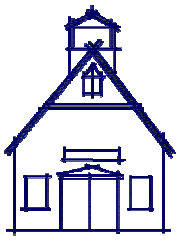

Wisconsin Charter Schools Study

www.lafollette.wisc.edu/wcss

The Robert La Follette School of Public Affairs
University of Wisconsin–Madison
1225 Observatory Drive
Madison, WI 53706
608-262-3581

The Performance of Charter Schools in Wisconsin

John F. Witte
David L.Weimer
Paul A. Schlomer
Arnold F. Shober

Department of Political Science
Robert La Follette School of Public Affairs
University of Wisconsin- Madison

August, 2004

Abstract

In this paper we present data on the performance of charter schools in Wisconsin. We focus on several comparisons between charter schools and traditional public schools, limiting our analysis to standardized test in the 4th and 8th grades for 2000-01 and 2001-02. The 2002-03 and later data are not comparable because the date of the test was changed, the test contents were altered, and the scoring "cut points" were also considerably changed. We reserve judgment until later on charter high schools because almost all are at-risk schools for which test score data alone will provide a distorted picture of performance. The results for 4th and 8th grades are generally favorable for charter schools and the findings hold up over various tests, comparison schools, and weighted or un-weighted data. For the second year of data, almost all the effects occur in charter schools in existence over one year. In 2000-01 there were too few new schools to make that comparison.

The Performance of Charter Schools in Wisconsin

I Introduction

Political scientists have lately taken a strong interest in school choice policies. (See for example, Witte and Clune, 1988; Chubb and Moe 1990; Henig 1994; Smith and Meier 1995; Peterson, Howell, and Greene 1997; Hess 2000; Schneider, Teske, and Marshall 2000; Witte 2000; Smith 2003; Vergari, 2002; Miron and Nelson, 2002; Hall, Lake, and Celio, 2002). Much of this interest focuses on how the creation of a competitive education marketplace can improve not only the achievement of the students who attend the choice schools, but can also improve the overall system of traditional, public schools. The most controversial and often the most studied choice programs are voucher programs, through which parents receive public money to send their children to private schools. Despite these programs' small numbers, many studies have attempted to gauge their impact, often coming to differing conclusions (Greene 2001; Metcalf, 1998; Metcalf 1999; Peterson, Howell and Greene, 1999; Peterson, Howell and Campbell 2002?; Rouse, 1998a; Rouse, 1998b; Witte, 1995; 2000). Voucher programs generate so much research partly because they are very controversial in political and educational circles.

Choice based on charter schools is less politically controversial. Both the Republican National Party (RNC) and the Democratic National Party (DNC) call for increasing the number of charter schools across the country.[1] In addition, the nation's

[1] The Republicans included the following passage in their 2000 party platform: "Expand parental choice and encourage competition by providing parents with information on their child's school, increasing the number of charter schools, and expanding education savings accounts for use from kindergarten through college." (Republican National Committee website, http://www.rnc.org/GOPInfo/Platform/2000platform3.htm. The Democrats included the following in their platform: "Charter schools and other nontraditional public school options can free school leaders, teachers,

two largest teachers' unions now concede that charter schools are viable alternatives to traditional public schools. Charter schools are public schools that operate under a management contract. In exchange for exemption from many of the rules and regulations that govern traditional public schools, the charter school is held to the requirements of its contract by the authorizing agency with whom it has contracted. According to the Center for Education Reform, as of September 2003, nearly 3,000 charter schools operated across 40 states and the District of Columbia. Thus, charter schools have progressed from being rare experiments to now capturing a substantial share of the education market. Yet despite now having become established public policy, charter schools are no less studied than their voucher cousins. Everything from student performance to charter schools' fiscal impact on public school districts has been analyzed. As stated by Mintrom and Plank, the public's lack of information about school choice, and charter schools in particular, is remedied "as more and more school choice initiatives have been implemented, claims for and against its merits can now be scrutinized against appropriate evidence (Mintrom and Plank, 2000 p. 4)."

