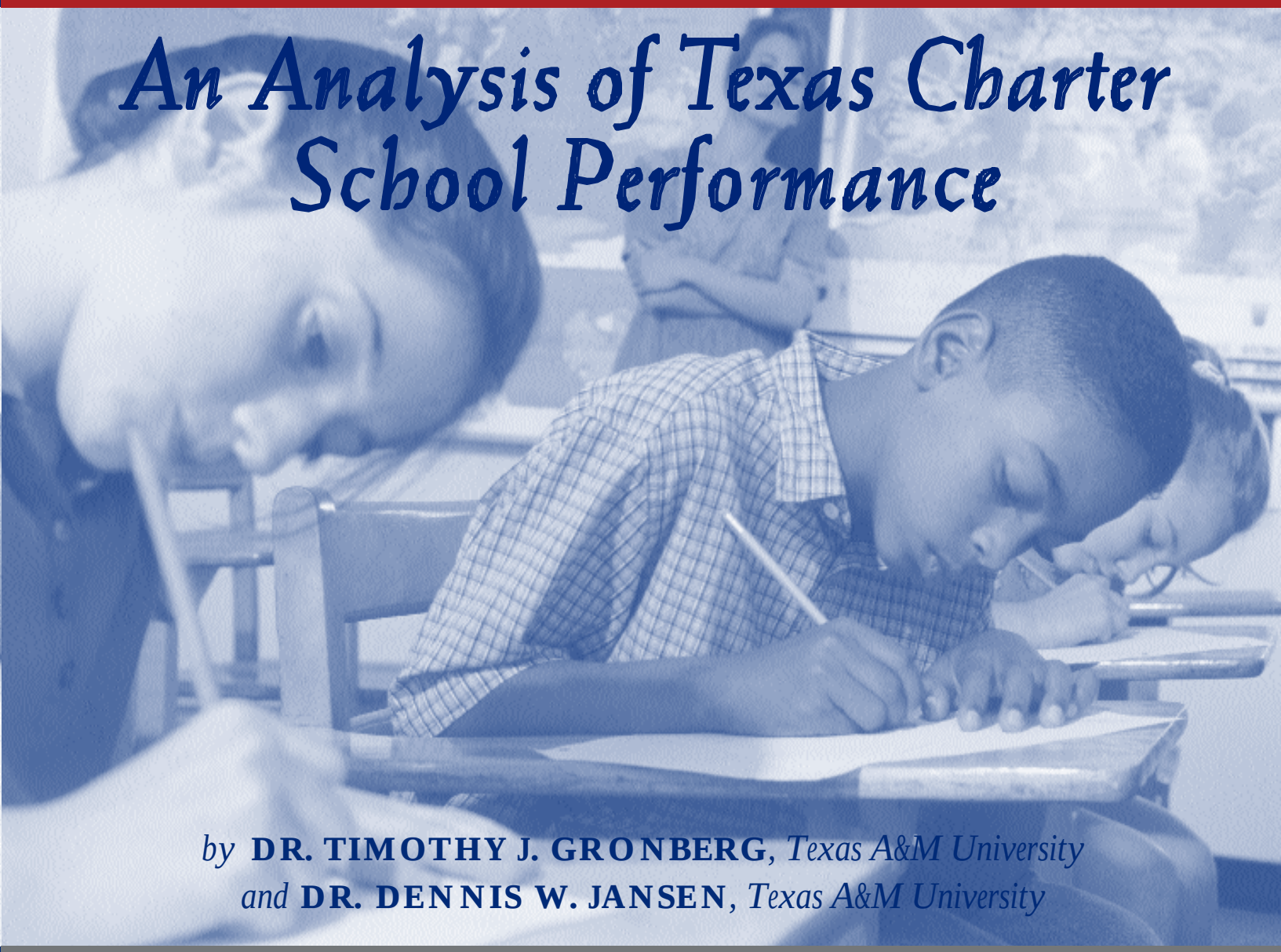
NAVIGATING
Newly Chartered Waters

APRIL 2001

An Analysis of Texas Charter School Performance



by **DR. TIMOTHY J. GRONBERG**, *Texas A&M University*
and **DR. DENNIS W. JANSEN**, *Texas A&M University*

Texas Public Policy Foundation

www.tppf.org

FOREWORD

by Chris Patterson

There is very little research available in the United States about the impact of charter schools on student achievement because charters are an entirely new form of public schools. Charter schools first appeared in Texas in 1997 and their appearance was enthusiastically welcomed by parents seeking alternatives to traditional public schools. By the close of the 1999-2000 school year, 142 charters were serving more than 25,000 in Texas.

The growing number of charter school applications and the lengthening list of students awaiting admission attest to the need for accurate, objective, and comprehensive knowledge about charter schools in Texas.

School Choice in Texas: Navigating Newly Chartered Waters adds new information about the students, teachers and operations of charter schools in Texas. Using a statistical approach known as "value added," the study makes a unique contribution to our understanding of the academic effect of charter schooling on students. After determining the academic value gained by students in charter schools, the authors compare achievement of students in charter schools with their peers who attend traditional public schools in Texas.

Timothy Gronberg and Dennis Jansen present surprising information about how well charter schools are serving the academic needs of disadvantaged students in Texas, surpassing the educational impact of traditional public schools with greater economic efficiency. The study also reveals the academic limitations, costs associated with student mobility, and operational problems now facing many charter schools in Texas.

This remarkable study offers a convincing argument for nurturing the growth of charter schooling in Texas and for conducting additional research. Charter schools in Texas are successfully educating a special student population, introducing educational innovations, and helping traditional public schools find new ways to improve student achievement.

Chris Patterson is Director of Education Research for Texas Public Policy Foundation. She previously served as Director of Education Policy for the Lone Star Foundation and Education Connection of Texas. She is the author of numerous reports on educational reform in Texas.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report summarizes the key findings of a study of charter schools in Texas over their first four years of existence, 1996-97 through 1999-2000. The study compiles information on the charter school market, including characteristics of students served. It also investigates student performance from a variety of perspectives, and evaluates the cost efficiency of charter school performance.

A caveat is in order. Charter schools are new entrants in the market for educational services in Texas. This means that charter schools are all either new or recently established. There were initially few students in charter schools, and currently there are still relatively few students in charters compared to traditional public schools, although the number of charter students has grown significantly. This investigation of charters is an early look at this emerging market sector. As such, this investigation is preliminary, based on a relatively small number of observations of charter schools and charter students, based on a limited number of performance measures, and based on an industry that has only just begun to operate and that is still growing and evolving rapidly.

MAJOR CONCLUSIONS

- In general, at-risk charters seem to be performing well. Estimates from individual student fixed-effect regressions, which represent a best attempt to control for the impact of individual student characteristics upon test score performance, indicate that at-risk charter schools have a positive value-added effect relative to traditional public schools. The opposite results hold for non-at-risk charters.

- Following cohorts through time, rather than taking one-year looks, indicate that test score improvements of continuing charter students track those of traditional public schools, and that continuing at-risk students in charters improve their test scores at greater rates than their at-risk traditional public school comparators.

- Students moving into a charter often exhibit a first-year drop in Texas Assessment of Academic Skills (TAAS) test scores, an effect which might be compounded when students move into a newly opened charter. The charter industry has been growing rapidly, and new entrants into charter schools make up a large share of all charter students in any given year. A one-year look at average changes in test scores for charter students will mainly capture the decline in performance of the new entrants.

- Charter schools are cost efficient. On average, they achieve a given level of student performance at a lower expenditure per student than would be predicted for a comparable traditional public school district.

- Compared to traditional public schools, a disproportionately large percentage of at-risk students, minority students, and economically disadvantaged students choose to attend charter schools. A meaningful evaluation of the performance of charter schools must recognize and account for these facts.

- Overall, charters allow innovative approaches, they are cost efficient as a group, and they often achieve student performance levels for at-risk students that rival those of traditional public schools. Judging Texas's experiment with charter schools on all of these grounds, this is an experiment worth continuing, an experiment that will likely lead to new insights in delivery of educational services. While it is far too early to know the final results of this experiment, the initial indications, while certainly mixed, contain many positive signs. The charter industry will likely continue to challenge the traditional public school districts to be more effective, more efficient, and more innovative in their own delivery of educational services.

KEY FINDINGS

The Texas Charter School Market

- The number of students enrolled in charters increased from 2,412 in 1997 to 25,687 in 2000.

- Growth in student population among existing charters was high – 23 percent in 1999 and 13 percent in 2000.

- The explosive growth in the charter market was driven by new entrants – 77 percent of the student population growth in 1999 and 87 percent of the growth in 2000 occurred due to the opening of new charters.

Student Population

- Charter schools serve a markedly larger percentage of African American students than traditional public schools.

- Charter schools serve a far smaller percentage of Anglo students than traditional public schools.

- Charter schools as a whole serve a student body with a larger percentage of at-risk students than traditional public schools. However, this varies greatly among particular schools and is somewhat muddied by imperfect data reported to the Texas Education Agency (TEA).

Student Performance In Charter Schools

- Continuing students in charter schools (students enrolled in a charter school in the previous year and continuing in that charter school in the current year) have greater *improvement* in their TAAS test scores in both reading and math than do continuing students in traditional public schools. This is true in every year of our study.

- The overall improvement in test scores of a matched cohort of continuing charter school students is greater than that for a relevant comparison cohort of traditional public school students.

- For this matched cohort, at-risk charter students improve relative to at-risk public students, particularly with respect to reading scores.

- There is a consistent negative first-year charter school effect. Students moving to charters suffer first-year drops in TAAS test scores, in both math and reading. This occurs in both at-risk and non-at-risk charter school populations.

- There is a consistent positive second-year charter school effect.

Statistical Estimates of Charter Effects on Student Performance

- Estimates from a student fixed-effect model indicate that the average value added to TAAS test scores in at-risk charters is 0.76 *higher* than in traditional public schools. That is, adjusting for differences in student characteristics, a student in an at-risk charter scores an estimated 0.76 of a point higher on the TAAS Texas Learning Index (TLI) than a student in a traditional public school. The same regressions find the value added to test scores in non-at-risk charters is 1.56 *lower* than in traditional public schools.

- Estimates from these student fixed-effect type regressions indicate that the average value added to TAAS scores in a charter school, without conditioning on at-risk or non-at-risk classification of the charter school, is 0.91 *lower* than in a traditional public school.

- The average value added of continuing charters is better than the average of new charters, as measured by a district fixed effect model.

Teacher Characteristics

- The average level of classroom teaching experience among charter teachers is slightly more than one-third of the average classroom teaching experience of traditional public school teachers.

- Charter school teacher salaries are, on average, $8,400 per year less than traditional public school teacher salaries. The lower overall average salary in charters reflects the relative lack of classroom experience of charter school teachers. For teachers with less than ten years of experience, average pay in charters and traditional public schools is basically equal.

- The official reported turnover rate among charter teachers is more than three times the public school teacher rate. These statistics are averages of district average turnover rates.

- An alternative measure, which looks at individual teachers and adjusts for local labor markets, indicates a smaller turnover rate ratio between charters and traditional public schools (in this case, the turnover among charter school teachers is about 1.8 times the comparison group of traditional public school teachers), and a higher level of turnover in both sectors.

Charter Finances and Expenditures

- Revenue *from the state* at the 142 charter schools averaged $5,175 per pupil, while the state average for traditional public school districts was $3,772 per pupil. Charters, however, receive no *local* property tax funding. *Total* public revenue (*state plus local plus federal*) averaged $5,564 per pupil at charter schools and $7,135 per pupil at traditional public schools.

- A large majority of charters spend significantly less per pupil than is predicted by a model of traditional public school district costs, after controlling for student performance, size of district, teacher salaries, and other characteristics of the district.

Relative Efficiency

- Charters enjoy a cost advantage. Based on our cost function model predictions, the average charter spends over $4,000 per pupil less than a traditional public school with identical characteristics and identical student performance.

- While some of the cost differences are related to size, and new charters are especially likely to be small, even large charters (more than 250 students) spend $1,600 per student less than our cost function predicts a traditional public school would spend. Medium-size charters (between 100 and 250 students) spend $1,800 per pupil less than predicted for a comparable traditional public school.

- In looking at how well schools operate at minimum costs, the median charter school is closer to the estimated attainable cost frontier than is the median traditional public school, or even the median small traditional public school. While there are a few exceptions for newly opened charters, charters overall operate very close to the estimated cost frontier.

INTRODUCTION

Texas has become a major player in the charter school movement, with 142 charter schools enrolling more than 25,000 charter school students in the 1999-2000 academic year.[1] These figures reflect a marked growth in charters in Texas since their first appearance in 1997. The first year saw 16 schools in operation, with a total student enrollment of 2,412.

The aggregate growth of the charter school sector provides some information as to the attractiveness of charter schools as an institutional alternative to traditional public schools. At this early stage in the development of the charter industry, however, the growth in new entrants and in new customers is mainly a reflection of dissatisfaction with the current public school provider rather than an indicator of absolute or even relative performance success. The longer term viability of charters depends upon their ability to deliver higher quality educational outcomes at the same cost as traditional public schools, or their ability to deliver similar quality educational outcomes at a lower cost than do traditional public schools. Evaluating performance quality in education is a tough task, but a meaningful public policy analysis of charter school experiments requires such an evaluation.

A caveat is in order. Charter schools are new entrants in the market for educational services in Texas. This means that charter schools are all either new or recently established. There were initially few students in charter schools, and currently there are still relatively few students in charters compared to traditional public schools, although the number of charter students has grown significantly. This investigation of charters is an early look at this emerging market sector. As such, this investigation is preliminary, based on a relatively small number of observations of charter schools and charter students, based on a limited number of performance measures, and based on an industry that has only just begun to operate and that is still growing and evolving rapidly.

In spite of the fact that the charter school market is in its infant stage, we believe a careful assessment of the early evidence on charter school performance in Texas will be informative. We have assembled an extensive data set on charter schools to make such an assessment. A critical feature of the data set is the inclusion of data on individual student test scores and several individual student characteristics from 1997 to 2000.

[1] Here and elsewhere in the text, our count of charters is based on charters that have reported data on student TAAS test scores to the TEA. We did not count charter schools that received a charter but did not begin operations, nor charters that operate without reporting data to the TEA's Public Education Information Management System (PEIMS). All data throughout this document are taken from TEA district, campus, student and teacher level data files unless otherwise noted.

We use the data for three purposes. First, we highlight key distinguishing characteristics of the charter school market, the charter school student population, and the charter school teacher population. Second, we produce several alternative test score based measures of the performance of charter schools. Third, we develop cost function based measures of the relative efficiency of charter schools.

THE TEXAS CHARTER SCHOOL MARKET

Charter schools have been expanding rapidly in the number of schools, campuses, and students. This is not altogether surprising, given that the Center for Education Reform has ranked Texas as having the seventh best charter law environment. Even with the significant growth, however, charters still make up a tiny share of the public school market in Texas.

Tables 1, 2, and 3 show the following:

- Charters expanded from 16 schools in 1997 to 142 schools in 2000.
- The number of students enrolled in charters increased from 2,412 in 1997 to 25,687 in 2000.
- Charters are spread among 34 of the state's counties, but are concentrated in five counties representing the four largest metropolitan areas: Houston, Dallas-Fort Worth, Austin and San Antonio.

Table 4 lists the number of charters operating in other counties.

It is important to note that, even with the tremendous growth of charter schools and charter school enrollments over the past few years, the enrolled student body of charter schools is only 0.64 percent of the total public school student population.

Table 1: Charter School History

Year	Number of Charter Schools	Number of At-Risk Charter Schools	Number of Non-at-Risk Charter Schools	%Traditional Public School Students in Charters
1997	16	8	8	0.06
1998	19	8	11	0.10
1999	61	27	33	0.31
2000	142	73	48	0.64

Note: The number of at-risk and non-at-risk charters does not add up to the total because there were 21 new charters in 2000 for which data on the percent of students at-risk were unavailable at press time. There was also one unclassified charter in 1999.

