.008***	0.034***
Year: 2011	0.088	0.088	-0.14	-0.14
	0.019***	0.049	0.007***	0.030***
Retained in Grade			0.504	0.504
			0.006***	0.023***
Constant	-2.202	-2.202	-2.388	-2.388
	0.028***	0.085***	0.015***	0.082***
Observations	183407	183407	935733	935733

* significant at 10%; ** significant at 5%; *** significant at 1%

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