We present data on the performance of charter schools in Wisconsin. We focus on several comparisons between charter schools and traditional public schools, limiting our analysis to standardized test in the 4th and 8th grades for two academic years, 2000-01 and 2001-02. The 2002-03 and later data are not comparable because the date of the test was changed, the contents of the test altered, and the scoring "cut points" were also considerably changed. We reserve judgment on charter high schools because almost all are at-risk schools for which test score data alone will provide a distorted picture of

---

parents, The Democratic Party will triple the number of charter schools in the nation." (Democratic National Committee website, http://www.democrats.org/).

performance. This research is part of a larger U.S. Department of Education sponsored grant to understand how the range, type, motivation behind, and performance of charter schools in Wisconsin varies by the degree of choice offered in the school district.

We first provide background on charter schools in Wisconsin, noting their expansion and an analysis of the students who attend charter schools in different parts of the state. We next discuss the challenges to, cautions with, and strategies for analyzing standardized test data for charter and non-charter schools. We then present the results in several formats, with an appendix reporting on a breakdown of the charter effects into first-year and older charter schools.

II Charter Schools in Wisconsin

Expansion of Charter Schools

Wisconsin has been a leader in a wide range of choice initiatives, including the nation's first voucher program. Discussions of school vouchers have captured the attention of the media and policy makers, yet there is little understanding of how individual charter schools operate and perform.[2] Much of this stems from the fact that Wisconsin's acceptance of charter schools as policy was slow to develop. The original law in 1993 was quite restrictive, with a maximum number of charter schools set at 20. The very few, scattered, charter schools in the state did not capture researchers' interest as well as did the state's unique voucher program.

[2] In the past two years, choice, specifically Milwaukee's voucher program, has been the subject of in-depth stories by Frontline and CNN and of an hour-long NBC special narrated by Tom Brokaw. The national print media has extensively covered the Milwaukee voucher program with stories appearing in the *New York Times*, *Washington Post*, *Los Angeles Times*, *Wall Street Journal*, *Time*, *Newsweek*, and *Education Week*. Milwaukee has even captured international attention with several stories appearing in *The Economist* magazine and the *London Times*.

The initial law allowed 10 school districts to establish two charter schools each. Three charter schools were created under this original law. Revisions to the law occurred in 1995, 1997, 1999, and 2001. Each revision of the charter school law increased the opportunities for granting charters. Under the 1995 law, all school districts were allowed to grant charters with no restrictions on the number of charters. In 1997, the law was changed to provide authority to grant charters in Milwaukee to the City of Milwaukee, the University of Wisconsin-Milwaukee (UWM), and the Milwaukee Area Technical College (MATC), in addition to Milwaukee Public Schools (MPS), which had only granted one charter at that point. In 2001, The University of Wisconsin at Parkside (Racine, Wisconsin) was granted the right to establish a charter school on a pilot basis.

Also in 1997 an important distinction in charter school-type was added to the law. The legislature created what are termed "instrumentality" and "non-instrumentality" charter schools. Instrumentality schools are "instruments of a school district," non-instrumentalities are not. The chief distinction between the two is that the staff of instrumentality schools must be district employees, and hence in the union and covered by union rights and benefits. The staff in non-instrumentality schools *may not be* employees of a district and hence are unlikely to be in a union unless they form one for the school. Non-instrumentality schools tend to be mostly chartered by the City of Milwaukee, colleges, or by regional educational units that may charter schools serving more than one district. There are several non-instrumentality schools chartered by MPS, and others are chartered by regional educational service organizations. In 2002-03, 23% of Wisconsin charters were non-instrumentality schools.

Table 1 highlights the growth in both charter schools and enrollment over the past decade.[3] The number of schools has increased from 1 in 1994 to 130 in 2002-03. Enrollment has increased from an estimated 343 students in 1995-96 (the first year of reliable data) to 19,037 in 2002-03. Of this total, 60 percent are charter school students in Milwaukee. Of the new schools, the majority (92) were new startup schools and 46 were conversion schools. There were also 10 closings, 9 of which were in startup charter schools. Of the 426 public school districts in the state, 67 have charter schools. There are also a small number of charter schools chartered by regional education service organizations. Most districts have granted one charter, with 19 districts granting two or more charters. Approximately 2 percent of all public school students in the state attend charter schools in Wisconsin.

(Table 1 Goes About Here.)

Who Attends Charter Schools?