Table 2: Charter Student History

Year	Number of Charter School Students	Number of Students in New Charter Schools	% Growth in Charter Population Due To New Schools
1997	2,412	2,412	100
1998	3,856	364	25
1999	12,226	6,427	77
2000	25,687	11,770	87

Table 3: Charter Schools in Major Metropolitan Counties

County	Number of Charter Schools in 2000
Bexar	15
Dallas	23
El Paso	2
Harris	36
Tarrant	5
Travis	9
Total	**90**

Table 4: Charter Schools in Other Counties

County	Number of Charter Schools in 2000
Angelina	1
Bell	3
Bowie	1
Brazos	2
Brooks	1
Cameron	2
Comal	1
Ellis	1
Galveston	2
Gregg	1
Harrison	1
Hays	1
Hidalgo	5
Jefferson	3
Lampasas	1
Lubbock	4
McLennan	3
Midland	3
Montgomery	1
Nueces	5
Smith	2
Taylor	1
Uvalde	1
Val Verde	1
Van Zandt	1
Walker	1
Webb	2
Wichita	1
Total	**52**

Beginning with the 1998-99 school year, some charters were granted on the condition that they serve predominantly (at least 75 percent) “at-risk” students. The number of charters issued to this type of school is not capped as it is for open enrollment charters. We therefore attempt to classify each school by whether or not it serves an at-risk population. Unfortunately, this is not as straightforward as its sounds, since a student may be classified as at-risk for a wide variety of reasons, the most important being failure to pass a course or a TAAS exam.

Furthermore, data on the number of at-risk students in charter schools often appears flawed.[2] We employ the classification implemented by *Texas Open-Enrollment Charter Schools: Third Year Evaluation, 1998-99*, where available. The authors of that report considered both the reported number of at-risk students and the mission statement of the charter. In this report, new schools in 1999-2000 are classified as at-risk if at least 50 percent of students are so classified.[3] Otherwise, the schools are classified as non-at-risk.

Finally, if TEA reported zero at-risk students at a charter, we did not include that school in either the at-risk or non-at-risk categories (we consider zero at-risk students implausible, a belief confirmed by inquiring with several of the schools in question).

Three features of the early development of the charter market are worth noting:

- Expansion in student population among existing charters was an impressive 23 percent in 1999 and 13 percent in 2000.

- The explosive growth in the charter market over 1999-2000 is driven by the entry of new charter schools --77 percent in 1999 and 87 percent in 2000.

- The relative share of new entrants serving heavily at-risk student populations is growing.

[2] Under Section 29.081 of the Texas Education Code, a student may be classified as "at risk" for a variety of reasons. These include failure to advance from one grade level to the next, failure of two or more classes, and failure of a section of the TAAS exam, as well as reasons having to do with personal circumstances such as becoming pregnant. In addition to the high degree of subjectivity inherent in this classification, it appears that TEA is not collecting or reporting data on the number of at-risk students for many charter schools. In 2000, 29 charter school districts were listed as having zero at-risk students, a highly implausible figure refuted by several districts when asked.

[3] We employ a standard of 50 percent at-risk students both to be consistent with the *Third Year Evaluation* (which does not adhere strictly to the 75 percent standard mentioned in the law), because we believe at-risk numbers in charters are often underreported, and because having 50 percent at-risk students is a large share in any event.

CHARACTERISTICS OF CHARTER SCHOOL STUDENTS AND TEACHERS

STUDENT POPULATION

Charter schools serve a student body whose characteristics differ in some ways from the overall characteristics of the total public school student body. Table 5 provides a description of the student populations at both charter and traditional public schools in Texas for academic year 2000. Some of the following characteristics stand out:

- Charter schools serve a markedly larger percentage of African American students than traditional public schools.
- Charter schools serve a far smaller percentage of Anglo students than traditional public schools.
- Charter schools appear to serve a higher number of at-risk students (although here the data available from the TEA are imperfect).

Table 5: Student Demographics, 1999-2000

Student Group	Charter Schools (142)	At-Risk Charter Schools (73)	Non-at-Risk Charter Schools (48)	Traditional Public School Districts (1,041)
% Anglo	22.0	16.8	27.9	43.2
% African American	38.7	36.7	37.3	14.2
% Hispanic	37.7	45.8	32.2	39.5
% Asian	1.3	0.6	2.3	2.6
% Native American	0.2	0.2	0.3	0.3
% Economically Disadvantaged	59.3*	69.2*	49.3*	48.9
% Limited English Proficiency	4.1	6.5	2.5	14.0
% Special Education	6.7	9.1	4.7	12.1
% Career & Technology	17.8	32.2	7.4	18.6
% At-Risk	56.1%**	84.0%**	22.3%**	35.6%***

***** Numbers based on only those charter schools that reported a positive number of students economically disadvantaged (111 of 142 charters total, 57 at-risk charters, 39 non-at-risk charters).
****** Numbers based on only those charter schools that reported a positive number of students at-risk (102 of 142 charters total, 65 at-risk charters, 37 non-at-risk charters).
******* Number derived from individual student TAAS data, grades 3-8 and 10 only.
Units of analysis in this table are students (i.e., 22% of all charter students are Anglo).

A common concern about choice programs such as charters is that they will promote stratification of various student populations across schools. Figure 1 plots the frequency distribution of African Americans among charter schools and traditional public schools. In the bottom half of the figure, it is clear that there are a group of charter schools whose student populations are 90 percent or more African American. Charter schools also have greater mass in the 30 to 50 percent range of the distribution than traditional public schools. In contrast, very few traditional public schools have a student body that is 90 percent or more African American. For the case of Hispanics, the distributions for charters and publics are more similar, as shown in Figure 2.

Figure 1: Percentage Distribution of African American Students

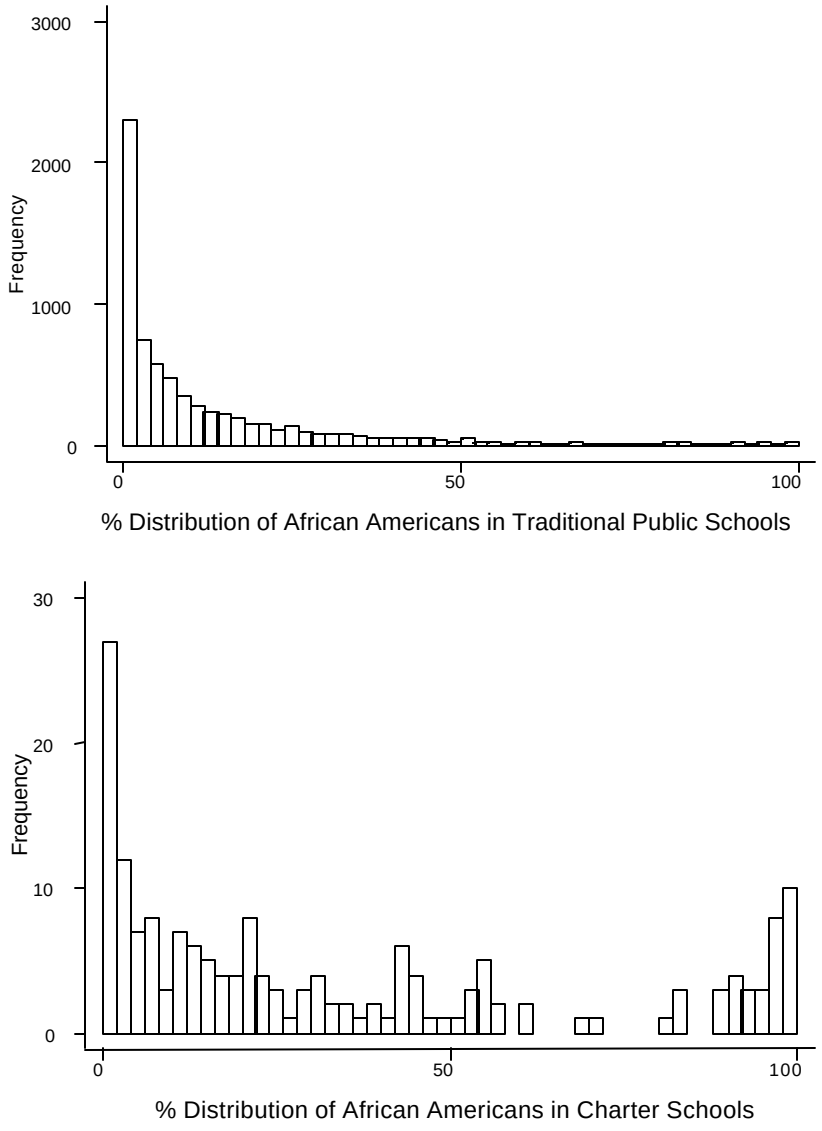
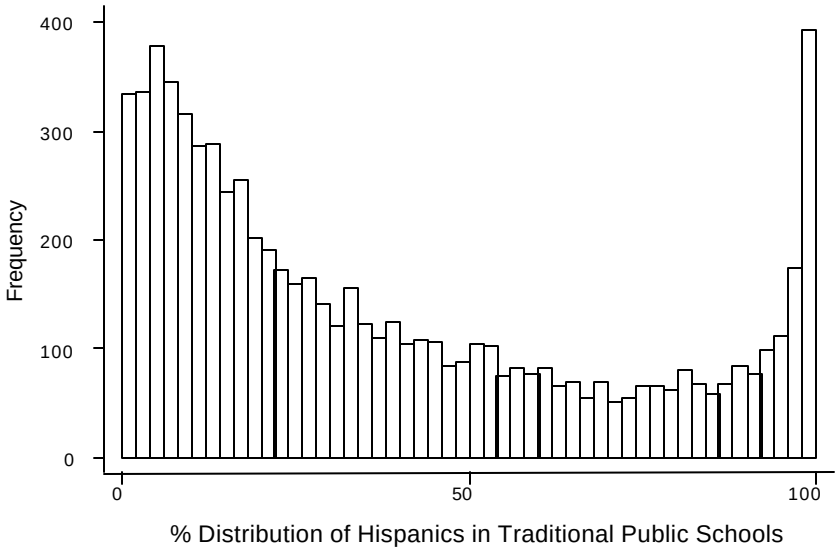
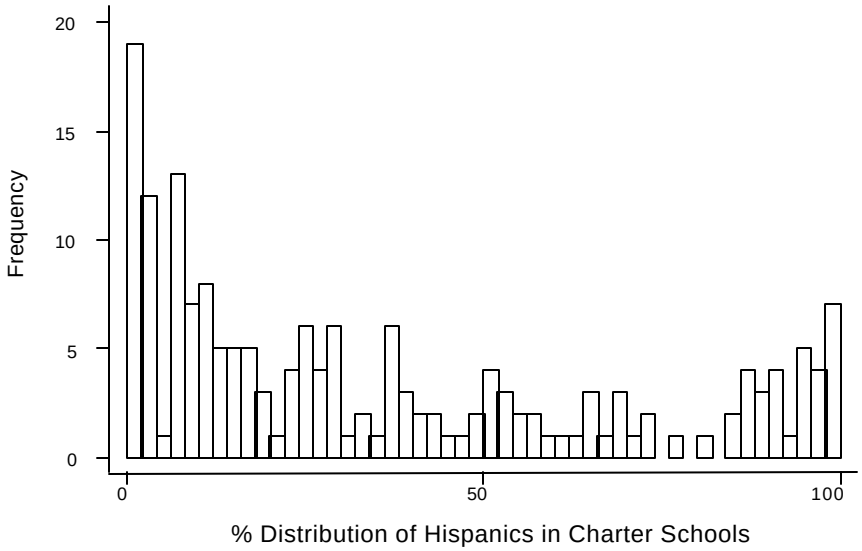


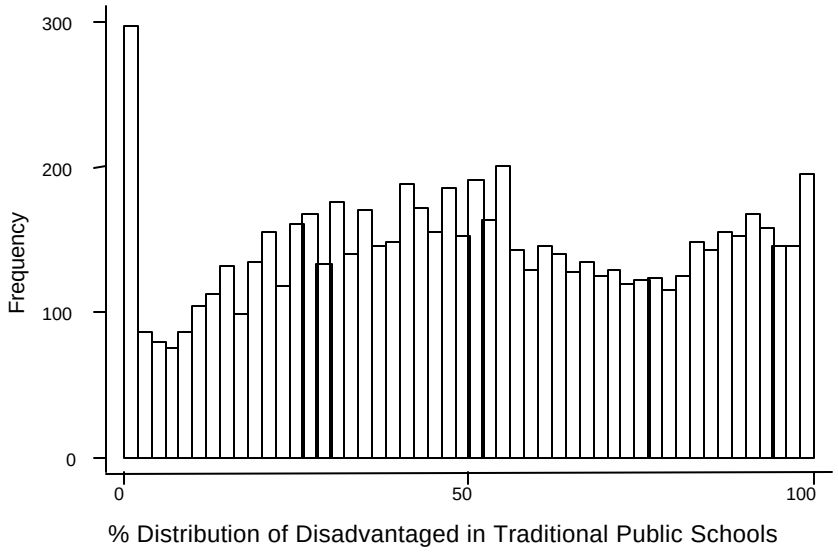
Figure 2: Percentage Distribution of Hispanic Students

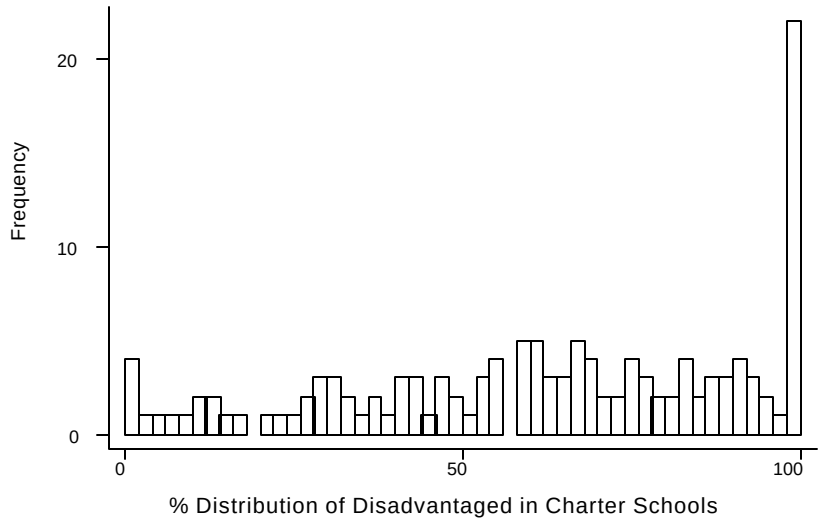




Charters serve students classified as disadvantaged at somewhat higher rates than traditional public schools. Figure 3 plots the distribution of the percentage of students classified as disadvantaged in the set of traditional public school campuses and in the set of charter schools. While the distributions are not identical, there are not huge disparities. Perhaps the most notable feature is that a larger share of charter schools serves a majority disadvantaged student population. It should be noted, however, that charter schools reporting no disadvantaged students were not included in Figure 3, as those numbers most likely are due to reporting errors.

Figure 3: Percentage Distribution of Disadvantaged Students

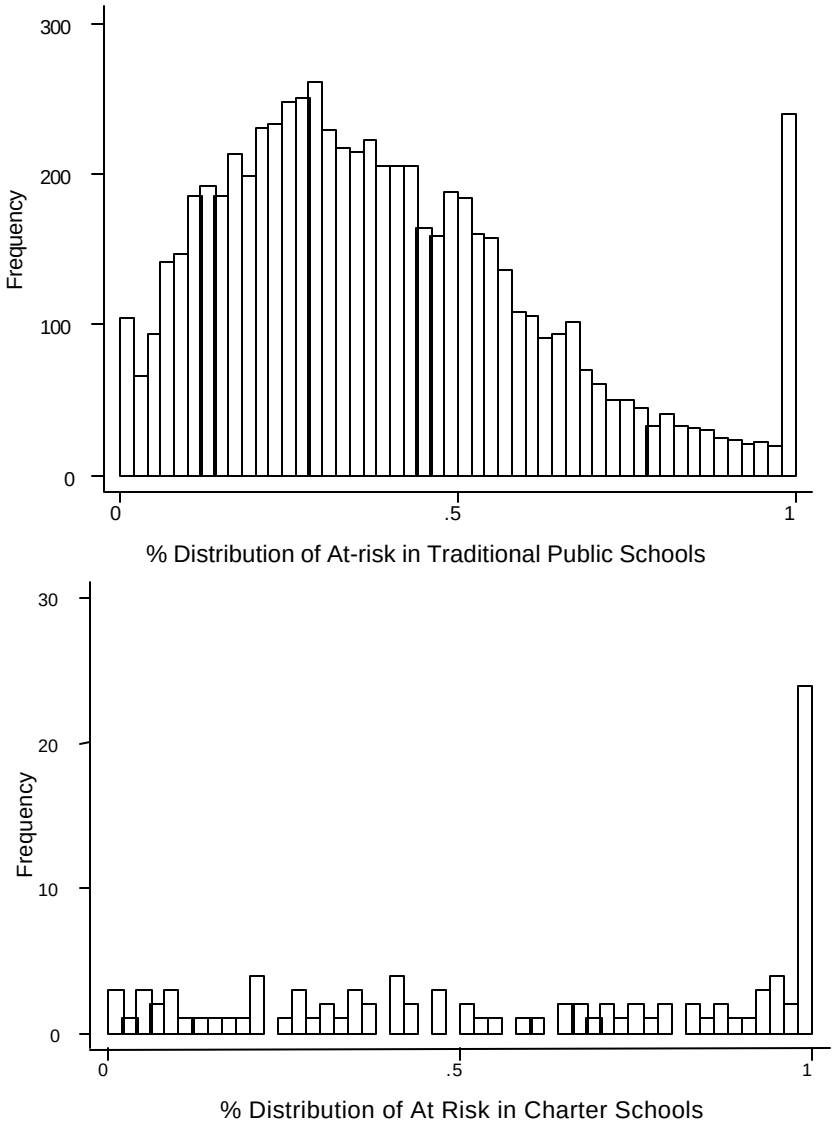




For the distribution of students labeled at-risk, the disparity between charters and traditional public schools is more pronounced. Figure 4 graphs the distribution of the percent of students labeled at-risk at traditional public school campuses and charter schools, respectively. The distribution of percent at-risk among charters appears almost uniform up until the 100 percent level, whereas the distribution of percent at-risk among traditional public school campuses has a well-defined concentration below 50 percent, although there is again a large mass at 100 percent.

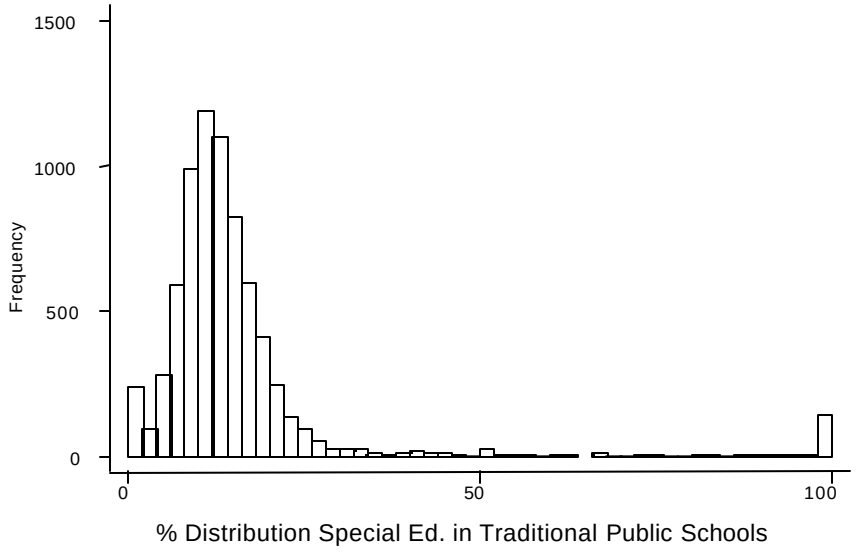
Note that the public campus figure reflects data derived from the individual student TAAS data set that only includes 3rd through 8th and 10th grades. The charter figure reflects only those charter schools reporting a positive number of at-risk students in the TEA district profiles.

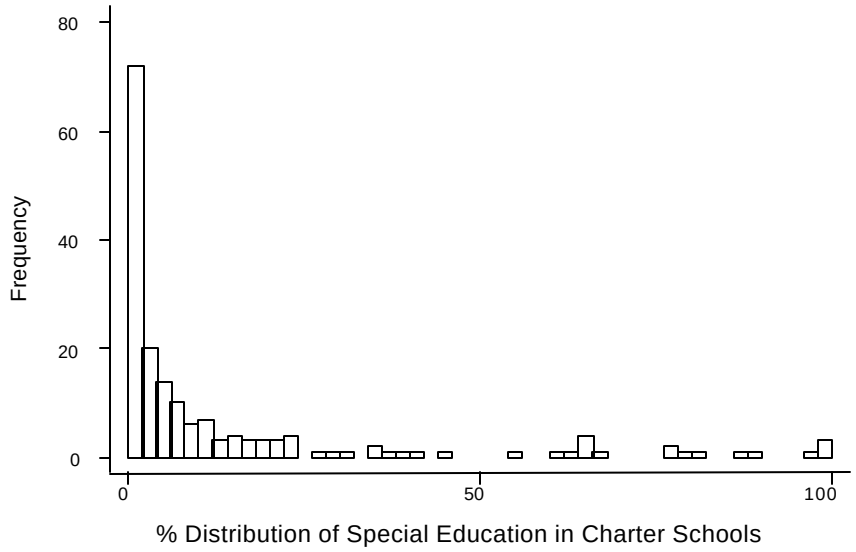
Figure 4: Distribution of Percentage of At-Risk Students



Finally, charters on average have lower percentages of pupils labeled as special education students. As Figure 5 indicates, the distribution of percent special education students by district shows a unimodal distribution centered near 15 percent, with tails extending to zero percent and the low 40 percent range. In contrast, charter schools have a strongly left-skewed distribution, with a large mass of schools with zero percent special education students. At the same time, there are ten charter campuses specializing in special education, with populations of more than 75 percent special education students.

Figure 5: Percentage Distribution of Special Education Students





TEACHER AND ADMINISTRATIVE STAFF CHARACTERISTICS

Table 6 describes the characteristics of the faculty and administrative staff of Texas's 142 charter schools and 1,041 traditional public school districts for the 1999-2000 academic year. The table shows the following:

- Relative to traditional public schools, charter schools have a larger share of staff classified as central administration or campus administration staff. This is at least partly due to the relative size of each school. Charters average 181 students, while traditional public school districts average 3,810 students. Economies of scale in administrative services allow larger districts to spread administrative costs over a larger number of students and staff, hence lowering the proportion of dollars and staff positions going to administration in larger units.

- Charter schools include a much higher percentage of minority teachers than traditional public schools, 60 percent versus 20 percent.

Table 6: Teaching and Administrative Staff Characteristics, 1999-2000

	Charter Schools (142)	Traditional Public School Districts (1,041)
% Staff Holding Positions: Central Administration	5.2	1.9
% Staff Holding Positions: Campus Administration	4.1	2.8
Average Annual Salary: Central Administrative Staff	$51,987	$63,146
Average Annual Salary: Campus Administrative Staff	$46,596	$52,138
Average Annual Teacher Salary	$27,434	$35,836
% Minority Staff	60	20.2
Students per teacher	16.0	12.6
% Teachers With Less than 5 Years of Experience	71.7	31.7
Teacher Average Years of Experience	4.6	12.1
% Teachers with B.A. or Higher	86	99.5
% Teachers with M.A. or Ph.D.	17.2	19.3
% Teacher turnover rate	51.7	16.2

There are three striking differences between the average characteristics of the charter and public teacher populations:

- Charter schools pay annual teacher salaries that average $8,400 less than traditional public schools. (This difference does not control for experience differences).

- The average level of experience among charter teachers is slightly more than one-third of the average experience of public teachers.

- The reported turnover rate among charter teachers is more than three times the public teacher rate.[4]

Public teacher salary schedules, however, are basically experience-rated schedules, so the average salary and average experience observations for charters are structurally linked. Put differently, charter schools pay less and have higher turnover rates in large part because they hire teachers with lower levels of experience. A more meaningful comparison of the structure of wages between traditional public schools and charter schools requires a look at the wage-experience distributions for each market. This is provided in Table 7.

In assembling Table 7, individual teacher data were only available for 1998-1999 school year. This data allowed us to compare monthly salaries of teachers with similar years of experience across public and charter schools. This shows:

- Salaries of traditional public school teachers and charter school teachers are very similar within experience groups, although charter schools exhibit greater variation.

- The lower overall average salary in charters reflects the relative inexperience of charter school teachers, not lower pay after controlling for experience level.

[4] The TEA defines teacher turnover rate as the total full-time equivalent (FTE) count of teachers not employed in the district in the fall of 1999-2000 who were employed as teachers in the district in the fall of 1998-99, divided by the total teacher FTE count for the fall of 1998-99. Staff who remain employed in the district but not as teachers are counted as teacher turnover.

Table 7: Comparison of Monthly Charter & Public Teacher Salaries in School Year 1998-1999

	All Teachers	Less than 5 Years of Experience	5 - 10 Years of Experience	10+ Years of Experience
Public	$3,447 (700) *N=253,150	$2,718 (286) N=72,485	$3,053 (251) N=48,974	$3,995 (473) N=131,691
Charter	$2,863 (489) N=390	$2,763 (411) N=316	$3,103 (467) N=51	$3,709 (532) N=23

N = number of teachers.
Standard errors in parentheses.

The high level of teacher turnover in charter schools is another noteworthy feature of the data in Table 6. Note that teacher turnover data in that table reflect the average across districts and are heavily influenced by the low turnover in a large number of small public districts.

Analysis of total turnover among traditional public school teachers between 1999 and 2000 using a data set containing individual teacher observations indicates that both traditional public school district and charter school teacher turnover is higher than reflected in Table 6. Between these years, the turnover rate was 27 percent for traditional public school teachers and 63 percent for charter teachers. In charter schools in 1999, 49 percent of teachers had fewer than five years of experience and, not surprisingly, the turnover rate among those teachers was higher than among more experienced teachers. The turnover rate for teachers with less than five years of experience was 35 percent in traditional public schools and 72 percent in charter schools. .

It is illustrative to note that the turnover rate in the three public school districts in which the largest number of charter schools are geographically located (Dallas, Houston, and San Antonio) was somewhat higher at 39 percent for teachers with less than five years of experience, while the turnover rate for charter school teachers with less than five years experience was 72 percent. Also, charter schools are smaller operations than traditional public school districts, and thus job changes of teachers that would be a move within district in a traditional public school (e.g., changing grade levels or specialization) might well require a teacher to leave a charter school for another campus.

Thus:

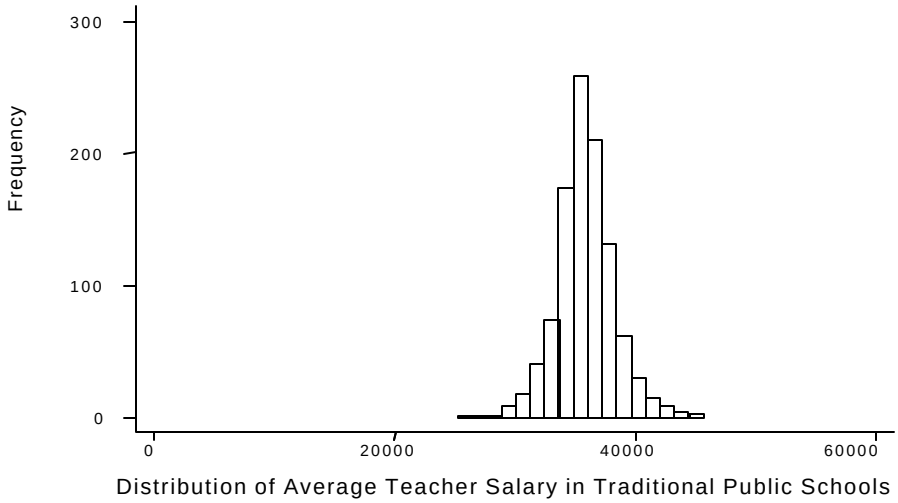
- Charter schools have much higher teacher turnover rates than traditional public schools, 63 percent versus 27 percent.

- Among teachers with less than five years experience, traditional public schools have a teacher turnover rate of 35 percent, while charters have a rate of 72 percent.

- Among teachers with less than five years experience in three major metropolitan area public school districts (Dallas, Houston, and San Antonio), traditional public schools have a teacher turnover rate of 39 percent, while charter school teachers have a turnover rate of 72 percent.

On the following pages, Figures 6 and 7 illustrate graphically the information outlined in Tables 6 and 7. In Figure 6, traditional public school district average yearly salaries are concentrated around $35,000, whereas charter school average yearly salaries lie mostly in the $20,000 to $30,000 range. This difference is due to the lower average experience level of charter school teachers, which is illustrated in Figure 7. In most traditional public school districts, teachers average 10 to 15 years of experience. Conversely, most charter schools employ teachers with fewer than 10 years of experience on average.

Figure 6: Distribution of District Average Teacher Salaries



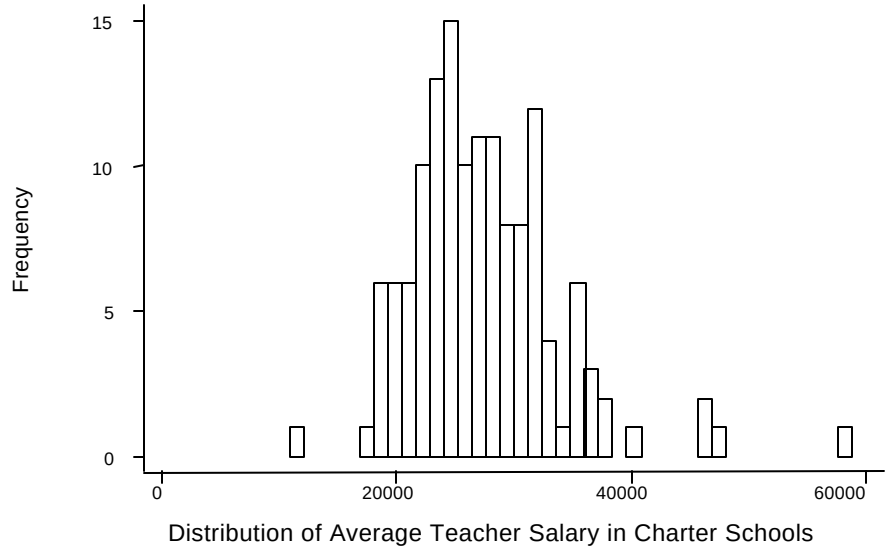
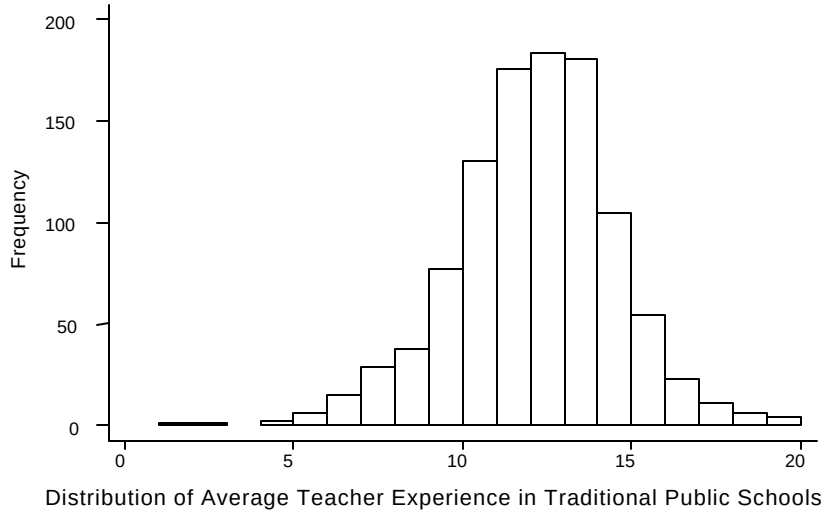
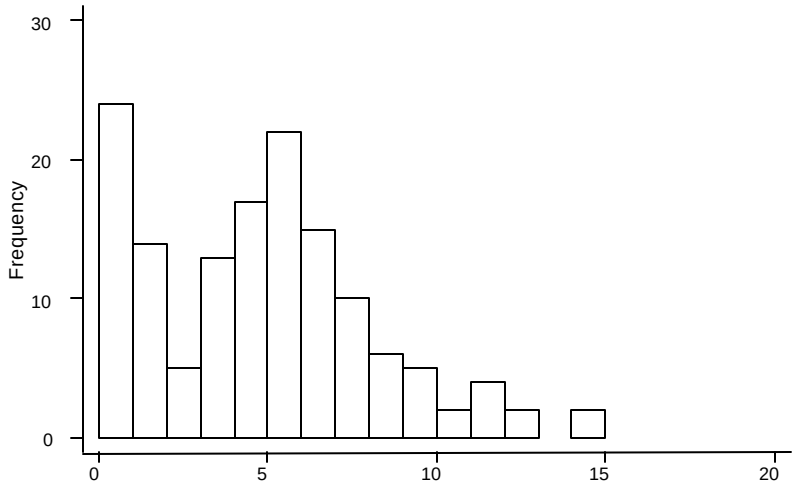


Figure 7: Distribution of Teacher Experience



Distribution of Average Teacher Experience in Traditional Public Schools



Distribution of Average Teacher Experience in Charter Schools

STUDENT PERFORMANCE IN CHARTER SCHOOLS

There are a variety of ways to measure student performance, including post-school labor market outcomes, probability of going on to higher education, performance in higher education, quality of life, etc. Data on these broad measures are, however, difficult to obtain, and they are almost never used in evaluating the quality of education provided. Part of the problem is a practical one of dealing with the time lag between delivery of educational service in, say, elementary school, and post-graduation performance in the labor market more than a decade later. Another issue is that students will have many educational providers over the course of their educational experience, and it is extremely difficult to measure how each impacted a particular student. .