In order to prevent charter schools from selecting their student bodies, and perhaps state statutes require that charter schools' racial and ethnic compositions mirror that of the district wherein the charter school is located. Table 2 displays the 2000-01 and 2001-02 racial breakdown of Wisconsin charter schools compared to the state's other public schools. In total, the percent of non-white enrollment in charter schools was 54 and 56 percent compared to 19 and 20 percent for all public schools for those respective years.[4] However, that figure masks several important distinctions when you breakdown

[3] Estimates had to be made for enrollment and schools for the following school years: 1993-94, 1994-95, 1995-96, 1996-97, 1998-99 and 1999-00. These estimates were obtained from newspaper accounts in the *Madison Capital Times*, the *Madison State Journal* and the *Milwaukee Journal-Sentinel* of the opening of schools and the enrollment of these schools.

[4] This is an increase over the 27% non-white students in charter schools in 1997-98 reported by RPI International (2000, pp. 32-33).

the figures into types of districts. Because Milwaukee is the only large, urban school district in the state, and thus has the greatest percentage of non-white enrollment, we also compare Milwaukee charters to Milwaukee non-charters and the same for charters outside of Milwaukee. By concentrating on the "White" column, in the first year Milwaukee charters have only 14 percent white compared to 19 percent for non-charters, however this is revesed for 2001-02 to 22 percent and 18 percent. On the other hand in non-Milwaukee school districts, charters have about 30 percent more minority students than other schools in these districts.

(Table 2 Goes About Here.)

There are also quite different trends when comparing low-income levels among charter and non-charter schools in Milwaukee and in non-Milwaukee charters. Using the percent of students who qualify for free or reduced-price lunch as our gauge, Milwaukee charter schools have 24 to 26 percent fewer free-lunch qualified students than non-charters. But, non-Milwaukee charters have only 2 or 3 percent fewer free-lunch qualified students than other non-Milwaukee charter district schools. One reason for this anomaly may be that many more non-Milwaukee charters are at the high school level, and high school students consistently fail to sign up for, and thus are not counted as qualifying for free lunch.

These patterns can be interpreted in several ways. One interpretion, putting a positive spin on charters, is that they create more diverse schools by adding non-poor students in Milwaukee and by serving a greater proportion of non-white and poor students in the non-Milwaukee charter schools. The negative spin would be that in Milwaukee charters could be interpreted as cherry picking non-poor students, while in

non-Milwaukee districts they could be accused of concentrating non-white students who may be having academic problems. We prefer the positive interpretation because our case studies clearly highlight the concern for and need to better address at-risk student problems outside of Milwaukee. In addition, many of the charter schools in Milwaukee were attempting to provide challenging academic environments that would explicitly attract students who might have left the system without that focus.

III Charter School Performance

General Issues

Background. When charter school legislation was first debated and passed in Wisconsin, it was fraught with controversy. The Wisconsin School Boards Association raised concerns regarding the program, and teachers' unions brought suit against the first charter schools (*Milwaukee Journal Sentinel*, July 20, 1999, p. 1). Today, The Wisconsin School Boards Association supports charter schools as long as the school district grants the charter. The union also supports charter schools as long as the schools are instrumentalities of the district. Despite what appears to be a growing acceptance of charter schools both statewide and nationally, William Bennett, Secretary of Education under President George H. W. Bush, recently stated during a national conference on charter schools, "There is a war against charter schools in America today…" and it is being fought by what he called "the blob" --- the groups and forces backing the conventional education system (*Milwaukee Journal Sentinel*, June 2, 2002, p. 1). He went on to urge advocates of charter schools to work harder to tell their story to parents, politicians, and the public in general, saying the battle for public opinion was critical to the movement.

This "war" rhetoric may be a little out of place in describing today's political climate in Wisconsin. However, what does appear to be of interest to policymakers is whether charter schools are meeting their original goals. The philosophy behind charter schools is that if a school did not meet the obligations of its charter, the contract would be revoked and the school closed. According to this principle, mediocrity and poor quality in schooling would not be tolerated. For many, the main purpose of charter schools is to improve educational performance, although other goals are certainly supported by charter school advocates.

The debate over whether increases in performance are occurring is intense and literally all over the map in terms of conclusions. A recent exchange highlights this tension. Bruce Fuller and co-authors (2003) find that charter schools hire ill-prepared teachers who can contribute to a widening of the achievement gap. Jeanne Allen of the Center for Education Reform lambasted this California charter school report. According to Allen, charter schools are succeeding by every measure of achievement, attendance, and diversity (see http://edreform.com/press/2003/pace.htm). Similarly, a recent study that purports to be the first national study of charter school performance by the very pro-choice Manhattan Institute found positive achievement test gains for charter schools (Greene, *et al,* 2003). We wonder about those conclusions in that a large number of charter schools, including "targeted" charter schools (e.g. at-risk schools) and conversion charter schools are excluded from the study.[5] An earlier national study released by the Brookings Institution found the opposite (Loveless, 2003). There were also significant

[5] This led the researchers to exclude Wisconsin from the study because all but 13 percent of the charter schools were eliminated. As we shall show, this need not be the case. Thus we have little confidence in this study, although our results for Wisconsin, while very cautious, are in the same direction as this study.

methodological limitations of that study in that it included at-risk schools, but did not statistically control for them. A comprehensive review of available evidence on charter schools conducted by RAND concludes that charter school achievement results are mixed (Gill, Timpane, Ross, and Brewer, 2001), as does a new book-length RAND study of California charter schools. In contrast another very recent study by Hoover Institution finds positive effects for charter schools (Raymond, 2003).

Because charter schools are public schools, charter schools must meet state requirements. This means that unlike publicly funded private schools in voucher programs, there is available public data on charter school performance. In Wisconsin, the Department of Public Instruction (DPI) must license charter school teachers. Charter schools must also participate in the Wisconsin State Assessment System that includes the Wisconsin Knowledge, Concepts and Evaluations (WKCE) exams, which up until 2002-03 have been Terra Nova achievement tests in five subjects in grades 4, 8 and 10. In addition, charter schools must participate in the annual school performance report produced by DPI.[6]

Evaluation Challenges. Analyzing performance of charter schools presents numerous challenges. First, as with all studies of performance, at the elementary level, very few quantitative measures exist other than standardized test scores, or some other test-metric. Attendance varies little in any setting. Small children go to school and if they do not it usually relates to illness. Behavioral measures also vary little and unpredictably based on school-level philosophies. And increasingly students are not graded until the higher elementary grades. Thus, we have to rely on state administered

[6] Data for both charter schools and non-charter schools come from the Wisconsin Department of Public Instruction.

tests as indicators of student performance. Other measures, such as parental involvement and satisfaction have not been available in this study. A large teacher survey, which will allow comparisons between charter and non-charter teacher attitudes and assessments, will be available at a later date and included in final reports on this project.

At the middle-school level, measures other than test scores begin to be useful, although they are also very limited. Students increasingly are given "at-risk" placements in specialty schools. We control for those schools in our estimates of achievement. However, we judge that behavioral data (suspension rates), attendance, and other measures of dysfunctional school action are still very sporadic and come under the purview of the principal. Thus, at the middle school level, we believe a control on the type of school (as at-risk or not) will measure some level of disadvantage, but we question other measures of performance beyond test results.

In ordinary circumstances, evaluations of high school performance is often much broader than at lower grades. Administrative behavioral data are subject to more uniform district policies (which still vary between districts); are recorded in a more diligent and reliable manner; and are placed in student records. Graduation data are also quite precise, although "dropout" data may not be. And what it means to "graduate" may be defined differently from district to district and even within a district. The administration of the GED degree is equally subject to variance, if not in policy, in implementation. Follow-up data (such as employment, post-secondary enrollment, assistance, or legal adjudication) vary dramatically and are often suspect because districts simply lose track of students and have little incentive to follow-up.