Abstracting from these unattainable goals of linking student educational experiences to lifetime earnings or lifetime happiness, most researchers want to develop a measure of educational performance based on achievement within the year of educational service delivered. This has led researchers to rely upon test scores and other measures of student achievement (grades, honors, etc.) within each academic year. Of course, individual districts and, indeed, individual school campuses may vary in the way grades are linked to achievement, so states have moved to statewide testing, such as the Texas Assessment of Academic Skills (TAAS) test. In fact, the Texas Legislature has formally adopted a set of outcome measures by which it judges public school performance. These measures are based primarily on TAAS test scores.

When considering alternative test data, the results of national tests administered to public, private and charter school students in Texas and other states would be desirable. A test such as the Iowa Test of Basic Skills or the Stanford Achievement Test would provide data allowing comparison of Texas school children with students in other states. Since such testing is not mandated, the Texas Education Agency (TEA) does not collect and publish such data by district or campus. In practice, the TAAS test forms the basis of analysis of student performance in Texas. This is the only statewide test for which there is data available from almost every public school district and charter school in the state.

For our analysis we use the Texas Learning Index (TLI), which is a statistic derived from raw TAAS scores that allows for comparison across years and grades (which raw scores do not). Because the TLI is constructed so that comparisons can be made across years and grades, a student receiving the same score for two consecutive years is demonstrating normal progress in a particular subject. A TLI score of 70 or above in a subject is considered passing.

When looking at student performance, we can compare absolute levels of performance – what was the score achieved on a test? Alternatively, we can compare changes in performance – how much did a score improve over a previous score? Both have merit. The absolute performance on a criterion-referenced test such as the TAAS is intended to be an indicator of whether or not a student has achieved a certain level of knowledge of a subject, a level deemed appropriate to a certain grade level. The absolute level of performance indicates whether or not students are achieving that performance standard.

When attempting to measure the performance of schools, however, changes in test scores are also important. Schools serve diverse student populations, and it is clearly the case that students who have scored well in the past tend to also score well on current tests. Measuring changes in test scores gives an indication of improvement, or lack thereof, and is arguably a preferred method of looking at the contribution of a particular school to student performance. The basic idea is to get an indicator of student improvement with the presumption that the school has at least something to do with that improvement. This is especially important when looking at schools that serve student populations which traditionally achieve below average on standardized tests.

Finally, schools face diverse circumstances, both in student populations and in other exogenous characteristics. It is important when judging school performance to control for as many of these factors as possible, so that schools are judged on a more even footing. This inevitably results in a more complicated analysis than merely providing averages of test scores within a district or the average of changes in test scores. In fact, there are a variety of statistical approaches to estimating the contribution of a school to the performance of students while controlling for other factors. We employ several in the analysis that follows.

TEST SCORE LEVELS

Table 8, parts a through d, provides summaries of the level of student performance on the TAAS test, as measured by the TLI, from 1997 to 2000. Several items are clear. First, charter school students on average perform at a lower level than students in traditional public schools. This likely reflects the achievement level of students who choose to enter charter schools at least as much as the effectiveness of the schools themselves. Not surprisingly, the average performance of students in at-risk charter schools is far below the statewide student average. This is very consistent with our finding that approximately 80 percent of students statewide labeled as at-risk have failed (i.e. received a TLI score below 70) a section of the TAAS test.

It should be noted that even those charter schools which are not specifically serving at-risk populations may, in many cases, be serving poorly performing students. Indeed, poor performance is a likely motivation for parents to consider enrolling their child into a charter school. Further, it is important to note that the results in these tables indicate raw average attainments uncorrected for any feature other than whether a charter falls into the at-risk classification, and whether a student falls into the at-risk classification. We also will show that a large part of the discrepancy between charter and traditional public school student performance on TAAS tests is due to the characteristics of students served by charter schools.

Table 8-a: 1997 TLI Levels

	Average TLI Math Score	Average TLI Reading Score	% Passing Math	% Passing Reading	% Passing Both Tests	# Students Observed[5]
All Public*	76.8	80.6	76	80	70	1,800,000
All Charters*	66.3	74.0	46	65	40	764
At-Risk Charters	53.5	60.8	11	35	6	172
Non-at-Risk Charters	70.4	77.9	58	74	51	587
At-Risk Students						
Public	69.1	71.8	55	62	44	610,000
Charter	61.2	67.6	33	51	25	340
Non-at-Risk Students						
Public	81.0	85.4	88	90	84	1,100,000
Charter	70.7	79.2	57	76	52	400

*In Table 8, parts a through d, traditional public schools are labeled 'public,' and public charter schools are labeled 'charter.'

[5] The precise number of observations differs across the columns in these tables because some students take either a reading test or a math test, but not both. For the charter groups, the difference in the number of observations is very small.

Table 8-b: 1998 TLI Levels

	Average TLI Math Score	Average TLI Reading Score	% Passing Math	% Passing Reading	% Passing Both Tests	# Students Observed
All Public	78.4	82.5	81	83	74	1,500,000
All Charters	71.1	77.4	59	72	54	1,180
At-Risk Charters	57.9	64.2	20	46	12	186
Non-at-Risk Charters	74.2	79.9	68	77	63	965
At-Risk Students						
Public	70.8	73.4	60	65	48	519,000
Charter	64.9	69.9	41	56	33	550
Non-at-Risk Students						
Public	82.4	87.2	91	93	88	1,000,000
Charter	76.9	83.6	76	86	72	623

Table 8-c: 1999 TLI Levels

	Average TLI Math Score	Average TLI Reading Score	% Passing Math	% Passing Reading	% Passing Both Tests	# Students Observed
All Public	80.3	83.9	85	86	79	1,800,000
All Charters	70.1	76.1	59	70	52	5,070
At-Risk Charters	69.0	73.6	55	65	47	1,793
Non-at-Risk Charters	71.0	77.9	62	73	56	3,120
At-Risk Students						
Public	73.8	75.2	69	69	55	427,000
Charter	69.5	73.8	56	64	47	1,890
Non-at-Risk Students						
Public	84.3	88.2	94	94	91	838,000
Charter	74.5	80.0	70	78	64	1,950

Table 8-d: 2000 TLI Levels

	Average TLI Math Score	Average TLI Reading Score	% Passing Math	% Passing Reading	% Passing Both Tests	# Students Observed
All Public	81.3	84.6	87	87	81	1,800,000
All Charters	70.3	75.2	59	68	51	9,200
At-Risk Charters	69.9	73.5	56	64	47	2,983
Non-at-Risk Charters	72.1	77.8	64	73	57	4,761
At-Risk Students						
Public	75.3	76.4	74	72	60	590,000
Charter	68.0	71.4	52	59	42	3,200
Non-at-Risk Students						
Public	84.3	88.3	94	95	91	1,200,000
Charter	72.0	77.8	64	74	57	5,590

TEST SCORE CHANGES

It is important to consider changes in test scores as well as test score levels. Table 9, parts a through c, summarizes the average changes in TLI scores at traditional public and charter schools from 1997 to 2000. The baseline case is students staying in traditional public schools, and these pupils exhibit an average annual improvement in TLI scores. Students staying in charters exhibit an even higher average annual improvement in TLI scores.

These tables also show that charter students' TAAS test scores often decline in their first year but recover strongly thereafter.[6] In our analysis, a student "mover" is one who changes school district from one year to the next. Students who change schools within a district are not labeled as movers because we were unable to distinguish between students simply progressing from an elementary to secondary school (for example) and those relocating.

[6] The *Texas Open-Enrollment Charter Schools: Third Year Evaluation* also analyzed changes in TLI scores such as those reported here. Our charter school results differ in some respects because report's authors used a more limited sample of students.

Table 9-a: 1997-1998 TLI Changes*

	Average TLI Reading Change	Average TLI Math Change	# Students Observed
Stayers in Public	2.1 (.009)	1.4 (.007)	1,200,000
Movers: Public to Charter			
Movers to Charter	-2.3 (.53)	-1.7 (.46)	430
Movers to New Charter	-1.6 (.68)	-1.3 (.49)	169
Movers to Old Charter	-2.8 (.78)	-1.9 (.68)	261
Stayers in Charter	3.5 (.84)	3.0 (.67)	135
Movers: Charter to Public	9.5 (1.92)	8.3 (1.63)	75
Movers: Public to Public	2.3 (.041)	1.6 (.033)	81,000
At-Risk Students			
Stayers in Public	4.6 (.020)	3.4 (.017)	380,000
Movers: Public to Charter	-3.2 (.99)	-2.5 (.92)	170
Stayers in Charter	3.7 (1.12)	3.1 (.91)	82
Non-at-Risk Students			
Stayers in Public	0.9 (.009)	0.4 (.007)	778,000
Movers: Public to Charter	-1.7 (.62)	-1.0 (.44)	257
Stayers in Charter	3.1 (1.28)	3.0 (.97)	55

*For Tables 9-a, 9-b and 9-c, standard errors are indicated in parentheses

One key feature in these tables is the strong performance -- in terms of changes in test scores --for students continuing in charters. For every year in our sample, for both math and reading, continuing charter students (that is, students enrolled in a charter the previous year and continuing in a charter in the test year) show greater increases in their test scores than do continuing traditional public school students.[7]

[7] Solmon, Paark and Garcia (2001) also find that students enrolled in charter schools in Arizona for two or three consecutive years outperform students in traditional public schools for the same period.

Table 9-b: 1998-1999 TLI Changes

	Average TLI Reading Change	Average TLI Math Change	# Students Observed
Stayers in Public	0.8 (.010)	1.6 (.008)	937,000
Movers: Public to Charter			
Movers to Charter	-1.2 (.31)	-1.6 (.25)	1,630
Movers to New Charter	-0.5 (.41)	-0.2 (.34)	912
Movers to Old Charter	-3.4 (.47)	-3.4 (.40)	638
Stayers in Charter	2.2 (.58)	1.8 (.46)	346
Movers: Charter to Public	4.4 (.84)	3.7 (.90)	146
Movers: Public to Public	0.8 (.044)	1.7 (.035)	65,000
At-Risk Students			
Stayers in Public	2.0 (.023)	3.0 (.018)	267,000
Movers: Public to Charter	.05 (.45)	0.0 (.36)	790
Stayers in Charter	2.5 (1.14)	3.4 (.85)	113
Non-at-Risk Students			
Stayers in Public	0.3 (.010)	0.9 (.007)	640,000
Movers: Public to Charter	-2.4 (.40)	-2.9 (.35)	810
Stayers in Charter	1.9 (.66)	1.0 (.54)	230

Another consistent pattern is the large positive increase in test scores for students moving from charters to traditional public schools, a finding that is based on a limited number of observations. While this might reflect a successful intervention by charters dealing with particularly troubled students, we simply do not have enough information to interpret this result.[8]

[8] Solman, Paark, and Garcia (2001) also report this transition pattern for their Arizona sample.

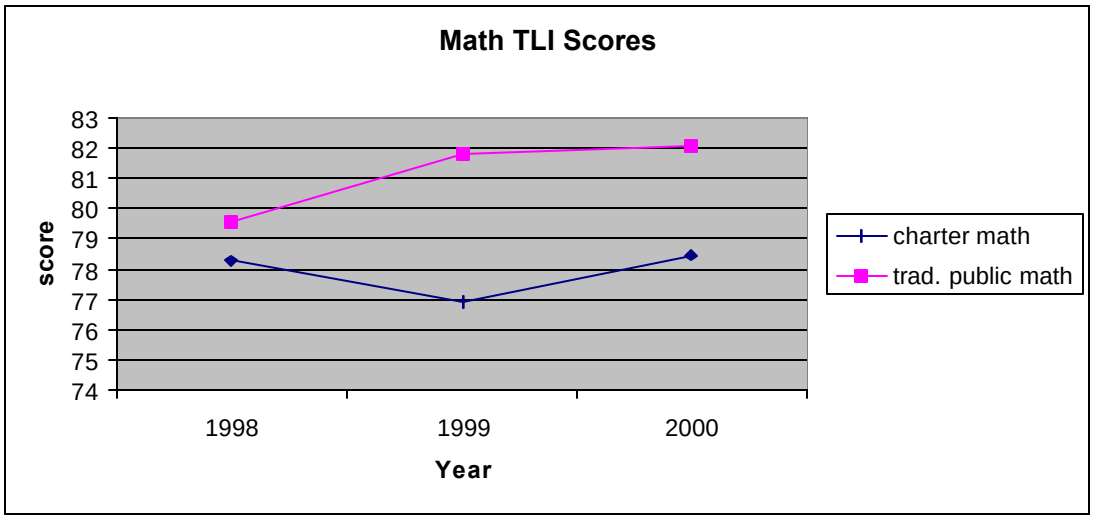
Table 9-c: 1999-2000 TLI Changes

	Average TLI Reading Change	Average TLI Math Change	# Students Observed
Stayers in Public	1.4 (.009)	1.5 (.007)	1,200,000
Movers: Public to Charter			
Movers to Charter	-2.9 (.26)	-2.1 (.23)	2,580
Movers to New Charter	-4.2 (.37)	-3.6 (.33)	1,367
Movers to Old Charter	-1.4 (.37)	-0.5 (.31)	1,181
Stayers in Charter	1.6 (.25)	2.8 (.21)	1,916
Movers: Charter to Public	5.3 (.44)	6.9 (.40)	850
Movers: Public to Public	1.3 (.038)	1.7 (.031)	84,000
At-Risk Students			
Stayers in Public	2.9 (.021)	3.2 (.016)	341,000
Movers: Public to Charter	-2.7 (.57)	-1.6 (.48)	675
Stayers in Charter	2.0 (.44)	3.2 (.37)	701
Non-at-Risk Students			
Stayers in Public	0.7 (.009)	0.7 (.006)	740,000
Movers: Public to Charter	-2.9 (.30)	-2.3 (.26)	1,748
Stayers in Charter	1.5 (.30)	2.5 (.26)	1,191

PANEL OF CHARTER ENTRANTS

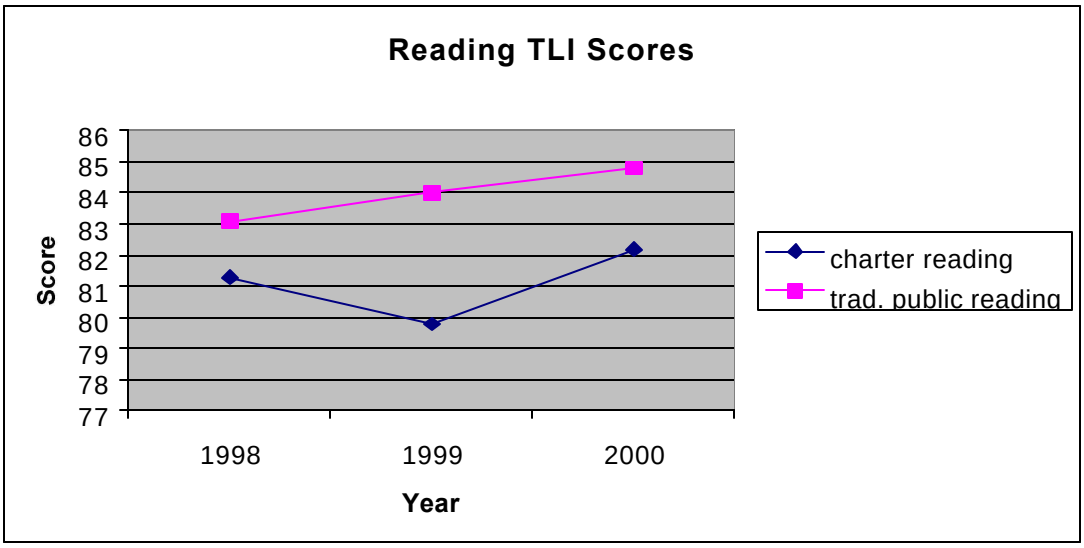
More information on student performance in charters and traditional public schools can be obtained by following a cohort of students who were all in traditional public schools in 1998 and then split between charters and public schools in 1999. We looked only at students in 3rd through 8th grade, because we wanted to string together performance on TAAS scores between years. Only those students whom we could track through all three years were included in the samples. The charter school group consists of students who were in a traditional public school in 1997-98, then entered a charter in 1998-99 and remained there.