The problem for high-school level charter schools is even more pronounced because the vast majority are at-risk schools. They may deal with students who are simply having difficulty in traditional high school settings, or they may, and often do, enroll students who are adjudicated delinquents, students in drug rehabilitation programs, or students released from jail to attend school under Huber laws. Almost by definition, at-risk students are much more likely to be truants and have other behavioral problems, which sometimes are quite extreme.[7]

There are two major problems in evaluating these schools. Standardized tests, the common stock of evaluations, are highly suspect for this set of students. Will they on do less well than the average student? Of course, but this is often one of the official definitions of "at risk." Some researchers might argue that "value-added" assessments would solve these problems. Value-added is for some the holy grail of evaluation, justifiably in that it tries to judge the impact of the school in assessing the value the school adds to student achievement regardless of where the students start. The problem for seriously at-risk, alternative schools --- be they charters or non-charters --- is that they very judiciously devote more of their time with the student (time which we suspect on average is considerably less than with traditional students) to non-academic, non-classroom exercises and training. These include: inter-personal coping skills; job-related skills; personal discipline; drug and violence counseling; and considerable emphasis on the abused, but relevant words "self esteem" and "self-confidence." As time spent on

[7] Several charter schools we have studied through cases studies are "last chance" schools for students who have exhausted all other options and face expulsion or administrative discharge if they do not enroll in the school.

activities reduces time available for academic subjects and academic course taking we expect decreased academic performance.

Unfortunately, what this means for evaluating at-risk, higher grade schools is that even value-added measures using standardized test scores are problematic. The growth curves must be assumed to be different due to time differences on academic subjects. But how much? We simply do not know. This does not mean that we do not attempt to determine how well these schools are operating. Indeed, these schools may be the most subject to exploitation by authorizers and others because the clientele are unlikely to complain or publicize problems.

Our project is attempting to work on this issue in three ways. First, we are acquiring non-test measures from both at-risk charters and a comparable at-risk, non-charter population. Second, we are attempting to compare test data between charter and non-charter comparable at-risk schools. Third, we hope to be able to suggest a reasonable protocol, data collection, and analysis for at-risk secondary schools. The schools are not inexpensive, often involve private or non-profit contractors, and should be assessed and be accountable to the citizens and taxpayers of a city. This paper does not include that analysis.

Achievement Test for 4th and 8thGradeCharter and Non-Charter Schools

Cautions. The results presented below are for two years of Wisconsin state test data based on the Terra Nova tests in five subjects in two grades.[8] Ninety percent of the

[8] As noted earlier, the WKCEs were administered in November, 2002 rather than in February of 2003 as they would have been in prior years. This by itself makes comparisons to prior years very suspect. Also, the 2002-03 test data are very different due to changes instituted by the Department of Public Instruction. The tests have reduced the nationally-normed Terra Nova items to make room for more in-state items that attempt to measure conformance with state standards. It is unclear if any reliable nationally normed measures (Terra Nova Standard Scores, NPRs, NCEs) can be used after 2001-02. Finally, new cut scores considerably increased the percentages of students in the "proficient" and "advanced" levels. Given all

high school charter schools in Wisconsin are at-risk schools and are not included in the analysis. In addition, we do not have available for this analysis any student-level data, or a value-added analysis. The problem of aggregation of data at school levels obscures variation within schools, which is always considerably more than variance between schools.

Usually, analyses rely on simple measures of central tendency for schools (means or medians). We present such results for mean national percentile ratings. But we focus our analysis on how schools are currently judged by state and national laws that require reporting on school performance based on the levels of their students' "proficiency" relative to stated "standards."

There are several advantages in analyzing performance based on levels of proficiency. First, American educators world seem to be enamored with judging schools, not necessarily students --- the No Child Left Behind law, the standards movement, and most charter laws are clear examples. Yet we need to get better at making those judgments. Second, privacy laws make it increasingly difficult to get student-level data for evaluations unless political authorities (states, school boards) agree to release such data --- even if sanitized of student identity. Third, the standards movement has had an impact on data and testing. The assumption is that students and schools must meet certifiable levels of performance against clearly stated educational standards for grades and subjects. These performance standards do not necessarily have to adhere to population "norms" based simply on the distribution of test scores across comparable

---

these concerns, we do not present data for 2002-03. It may be possible for researchers in subsequent years to begin analysis with the 2002-03 data and go forward in time in those comparisons, but our study will be unable to do that.

populations (which puts kids up against other kids). Rather performance standards are the goal and the club to assure that students are educated to an appropriate level.

In practical terms, in Wisconsin, this has led the state to change the testing protocol to adhere to federal law that stipulates that schools must be judged against state standards. What this means for our analysis is that we have developed a technique to estimate a school-level measure based on performance criteria. Because these types of performance levels are national in scope, we hope our methods may extend beyond evaluation of charter schools. One advantage of this strategy is that it allows researchers to rely not only on measures of central tendency, but also on the variances in different levels of performance. We exemplify, and rely on such fine-grained analysis to explain what we believe are the appropriate interpretations of the results reported below.

Estimation Strategy: Multichotomous Group Logit Regressions of School Performance. The Wisconsin Department of Instruction reports the school-proportions of students in grades 4, 8 and 10 in 5 subject areas who achieve four levels of performance: minimal, basic, proficient, and advanced. The basic estimation problem is to determine school performance after adjusting for the effects of various school characteristics on the probability that a student will be in each of these four categories. As probabilities must sum to one, the problem reduces to determining the factors that affect the probability of being in any three of the levels relative to a category that serves as a reference category.

Henri Theil (1970) derived the variance-covariance structure for multichotomous logit models for grouped data. The dependent variables in these models take the form of "logits," $\ln(f_{ij} / f_{iR})$ where f_{ij} is the frequency of the j^{th} group in the i^{th} unit and f_{iR} is the

frequency of the reference group, R, in the i^{th} unit. In such models, there are non-zero covariances among the dependent variables within the unit, but they differ across units. The non-zero covariances arise because an unexplained factor that increases the probability of being in one category necessarily reduces the probability of being in another. It is possible to take account of these non-zero covariances by appropriate weighting and stacking of the logit equations (Mikhailov et al., 2002). Jackson (2002) demonstrates how any remaining covariance can be taken into account by applying seemingly unrelated regressions (SUR) to appropriately weighted data. Tomz et al. (2002) use Monte Carlo methods to show that even direct application of SUR to estimate such models yields results similar to those with more sophisticated methods.

These methods were developed in the context of multiparty elections where districts were generally of comparable size. Schools, however, can differ greatly in size, making it desirable to take account of the fact that the error for the observation unit depends on the number of "trials," students taking the test in our application, in the unit. Specifically, the variance is inversely proportional to the number of students so that the appropriate analytical weights are the square root of the number of students taking the examination.

In the case of school data, students take a battery of five tests. To the extent that there is some unmeasured characteristic of the school, such as a specialized pedagogical approach, charismatic principal, or difference in student body, one would expect the errors for the tests to be correlated. Consequently, the estimation strategy involves using seemingly unrelated regressions to estimate simultaneously the equations for the three levels of test outcomes (relative to the model category of proficiency) for each of the five

subject areas (reading, language, mathematics, social studies, and science). The improved precision offered by seemingly unrelated regressions is only fully gained when the equations have different independent variables. In the test score models, the percentage of students not taking the particular test plays this role.

Results

Comparison of Mean National Percentile Rankings. Mean national percentile rankings for Wisconsin charter schools and relevant comparison groups are presented in Table 3. Panel A presents the 2000-01 data, and panel B the 2001-02 data. The five rows consist of: charter-school means (with standard deviations in parens); means of non-charter relevantly-graded schools in districts *with* charter schools; means of non-charter relevantly-graded schools in districts *without* charter schools; and two measures of state means including all students and (second) all schools.

(Table 3 Goes About Here.)

The Wisconsin Department of Instruction reports the school-proportions of students in grades 4, 8 and 10 in 5 subject areas who achieve four levels of performance: minimal, basic, proficient, and advanced. We first report on average school-level national percentile rankings for both years. With the exception of the 8th graders in 2000-01, the results for both 4th grades and 8th graders in 2001-02are quite consistent across the five tests. As is true in our multivariate analysis, the 8th graders in 2000-01 are anomalous cohort. Their means range from 5.8 percentiles *below* traditional schools in language arts to slightly better than .2 percentiles in social science.

For both 4th grade cohorts and the 8th graders in 2001-02, charter schools do somewhat better than non-charter schools in districts that have charter schools. The

magnitudes vary from charter advantages of over 10 percentiles for 4th grade charters in 2000-01 to as small as .2 percentile for 2001-02 8th grade math. However, both charter and non-charter schools in charter districts do considerably worse (as much as 20 percentiles or more) than schools in districts that do not have charter schools. Thus charter schools are clearly not educating the best students in the state of Wisconsin.