Figure 8-a: Three-Year Series of TLI Math Scores for All Students



Based on TLI scores of 769 charter students and 699,230 public students

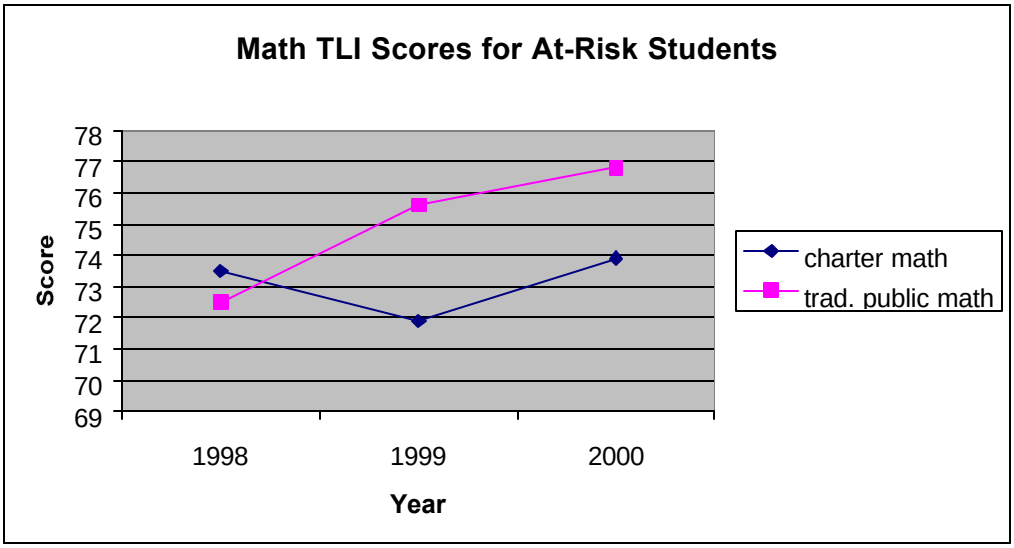
Figure 8-b: Three-Year Series of TLI Reading Scores for All Students



Based on TLI scores of 757 charter students and 694,177 public students

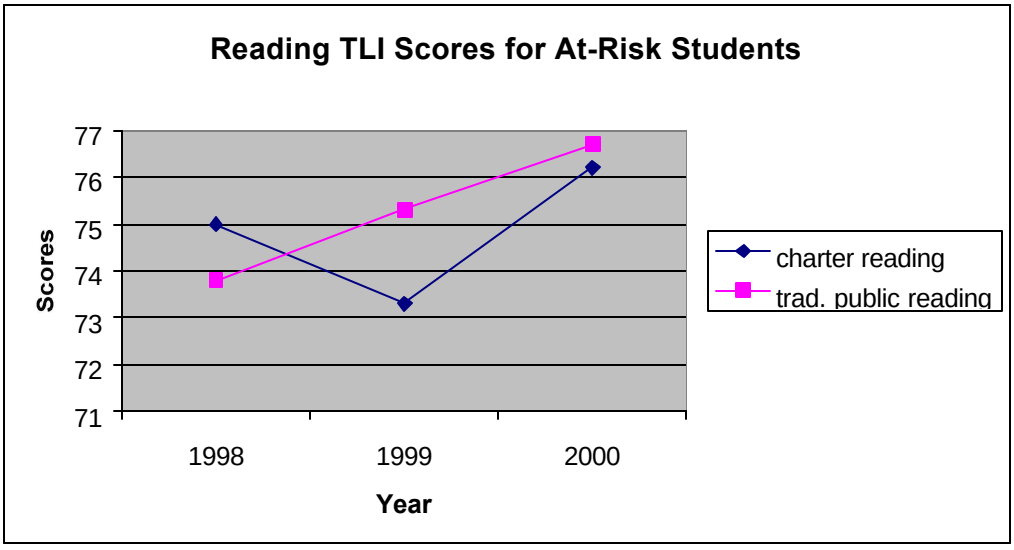
Figure 8 shows that Math TLI scores of students who attended public schools in 1998 but moved to charters in 1999 fell an average of nearly one point, whereas students who were in traditional public schools in 1998 and stayed in 1999 increased their Math TLI scores by two points. In 2000, charter students saw their Math TLI scores recover to their 1998 levels, while the traditional public school students saw their Math TLI scores remain at their 1999 levels. The story is similar for reading, with students moving to charters experiencing a drop in scores in 1999, followed by a recovery in 2000. Their scores, however, did not recover to the level achieved by public students.

Figure 9-a: Three-Year Series of TLI Math Scores for At-risk Students



Based on TLI scores of 353 charter students and 239,508 public students

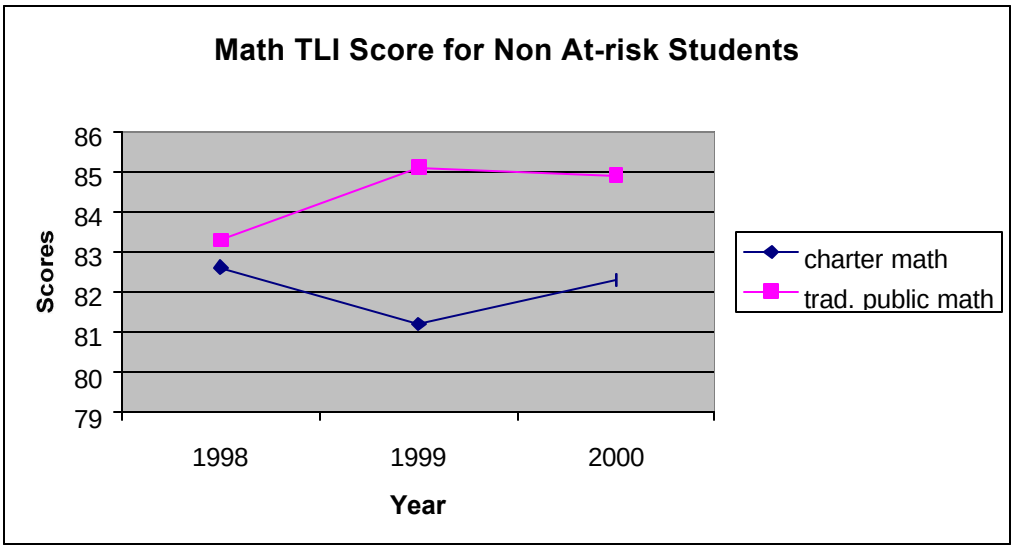
Figure 9-b: Three-Year Series of TLI Reading Scores for At-risk Students



Based on TLI scores of 344 charter students, 235,884 public students

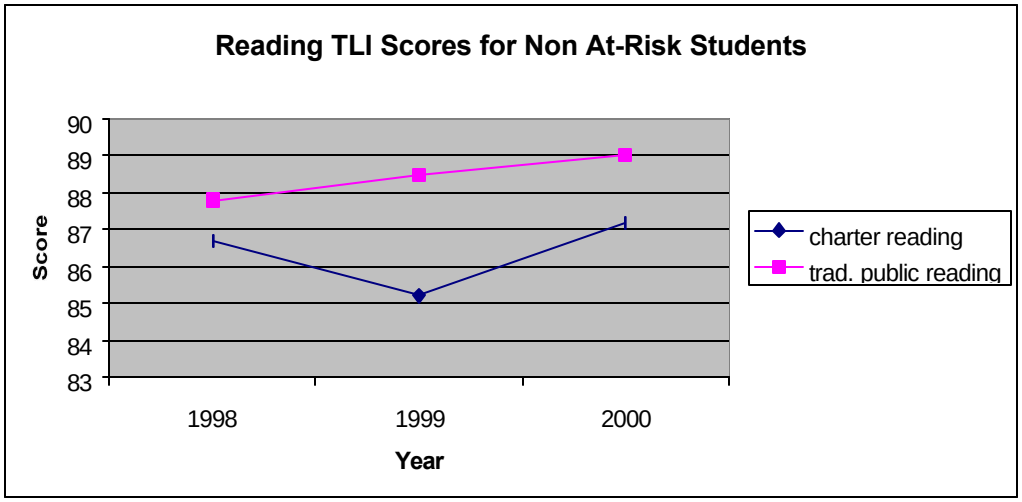
Figures 9 and 10 show similar patterns, but break students into two groups: at-risk and non-at-risk. In Figure 9, the charter school and traditional public school student performance of at-risk students is illustrated. In Figure 10, the experience of non-at-risk students is shown. Again, these graphs follow a cohort of students who all attended traditional public school in 1998, and from which some moved to charters in 1999 and stayed in 2000 and others stayed in publics in 1999 and 2000.

Figure 10-a: 3-Year Series of TLI Math Scores for Non-at-risk Students



Based on TLI scores of 412 charter students and 455,658 public students

Figure 10-b: 3-Year Series of TLI Reading Scores for Non-at-risk Students



Based on TLI scores of 409 charter students and 454,153 public students

A look at Figures 8 through 10 leads to the following observations:

- The average test scores for traditional public school students improved relative to those for charter students for all of the group comparisons considered.

- There is a consistent negative first-year charter school effect. This effect appears in both math and reading scores and appears in both the at-risk and non-at-risk charter school populations.[9] Students moving between traditional public school districts do not exhibit this decline in scores on average. Later results that control for previous test performance and for individual student characteristics do indicate a negative mover effect in both charters and traditional public schools.[10]

- Because new entrants into charter schools make up such a large share of all charter students in any given year, an analysis which does not separate these groups will mainly capture the decline in performance due to the new entrants.

- There is a consistent positive second-year charter school effect. This effect also appears in all groupings considered.[11]

PANEL OF CONTINUING CHARTER STUDENTS

The figures above can only provide a two-year, post-entry look at charter students, because by design the charter school movers were all in traditional public schools in 1998. Given the marked improvement in charter scores in the second-year, it would be valuable to have a three-year panel of test scores to assess whether the second-year improvement is a persistent effect or merely a recovery from the negative first-year shock. We generated the performance path of those students who were in a charter school for all three years (1998, 1999 and 2000) for that purpose. That is, we compared students who attended charters in 1998 and stayed in 1999 and 2000, and also students who attended traditional public schools in 1998 and stayed in 1999 and 2000.

[9] Solman, Paark, and Garcia (2001) find that students in Arizona also demonstrate a decline in test scores (using the Stanford Achievement Test, 9th Edition) in the first year of charter school attendance.

[10] Our results in these respects are consistent with the TEA's 1997 *Study of Student Mobility in Texas Public Schools*. This study finds that students who changed schools were adversely affected, with TLI score growth from the previous year, on average, being somewhat less than for non-movers. After controlling for previous student performance and other characteristics, they too find a negative effect of moving on TLI scores. A negative impact of moving on student test performance in Texas is also noted by Kain and O'Brien (1998).

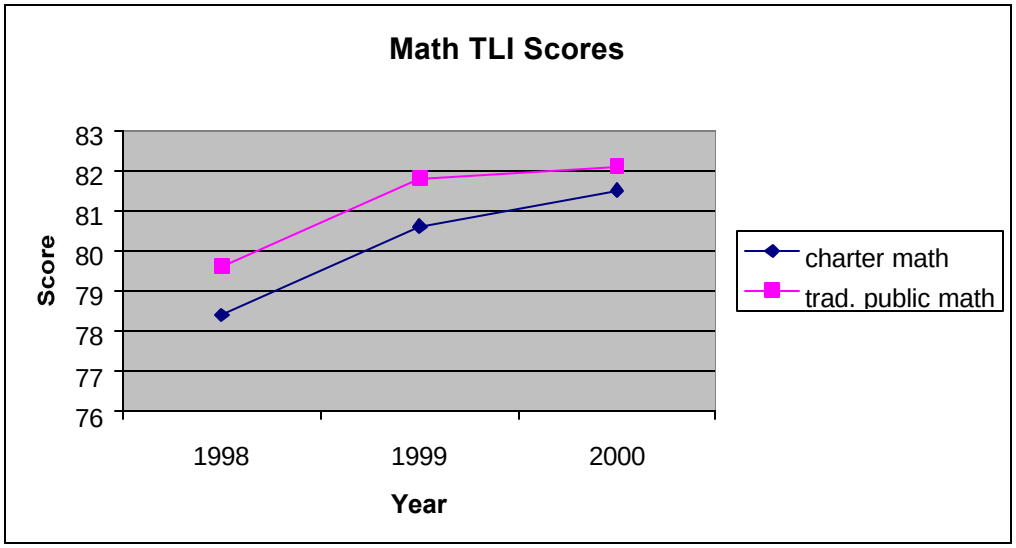
[11] This second-year performance improvement was also found by Solman, Paark, and Garcia (2001).

Figure 11 indicates that charter school students performed below traditional public school students on the TAAS math test, but that they exhibit a pattern of test scores that follows and even converges with the pattern of test scores of traditional public school students.

- For math scores, charter school students start out about one point below traditional public school students in 1998 and end up about a half point below traditional public school students in 2000.

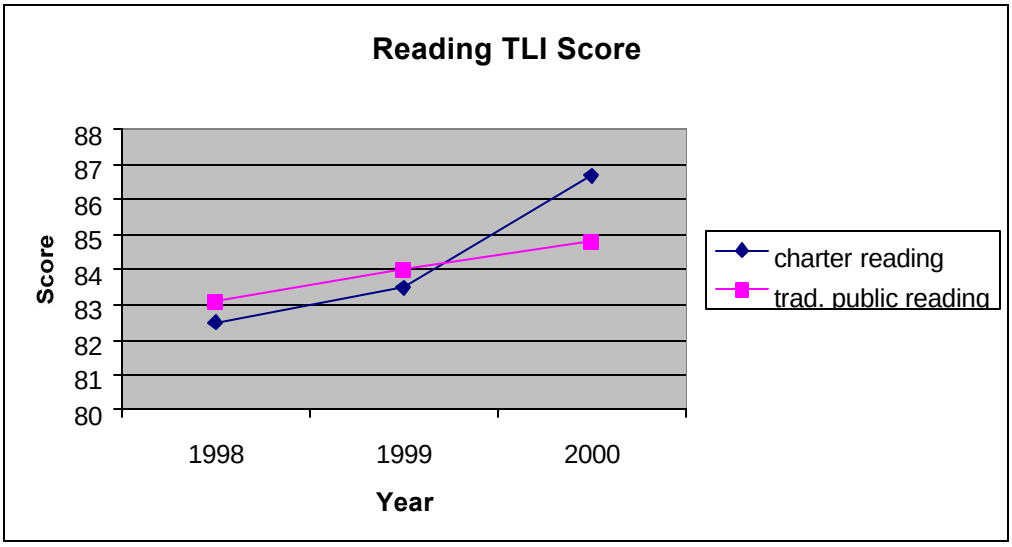
- For reading scores, the results are even more dramatic. In the third year, charter school students in this cohort outperformed traditional public school students on the TAAS reading test, scoring almost two points higher.

Figure 11-a: 3-Year Series of TLI Math Scores for Continuing Students



Based on TLI Scores of 131 charter students and 699,230 public students

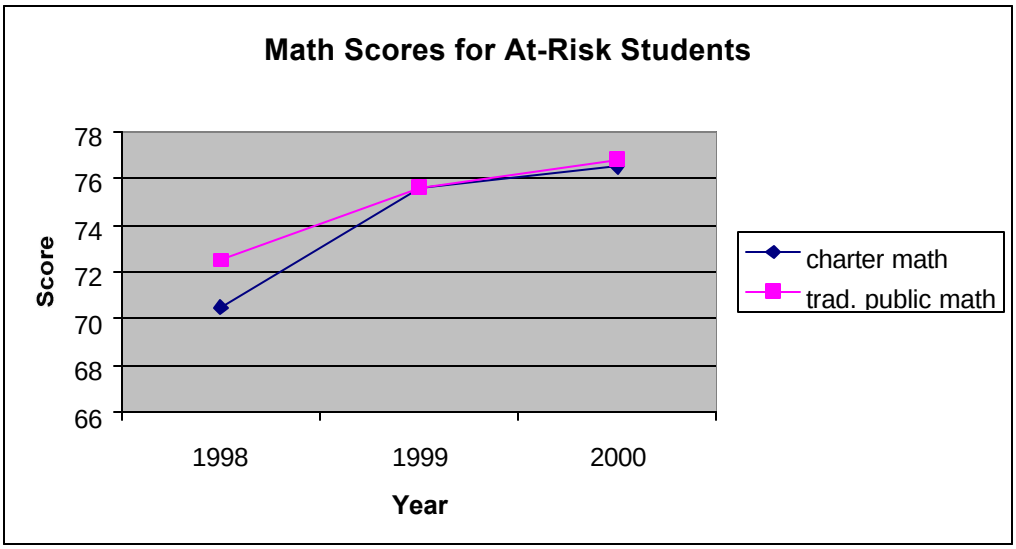
Figure 11-b: 3-Year Series of TLI Reading Scores for Continuing Students



Based on TLI scores for 409 charter students and 454,153 public students

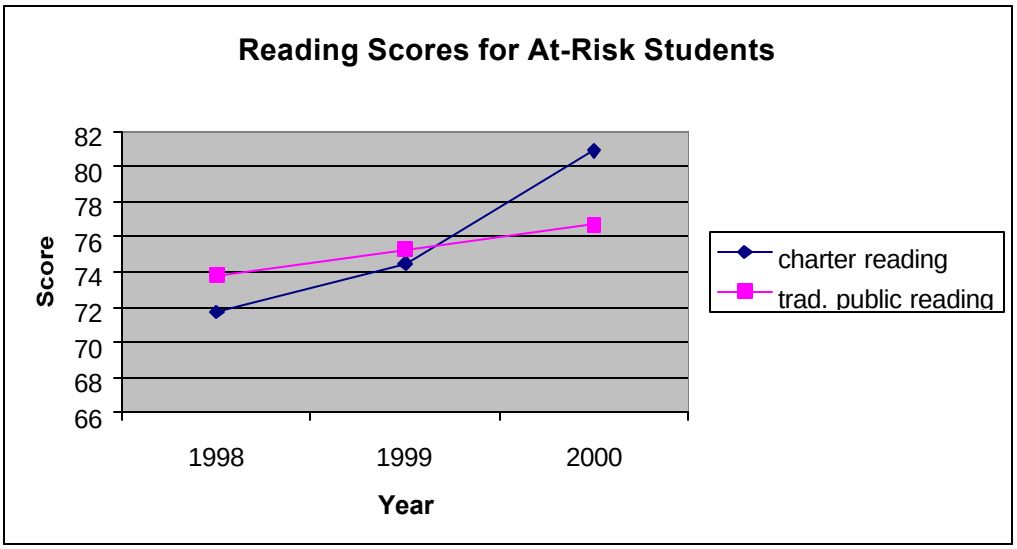
Figure 12 examines math and reading TLI scores for at-risk students in both charter and traditional public schools, again for that cohort of students enrolled in either a charter or a traditional public school in 1998 and continuing there through 2000. Here, the math scores of charter at-risk students converge to scores of traditional public at-risk students by 2000, and the reading scores of charter at-risk students are over three points higher than those of public at-risk students.

Figure 12-a: 3-Year Series of TLI Math Scores for At-risk Students



Based on TLI scores of 48 charter students and 239,508 public students

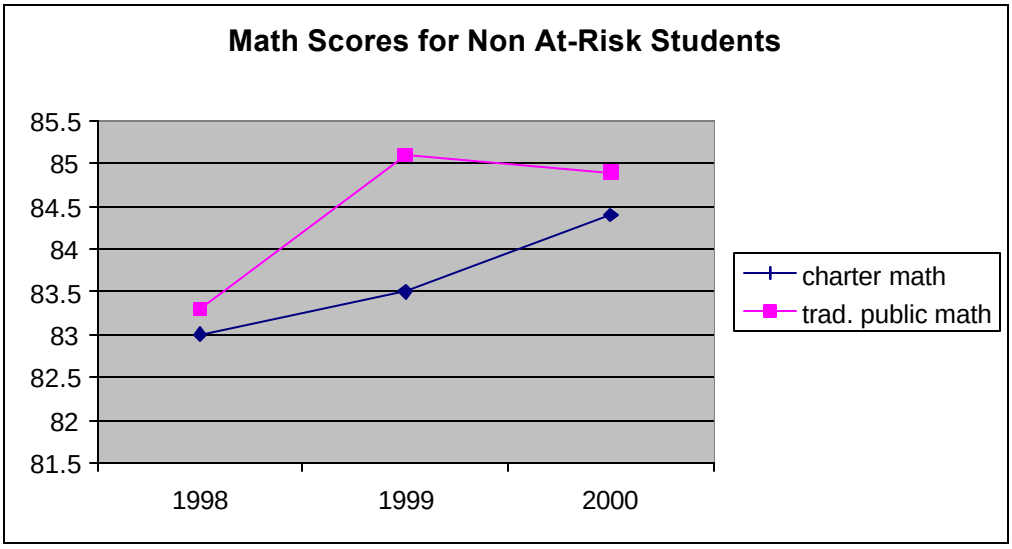
Figure 12-b: 3-Year Series of TLI Reading Scores for At-risk Students



Based on TLI scores of 49 charter students and 235,884 public students

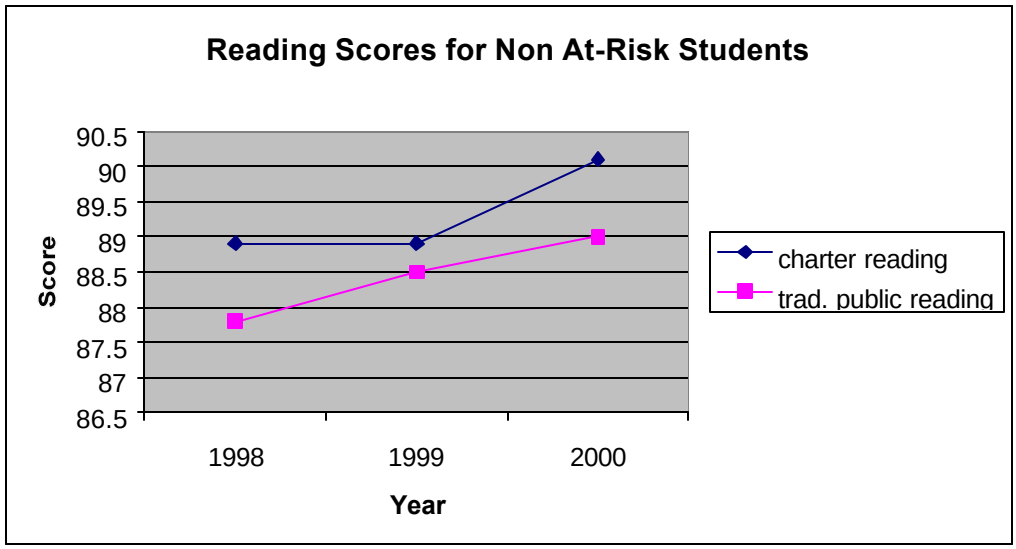
Figure 13 provides a similar analysis for non-at-risk students who were enrolled in either a charter or traditional public school in 1998 and stayed in that school through 2000. Here the charter school and traditional public school differentials have varied somewhat, but in 2000 were very similar to the differentials in 1998.

Figure 13-a: 3-Year Series of TLI Math Scores for Non-at-Risk Students



Based on TLI scores of 82 charter students and 455,658 public students

Figure 13-b: 3-Year Series of TLI Reading Scores for Non-at-Risk Students



Based on TLI scores of 83 charter students and 454,153 public students

The implications of Figures 11, 12, and 13 are:

- The overall improvement of charter school students is greater than that of comparator traditional public school students.

- The improvement for the at-risk charter students relative to the at-risk public students is particularly striking.

- The improvement in reading scores in at-risk charters is more marked than the improvement in math scores.

CONTROLLING FOR OTHER FACTORS

The above analysis of both levels of test scores and changes in test scores does not control for numerous other factors influencing student performance. These include, but are not limited to, such student characteristics as at-risk status, special education status, and limited English proficiency, as well as past student performance on similar tests.

In order to control for these other factors we take two approaches. The first is to estimate what we label a "district fixed effect" from a regression of student test scores on two years of past test scores, a number of student characteristic measures, and district indicator variables.[12] The idea is to control for student characteristics, student performance on past tests, and then to use a district indicator to pick up any remaining systematic differences of student performance across districts or charter schools. This district indicator assigns

[12] This methodology was utilized in the *Study of Uncontrollable Variations in the Costs of Texas Public Education*.

to the district or charter school all systematic variation in the test scores of students in a district or charter not explained by past student performance or by various student characteristic measures. That is, the district fixed effect conveys the performance of the school or district that is not due to the characteristics of the students in the district.

In this analysis, we use only students in grades 3 - 8 because we want to control for the previous year's test score. (The only high school TAAS test score available is the 10th grade exit-level test, which does not allow for a previous year's score.)

When we estimate this regression using TAAS math and reading scores as our measures of performance, we find a number of expected results. First, current reading scores are related more heavily to previous reading scores than to previous math scores, although both are important explanatory variables for reading test scores. Second, current math scores are related more heavily to previous math scores than to previous reading scores. Female students do better on both reading and math tests than do male pupils, but the effect is much larger for reading scores. Certain minority populations (African American, Hispanic) do worse on these tests than Anglo and Asian Americans. Students classified as disadvantaged or in special education also do worse on both these tests, and limited English proficiency students do worse on the reading test than others.

For charter schools, the fixed effect indicator takes an average value of -4.0, based on 83 observations. At-risk charters have an average value of -4.1, and non-at-risk charters an average value of -2.4. Charters that were new in 2000 had an average fixed effect of -4.37; charters that were in at least their second year of operation had a fixed effect of -1.75; and charters that were in at least their third year of operation had a fixed effect of -.79.

We also estimated the effects separately, based on new charter students and charter students in at least their second year. The average fixed effect based on new students was -3.73, that based on new students was -1.21. Table 10 summarizes these effects as follows:

- The average quality of traditional public school output, as measured by a district fixed effect model, is greater than the average quality of charter school output.

- The average quality of continuing charters, as measured by a district fixed effect model, is greater than the average quality of first-year charters.

Table 10: Summary of District Fixed Effects

Category of School	Average District Fixed Effect	# Observations
Public Districts	0.13	1,038
All Charters	-3.20	83
At-risk Charters	-3.03	36
Non-at-risk Charters	-2.40	36
New Charters in 2000	-4.37	46
Charters in at least 2nd year of operation	-1.75	37
Charters in at least 3rd year of operation	-0.79	11
Charter effect on new students	-3.73	83
Charter effect on students beyond first year	-1.21	40

Note: Eleven charters in this sample were classified as neither at-risk nor non-at-risk.

The data in this table are not entirely encouraging for charter schools, but several factors should be kept in mind. It is important to note that for many charter schools, we were able to identify only a very small sample of students with three years of test score data upon which to base our estimate of school performance. The small sample size makes this a less precise performance measure. Although we include student characteristics, this likely does not fully control for student ability. The average disadvantaged and at-risk student in a charter may, in fact, be more difficult to educate than the average disadvantaged and at-risk student in a traditional public school.

The next section discusses a methodology that can more fully control for these differences in student ability. It will show that charter schools that have been in operation for more than a year perform significantly better. This may reflect getting past initial start-up problems, as well as possibly indicating that the regression failed to fully control for the drop in performance during a student's first year in a charter (and new charters have entirely new students).

To capture better the overall effect of charter schools on student performance, we also treated all charter schools as a single district for the purpose of the regression. This allows for a better representation of the average effect of charters on individual students and gives equal weight to each student in a sample instead of equal weight to each school district. Using this method we found the fixed effect of the charter district to be -0.61.

MEASURING CHARTER SCHOOL PERFORMANCE FROM A "STUDENT FIXED EFFECT" MODEL

It is quite possible that estimates of the performance of charter schools based on the above district fixed effect model mask some of the systematic differences in the population of students that charters are serving relative to traditional public schools. The various indicator variables that try to control for student characteristics do not in any way exhaust the list of possible student characteristics, and charter schools may well be choosing to serve a student population that is different in some unmeasured ways from the traditional public school student population.

In order to address this issue, we estimated a "student fixed effect model," in which we modeled student test scores as depending on prior test scores, and a number of campus-wide measures of student body characteristics. Additionally, we included an indicator for whether or not the student changed districts (which includes movers across traditional public school districts, as well as movers to and from charter schools). The results indicate that moving had a significantly negative impact on both math and reading TAAS test performance. We also included an indicator variable *for each student* so that we controlled for the characteristics of every individual pupil. Then we included an indicator for whether the student was in a charter school in one case or, in a separate model, an indicator for whether the student was in an at-risk charter or in a non-at-risk charter. We call this the charter effect as calculated from the individual student fixed effect model.

In essence we are describing a charter school effect as that portion of the performance of students in charter schools that cannot be explained by knowledge of students' past scores and individual student average achievement levels, by certain student characteristics that might change over the sample, and by school overall campus characteristics. This charter effect gives a measure of how being in a charter school changes average performance after controlling for other factors, including a specific student indicator. Table 11 presents our findings. After controlling for each individual's past performance on TAAS tests, we find:

- The average value added to TAAS test scores in at-risk charters is 0.76 *higher* than in traditional public schools. That is, adjusting for differences in student characteristics, a student in an at-risk charter scores an estimated 0.76 higher on the TAAS TLI than a student in a traditional public school. The same regressions find the value added to test scores in non-at-risk charters is 1.56 *lower* than in traditional public schools.

- Estimates from these student fixed effect type regressions indicate that the average value added to TAAS scores in a charter school, without conditioning for the at-risk or non-at-risk classification of the charter school, is 0.91 *lower* than in a traditional public school.

Table 11: Charter Effects from Student Fixed Effect Model

	Estimated Charter Effect	Standard Error
Charters Overall	-0.909	0.119
At-Risk Charters	0.759	0.223
Non-at-risk Charters	-1.56	0.164

COST EFFICIENCY IN CHARTER SCHOOLS

CHARTER SCHOOL FINANCIAL CHARACTERISTICS

Considerations of charter schools should include an analysis of benefits and costs. Student performance is one dimension in which charters should be measured. This is the benefit in the benefit-cost ratio that policymakers might contemplate.

Another dimension is a financial comparison. How do per pupil expenditures at charters and at traditional public schools compare? This is the cost side of the benefit-cost ratio.

Table 12-a provides a comparison of charter school and traditional public school revenues and expenditures. These comparisons must be done carefully because charter schools have no direct taxing authority and hence rely exclusively on state funding. Traditional public school districts, in contrast, rely on a mixture of direct state funding and local property tax levies. Since these local property tax levies are explicitly a substitute for state funding in the school finance formulae, it is important to take both state and local revenue sources into account in any comparison of public and charter schools.

Table 12-b indicates some differences in the ways in which charter and traditional public schools spend their revenues. These comparisons are made between charters, all traditional public schools, and traditional public schools with fewer than 800 students enrolled. Since no charter had an enrollment of 800 or more, comparisons of charters with small traditional public schools are arguably more relevant than comparing charters with all traditional public school districts.

The tables can be summarized as follows:

- Total revenue (federal, state and local) averaged $5,564 per pupil at charter schools, $7,135 at traditional public schools, and $7,738 at small traditional public school districts.

- Charters have proportionally lower payroll expenses than traditional public schools -- 64 percent of revenue versus 72 percent.

- Charters have proportionally higher expenditures on central administration -- 13 percent of revenue versus 8 percent at small public school districts and 6.5 percent at all public school districts. The average expenditure per pupil on central administration at charter schools is $762, which is actually less than the $928 per pupil average for very small traditional public schools with fewer than 400 students. For comparison, the overall average expenditure per pupil across all traditional public schools is $480 per pupil.

- Charters have a much lower fund balance than traditional public school districts, an indicator of the tight financial situation of charter schools.

Table 12-a: Revenue and Expenditures, 1999-2000 School Year

Type of Revenue or Expenditure	Charter School Average (N=142)	State Average (N=1,041)	Small District Average (N=445)
State aid per pupil	$5,175	$3,772	$4,277
Total public revenue per pupil	$5,564	$7,135	$7,738
Revenue from state	90.1%	54.7%	57.4%
Revenue from local	6.05%	42.1%	39.8%
Revenue from federal	3.8%	3.0%	2.7%
Total operating expenditures per pupil	$5,631	$6,636	$7,235
Ratio of operating expenditures to revenue	101%	93%	94%
Fund balance	4.3%	21%	25%
Expenditures on regular education	88%	72%	72%
Expenditures on special education	5.5%	11.5%	11.5%

N=Number of charter schools or traditional public school districts.
Note: these data are simple averages across districts (not weighted by district enrollment). "Small" districts are those public school districts with an enrollment of less than 800 students.

Table 12-b: Share of Expenditures by Category

Expenditure Type	Charter Schools (N=142)	Traditional Public School Districts (N=1,041)	Small Public Districts (N=445)
% operating	98.8	91.6	92.7
% payroll	64	72.5	71.9
% debt service	1.19	5	3.35
% capital	0	3.4	3.95
% instruction	52.8	57.8	57.9
% transportation	.9	2.95	2.85
% food	2.6	5.4	5.33
% extracurricular	.38	3.7	3.95
% central administration	13.1	6.47	8.1

One simple way to get a picture of how much charter school districts are spending compared to public districts is to plot expenditures for each type against scale of operation, i.e., the number of students enrolled.

Figure 14: Graph of Expenditures Against Scale

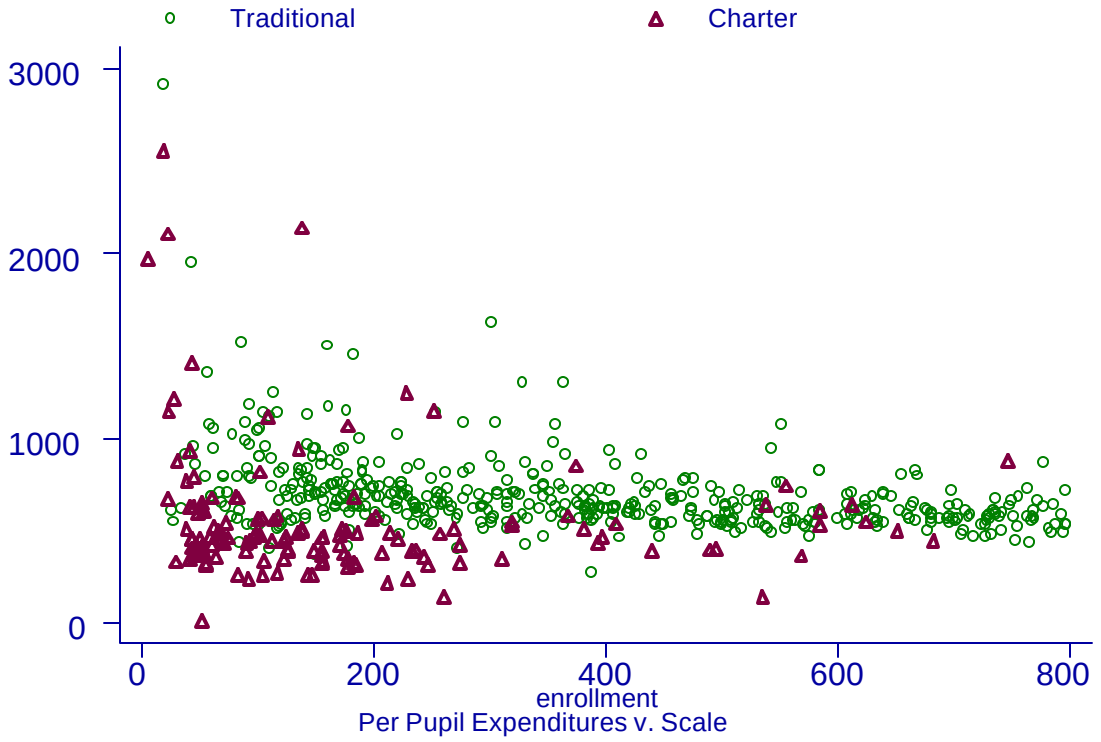


Figure 14 indicates charter schools typically spend less per pupil than similarly sized traditional public school districts, especially among those schools with enrollments of 200 or more:

- With a few exceptions, charters tend to spend less per pupil than small traditional public school districts.

- Charters in the 200 to 800 student enrollment range are almost always among the public school districts with the lowest spending per pupil

Graphs of per pupil expenditures versus scale are informative at one level, but they ignore deeper aspects of the issue. Earlier, we found that graphs of student performance at charter and traditional public schools can tell part of the surface story of relative student performance, but may mask important underlying relationships. Here the simple comparison of expenditures per pupil relative to scale fails to control for certain important dimensions of the environment within which schools operate.[13]

One solution to this multi-dimensional problem is to estimate cost functions that relate per pupil expenditures to scale of operation, to salaries and wages, and to other characteristics of the district and of the students enrolled. These cost function estimates allow us to calculate expected expenditures of traditional public schools and charters, conditional upon teacher salaries and other characteristics of a district or school. This methodology is described in the following section.

CHARTER EFFICIENCY: A PREDICTED EXPENDITURES APPROACH

Our cost function model estimates per pupil costs as a function of school size, teacher wages, student test performance and other student and district characteristics. This cost function summarizes the linkages between these variables and costs per pupil.[14]

We estimate this cost function for traditional public school districts, and then ask how charter schools would fare in this model. That is, we input charter school size, teacher wages, student test performance and other student and charter school characteristics, and ask what the model predicts the charter school would spend. Since the cost function is estimated using data from traditional public schools but then used to predict the costs faced by charter schools, this exercise can be interpreted as asking what it would cost to

[13] Note that under section 12.104 of the Texas Education Code, charter schools are subject to many of the major curriculum requirements facing all public schools. These include student performance on assessment instruments (such as the TAAS), special education programs, bilingual education programs, extracurricular activities, and health and safety.

[14] This methodology is similar to that discussed in *A Study of Uncontrollable Variations in the Costs of Texas Public Education* and in Duncombe, Ruggiero & Yinger (1996).

operate a charter school if it were treated and operated as a traditional public school. We then compare this predicted level of charter spending to actual charter school spending.

Though we believe this methodology is informative, we must emphasize that it has several limitations: 1. There is no question that schools produce outputs that we do not measure. For instance, some schools have more extensive extracurricular programs than others. 2. As in the student performance analysis, we use the percent of students labeled disadvantaged, limited English proficiency and special education to control for student population characteristics, but we know these do not fully account for differences in populations. 3. One of the most important determinants of expenditures per pupil in traditional public school districts is district size. However, the economies of scale that characterize traditional public school districts may not be precisely analogous to those which characterize charter schools, since small public districts typically serve geographically large, rural areas and the full range of grades, whereas charters typically serve an urban area and a smaller range of grades.

Table 13 summarizes the results, reporting actual expenditures per pupil and predicted expenditures per pupil from a cost function model. The table includes both traditional public schools and charter schools, and various subdivisions of charter schools. We find:

- With the exception of a few charters in their first year of operation, charters spend less per pupil than the cost function model predicts a traditional public school district would spend to achieve the same student performance with the same size student body, and the same teacher wages and other characteristics of the district.

- Small schools are more costly to operate per pupil, but even a comparison of small public districts with large charters shows a significant lower cost per pupil of charters. In fact, large charters have costs that average $1,600 per pupil less than our traditional public school cost function would predict.

- Charters known to be small – new charters just beginning operations, and certain at-risk charters – show particularly large differences between predicted costs from the traditional public school model and actual costs.

- The economies of scale faced by charters appear to differ from those in traditional public schools. While our estimated traditional public school cost function would have small charters facing costs per pupil of $15,000 and diminishing to $6,400 in large charters, our actual charter costs for a small charter average $6,100 per pupil and diminish to $4,800 per pupil in large charters.

- Non-at-risk charters and large charters have costs that are closest to our predictions for traditional public schools, but even here they have a $1,600 per pupil cost advantage.

Table 13: Actual & Predicted Expenditures Per Pupil in 2000

Category	Actual $ Expenditures	Predicted $ Expenditures	Difference	# of Districts
Traditional Public	6,084	5,969	115	1,038
Small Publics (< 800 Students)	6,984	6,767	217	483
All Charters	5,669	10,032	-4,363	82
At-Risk Charters	5,326	13,536	-8,210	35
Non-at-Risk Charters	5,899	7,513	-1,613	36
New Charters	6,128	11,404	-5,276	45
Old Charters	5,110	8,362	-3,252	37
Small Charters (<100 Students)	6,122	15,033	-8,911	30
Medium Charters (100 - 250 Students)	5,890	7,734	-1,843	29
Large Charters (>250 Students)	4,798	6,406	-1,608	23

Note: In order to generate predicted expenditures for charter schools, we included characteristics of the market in which they operate. In particular, we use a measure of the estimated average 0-4 years of experience teacher salary which is derived from the salary and benefits index presented in the *Study of Uncontrollable Variations in the Costs of Texas Public Education*, and a measure of the percentage of students living in poverty within geographic school districts obtained from the National Center for Education Statistics. The data used for charter schools are those corresponding to the school district from which most of the charters students were drawn (where that was evident) or the largest school district in the county in which the charter resides. The sample of charter schools is limited to those for which we could generate an output measure. In particular, any school district or charter serving only high school students were not included in our regression. We also excluded one charter school, Texas Serenity Academy Bayshore, because it had only six students. As noted earlier, some charters could not be classified either at-risk or non-at-risk due to lack of data.

CHARTER EFFICIENCY: A FRONTIER COST FUNCTION APPROACH

To conduct the comparison of charter costs with predicted costs from traditional public schools, we used an estimated cost function for traditional public schools that links costs per pupil to a host of factors that include size, student achievement, teacher salaries, and other characteristics. An alternative approach would be to estimate the cost function for both traditional public and charter schools jointly and ask how well the various schools do at achieving the lowest cost for their given characteristics. This is known as a stochastic frontier cost function model.[15]

The stochastic frontier cost function model is used here to ask how close, on average, traditional public schools and charters get to the estimated cost frontier -- the minimum cost per pupil -- after taking into account differences in enrollment, student achievement level, teacher salaries, and other characteristics of the school or district.[16]

For each charter and each district, we compute an estimate of inefficiency as the distance a school is from the estimated cost frontier. We then ask how these estimated inefficiencies compare across public districts and charters.

We can summarize our findings as:

- The median charter school is more efficient than the median traditional public school, and the median traditional public school is more efficient than the median small public school.

- The average charter school inefficiency measures exceeds the average inefficiency measure for traditional public schools. This is due to new charters, which have a lower median inefficiency but a higher average inefficiency than traditional public schools. This indicates that the distribution of charter school inefficiency measures is highly skewed because of six large outliers, all of which are new entrants.

- For old charters (those operating for more than one year), both the median and average inefficiency are lower than traditional public schools and much lower than small public schools.

[15] This approach has been applied to data from New York public schools in a study by Ruggiero and Vitaliano (1999).

[16] We note again that schools produce outputs other than those measured and included in our model. These missing outputs may lead some districts (charters as well as traditional public districts) to have higher estimated inefficiency than would be the case if all outputs were measurable and included.

- At-risk charters generally have a lower median and a lower average inefficiency measure than traditional public schools, and this difference is greater when compared to small traditional public schools.

- Among non-at-risk charters, there are several large outliers that are start-ups with high inefficiency measures. This causes non-at-risk charters to have a higher average inefficiency than even small public schools, although the median inefficiency level of non-at-risk charters is smaller than all traditional public schools.

- Large charters and small public school districts have basically the same measure of median and average inefficiency.

Table 14: Estimated Inefficiency

Category	Median Inefficiency	Average Inefficiency	Number of Observations
All Traditional Public Schools	.105	.138	1,038
All Charter Schools	.080	.193	83
New Charters	.079	.253	46
Old Charters	.088	.118	37
Small Public (<800 students)	.116	.168	483
At-Risk Charters	.070	.121	36
Non-at-Risk Charters	.084	.224	36
Small Charters (<100 students)	.073	.181	31
Medium Charters (100 - 250 students)	.080	.226	29
Large Charters (>250 students)	.119	.168	.23

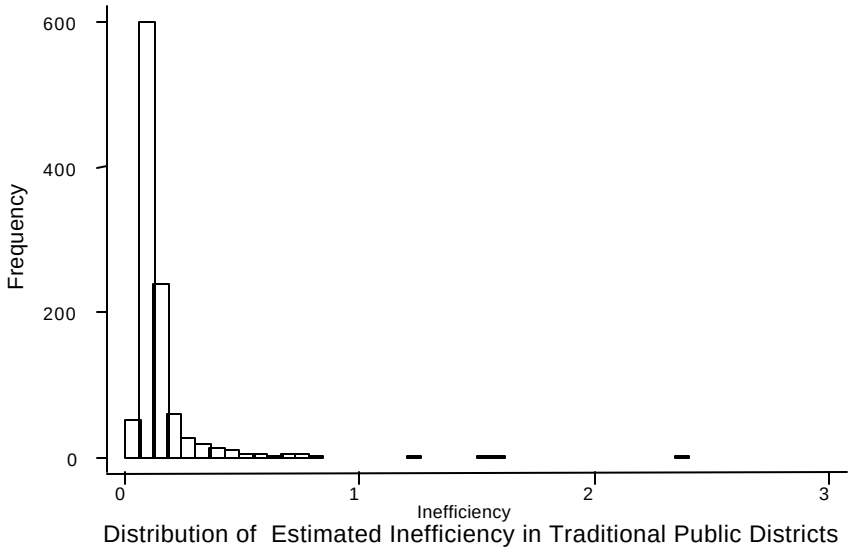
Note: charter min=.016, public min=.021

Finally, Figures 15 and 16 graph some of the efficiency measurements for charter schools and traditional public school districts. Figure 15 presents the distribution of inefficiency scores for public districts in the top panel and charter schools in the bottom panel. The horizontal scales are the same, allowing easier interpretation. Several aspects of these distributions are readily apparent. First, there is a large mass of charter schools in the lowest inefficiency range, and this, in fact, is the mode of the distribution for charter school inefficiency measurements. For traditional public schools, the mode of the distribution of inefficiency measures is the second lowest level graphed.

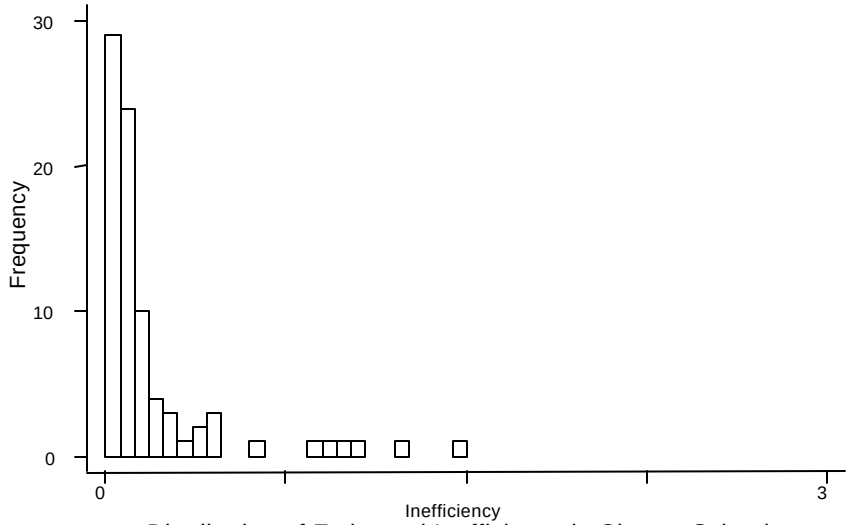
Thus, there is a much larger percent of charter schools in the most efficient (least inefficient) category relative to public districts. Second, charter schools have a longer right tail to their distribution. There are a couple of charter schools with very high inefficiency measures. These six schools are charters in their first year of operation, and these outliers lead to a highly skewed distribution of charter inefficiency measures.

Figure 16 graphs inefficiency versus scale for charter schools and for small traditional public school districts (800 or fewer enrollments). Here the inefficiency measures for traditional public schools are concentrated at low levels, but with quite a few values above .5 and less than one, and three schools with values above one. Charter schools have inefficiency measures that are concentrated at even lower levels, but with a set of schools with values above .5 and less than one, and six schools with values right at or above one. These graphs provide another look at the data and indicate again that charters have a handful of newly opened schools with very large inefficiency measures, along with a vast majority with quite low inefficiency measures.

Figure 15: Distribution of Inefficiency

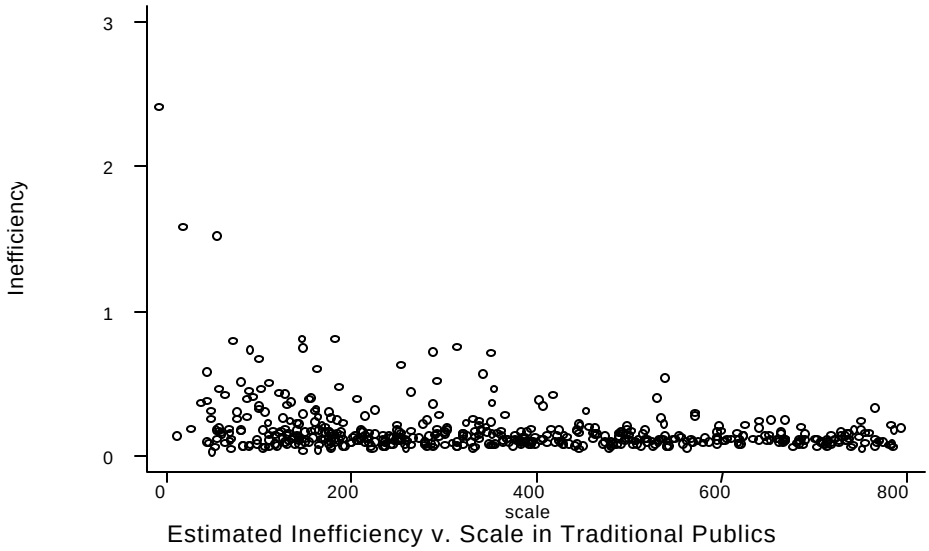


Distribution of Estimated Inefficiency in Traditional Public Districts

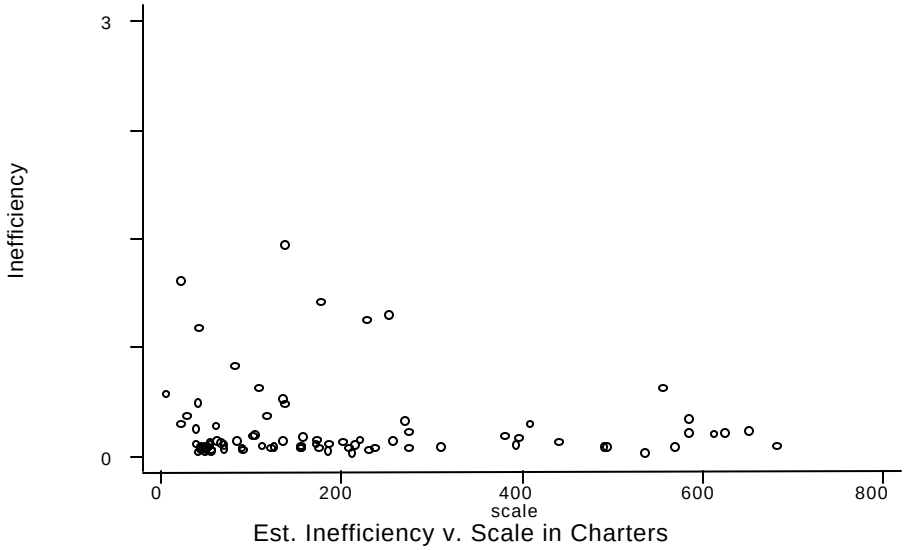


Distribution of Estimated Inefficiency in Charter Schools

Figure 16: Inefficiency versus Scale



Estimated Inefficiency v. Scale in Traditional Publics



Est. Inefficiency v. Scale in Charters

CONCLUSION

We want to repeat our earlier caution that charter schools are a new educational institution, one that is experiencing rapid growth and is still adapting and evolving. The existence of charter schools will impact not just charters and their students, but also traditional public schools and their students, as well as private schools and their students. This study is an early look at charter schools at a point in time when the data are still rather sparse. For these reasons our results and conclusions are necessarily tentative.

Overall, it is clear that the charter school experiment that Texas began in 1997 has created a new market, one that is expanding rapidly and playing an important role in education in Texas. This charter school market is experiencing the usual and expected growing pains that accompany any new institution. At this early assessment, we see both positive and negative elements of the charter story.

Some claim that charter students do not perform as well as non-charter students on TAAS tests. This is correct, as far as it goes. While not universally true of all charter schools, it is true that the average charter school student in Texas achieves a lower TAAS test score than the average traditional public school student.

But this is not the whole story. First, Texas charter schools serve a disproportionately large percentage of at-risk, economically disadvantaged, and minority students – all groups that achieve poorer TAAS test performance on average. Indeed, many charters are set up especially to deal with at-risk student populations. Working with these populations, charters can point to many successes.

First, charters seem to do especially well among at-risk students. While students moving to a charter often exhibit a first-year drop in TAAS scores, and while this might be compounded when students move to a newly-opened charter, the record also shows that continuing students in charters tend to perform at roughly the rate of traditional public school students. In fact, tracking cohorts through time usually indicates that, roughly speaking, charter students track traditional public school student test scores fairly closely, and that in some cases charter school students are outperforming traditional public school students when we control for at-risk status or other student characteristics.

The key feature here is that charter schools are new schools, and the market is growing so quickly that many students attending charters are either in their first year in a charter or are in a charter that has just opened for business. In this situation there has been some under performance of charter students relative to traditional public school students. But this new school and mover effect is, by definition, a temporary phenomenon. Nevertheless, in these early

years of existence, this phenomenon makes it difficult to extract the effect of charters themselves from the temporary start-up and mover effects in the data.

Our best estimate from individual student fixed effects regressions is that charter schools serving primarily at-risk students may have a positive net effect, and that charter schools serving primarily non-at-risk students may have a negative net effect. We could speculate that at-risk students move to charters seeking help for their academic performance and are on average helped by some aspect of charter instruction, whereas non-at-risk students move to charters because of dissatisfaction with some other aspect of their traditional public school experience that is less related to academics. Hence, at-risk students find more help with their academics at charter schools than do non-at-risk students. But this is speculation at this point – it is much too early to tease such an inference out of the existing data.

In addition, our concentration on TAAS scores as a measure of achievement is motivated by the fact that they are an important indicator in the eyes of the Legislature and required by the paucity of data on other measures of achievement. Indicators of success not captured by this analysis include student safety, classroom discipline and parental satisfaction, as well as graduation rates and preparation for college.

Another aspect of charter schools is their relative efficiency. Total per pupil resource expenditures at charters tend, with a few exceptions, to be lower than what traditional public schools would spend under the same circumstances to achieve the same level of academic performance. Thus, charter schools appear to be efficient at combining resources to provide educational services. That is, charters appear to be cost efficient. They achieve a given level of student performance at lower total cost than traditional public school districts.

Future research on this issue might be directed in a number of different directions. First, like many studies of production and cost functions for primary and secondary education, this study has been constrained by the available data on measures of educational outcomes. Better measures of these outcomes (e.g., additional testing data, including national tests, data on post-school performance in the job market or in college, data on non-test score outputs) would be useful in drawing firmer conclusions about the performance of schools. Second, additional data on teacher characteristics (e.g., certification, types of experience) would aid in interpreting school performance. Third, more in-depth comparisons of best practice techniques in charter and traditional public schools could aid in transferring knowledge of successful innovations in these schools to the broader education industry. Finally, just having more years in which to observe charter school functions and the interaction with and response of traditional public schools would be useful from a research perspective, in terms of expanding the sample and in terms of observing a more mature and developed charter school sector.

Overall, we think this ongoing experiment is worth continuing. Charters allow innovative approaches, they are cost-efficient as a group, and they often achieve student performance results for at-risk students that rival those of traditional public schools. Judging on all these grounds, charter schools seem to be a promising experiment in school choice – an experiment that will likely lead to new insights in delivery of educational services. The charter industry will likely continue to challenge traditional public school districts to be more effective, more efficient, and more innovative in their own delivery of educational services.

REFERENCES

Alexander, Celeste D., Timothy J. Gronberg, Dennis W. Jansen, Harrison Keller, Lori L. Taylor, and Philip Uri Treisman, *A Study of Uncontrollable Variations in the Costs of Texas Public Education: A Summary Report Prepared for the 77th Texas Legislature.* The Charles A. Dana Center, University of Texas at Austin, November 2000.

Baltagi, Badi H. 1995. *Econometric Analysis of Panel Data.* Chichester: John Wiley & Sons.

Duncombe, William, John Ruggiero, and John Yinger. 1996. "Alternative Approaches to Measuring the Cost of Education," in *Holding Schools Accountable: Performance-Based Reform in Education*, Helen F. Ladd, editor. Washington, D.C.: The Brookings Institution.

Hanushek, Eric A., Steven Rivkin, and Lori L. Taylor. 1996 "Aggregation and the Estimated Effects of School Resources." *The Review of Economics and Statistics*: 611-627.

Kain, John F. and Daniel M. O'Brien. 1998. "A longitudinal assessment of reading achievement: Evidence from the Harvard/UTD Texas Schools Project." UTD Texas Schools Project, University of Texas at Dallas.

Ruggiero, John and Donald F. Vitaliano. 1999. "Assessing the Efficiency of Public Schools Using Data Envelopment Analysis and Frontier Regression," *Contemporary Economic Policy*: 321-331.

Salmon, Lewis, Kern Paark and David Garcia. 2001. *Does Charter School Attendance Improve Test Scores? The Arizona Results.* Phoenix: The Goldwater Institute.

Texas Education Agency. 1997. "A Study of Student Mobility in Texas Public School."

Texas Open-Enrollment Charter Schools: Third Year Evaluation.
Part I (March 2000): http://www.tea.state.tx.us/charter/eval99/index.html.
Part II (June 2000): http://www.tasb.org/tcer/charter/index.html.

AUTHORS' ACKNOWLEDGMENTS

We thank Kevin Booker and Scott Gilpatric, doctoral students at Texas A&M University, for excellent research assistance. We acknowledge many discussions with Lori Taylor regarding estimating cost functions for public schools. Finally, we thank the Dana Center at the University of Texas - Austin for permission to use the data from *A Study of Uncontrollable Variations in the Costs of Texas Public Education*.

The research and opinions presented here are those of the authors, and do not necessarily represent the views of Texas A&M University.

GLOSSARY

Cost Frontier: the cost frontier model estimates how close traditional public school districts and charters get to an estimated cost frontier. This frontier represents the minimum cost per pupil of achieving a given level of student performance, taking into account differences in enrollment, teacher salaries, and other characteristics of the school or district.

District Indicator Variables: a district indicator variable is a variable that takes on a value of 1 if the student is in a particular district, and 0 otherwise. All systematic variation in the performance of each district's students which cannot be explained by student characteristics is then captured by that district's indicator.

District Fixed Effect: the estimated effect of the school district the student attends on that student's performance.

Regression: a statistical procedure for quantifying economic relationships and testing hypotheses about them.

Standard Errors: a measure of the dispersion of the estimates. When the standard error is small relative to the parameter estimate, then one can be more confident that the estimate is accurate.

Student Fixed Effect Model: a statistical model that controls for unobservable variation in student ability and home environment by including an indicator variable for each student.

Texas Learning Index (TLI): a statistic derived from raw TAAS scores that allows for comparison across years and grades. A TLI score of 70 or above is considered passing.

Value-added: value-added performance measures attempt to measure improvements in student performance relative to the previous year. Since students begin each year with very different initial levels of achievement, the effect of a school is best measured by controlling for this initial achievement level and evaluating how far the student has progressed.

ABOUT THE AUTHORS

DR. TIMOTHY J. GRONBERG

Dr. Gronberg is a Professor of Economics at Texas A&M University, where he teaches and specializes in research in microeconomic theory and public finance. He is a faculty member of the university's George Bush School of Government and Public Service and a Research Fellow of the Private Enterprise Research Center. Dr. Gronberg has been affiliated with Texas A&M since 1997 and has previously served as Director of Graduate Programs and as Chairman of the Department of Economics. He has published articles in several leading economics journals, including the *American Economic Review, Quarterly Journal of Economics,* and *Review of Economics and Statistics.* Dr. Gronberg is an experienced public policy research consultant and most recently served on the research team, which evaluated the Cost of Education Index at the request of the Texas Legislature. Previous studies in which Professor Gronberg has been involved include analyses of tax reform in Texas, tort reform, and highway infrastructure spending. Dr. Gronberg earned his Ph.D. in Economics from Northwestern University in 1978.

Dr. Dennis W. Jansen

Dr. Jansen is Professor and Head of the Department of Economics at Texas A&M University. He received his Ph.D. in Economics in 1983 from the University of North Carolina at Chapel Hill, and has served on the faculty of Texas A&M University as Assistant Professor (1983-89), Associate Professor (1989-94), and Professor (1994-). He has been Department Head since 1996. Dr. Jansen has held research and/or teaching positions at the Federal Reserve Bank of St. Louis, Indiana University-Bloomington, North Carolina State University, Erasmus University-Rotterdam, Catholic University Leuven, and Maastricht University. He has been a Private Enterprise Research Center Research Fellow since 1992. Professor Jansen has published more than 40 research papers in economics journals, two textbooks and numerous other writings. Most recently, Professor Jansen worked on an educational cost study commissioned by the Texas Legislature.

Join the
Texas Public Policy Foundation!

Become a member of the Texas Public Policy Foundation by making an annual contribution of $50 or more. Members receive studies, executive summaries, newsletters, policy updates and commentaries. In addition, they are invited to special events hosted by the Texas Public Policy Foundation.

Fill out the form below or sign up online at: www.tppf.org

Name:_____

Company:_____

Address:_____

City:_____ State:_____ Zip:_____

E-mail Address:_____Fax:_____

Phone: ( )_____ **9** Office **9** Home

I want to help the **Texas Public Policy Foundation** uphold the principles of limited government, free and competitive markets, private property rights and individual responsibility.

Enclosed is my tax-deductible gift of:

‘ $2,500 ‘ $1,000 ‘ $500 ‘ $100 ‘ $50*

Please bill my: ‘ MC ‘ Visa ‘ Amex

Card#_____

Name on Card:_____Exp. Date:_____

Signature:_____ (required for billing)

* Introductory (1st year) or Student

The Texas Public Policy Foundation is a non-profit, non-partisan research institute that accepts no government funds, relying solely on voluntary support from individuals, foundations, and businesses. Contributions are tax-deductible under Section 501 (c) (3) of the Internal Revenue Code.