Because there are no controls for race and income in these summary statistics, the considerable advantage of non-charter districts is undoubtedly a result of the student characteristics in charter schools reported above; i.e. there are many more poor, minority students in non-charter districts. An interesting question is if these non-charter districts do not have charter schools because their students appear to be doing quite well in traditional schools, or if other factors, including the proclivity in the Wisconsin law favoring at-risk charter schools, are affecting their disinterest.

Multichotomous Logit Group Analysis. As explained above, our estimation procedure is based on multichotomous logistic regressions. The basic idea is that, in comparison to a reference category, we can estimate the percent of students in a school at specific levels, controlling for a number of relevant explanatory variables. Thus, in the following analysis, we first compute the proportion of students in a school at the *minimal* level (lowest) compared to those at the *proficient* (third highest) level. *Proficient* was selected as the reference category because it is the modal category and thus provides the most stable basis for estimating logits. We do the same for *basic* (second) and *advanced* (highest).

We then estimate for the ith school the proportion in each of three categories as a function of school type (CH_i,) and a vector of *n* school-level independent variables (X_{ik}). The following equation defines the estimation:

For the ith school, the jth subject, and the kth performance level:

Equation (1): $$\ln\left(\frac{P_{ijk}}{P_{ik}^{\,p}}\right) = \alpha_{jk} + \beta_{jk} CH_i + X_{ik}\lambda_{jk} + \varepsilon_{ijk}$$

Where:
P_{ijk} *is the proportion in school i with performance level j on subject k;*
$P_{ik}^{\,p}$ *is the proportion in school i with performance level of "Proficient" on subject k;*
CH_i *(1|0) takes the value "1" for charter schools and "0" for non-charters;*
X_{ik} *are characteristics of the school which, in the case of the proportion taking the test, also depends on the subject;*
α_{jk}, β_{jk}, *and* λ_{jk} *are estimated parameters;*
and ε_{ijk} *is error due to excluded variables and sampling.*

Of primary interest are the coefficients (β) on the choice indicator variable. Because we are estimating proportions, a school would do better if it had low *minimal* or *basic* proportions (relative to proficient). This means that negative β coefficients on those categories, and a positive coefficient if it had a high proportion of *advanced* students would be favorable for charter schools. **Thus results favorable to charter schools will have negative signs for minimal and basic and positive signs for advanced.**

We analyzed the data in a number of ways. We estimated results for both un-weighted and weighted data. Un-weighted data consider each school equally, weighted

data took into account the number of students tested in the school.[9] Because of the wide range of school sizes, we present the weighted measures as the most reliable.[10] We also compare charter schools to grade-comparable non-charter schools in all districts, and to non-charter schools only in charter-school districts. This is parallel to the comparisons in Table 3, but these regressions include controls on school characteristics as indicated in our first illustrative table.

To illustrate the logit analysis in its entirety, we provide a sample of full results, including all independent variables, in Table 4. The table only estimates the 4th grade reading scores for schools in each of 2000-01 (Panel A) and 2001-02 (Panel B). The comparison group is grade-equivalent schools in *all districts* in the state. Each column represents the estimated parameters according to equation1. The key variable of interest is the Charter variable. Its coefficient (β) is shown in the first row, but the effects of other variables are important to confirm the accuracy of the model.

(Table 4 Goes About Here.)

To bring the analysis as up-to-date as possible, we provide an interpretation of Panel B (2001-02) for Table 4. As in all tables that follow, the bolded coefficients are significant at the usual (but arbitrary) .05 level of significance (two-tailed test). For fourth grade reading in 2001-02 (Panel B), on the key variable as to whether the school was a charter school or not, for both minimal and basic, charter schools performed somewhat better than the comparison non-charter school at the same grade. *The negative*

[9] The weight used, taking into consideration the variance of proportional measures, was the square root of the number of students taking an exam in a school.

[10] The results, however, were very similar for unweighted regressions. The coefficients were almost always in the same direction. Unweighted regressions provided slightly fewer "significant" coefficients. This robust result added to our confidence in the results presented. Unweighted tables available on request.

sign means that charter school had lower proportions of students at those low levels than non-charters. The other significant variables in the model also conform to expectations. The higher the percentage of Black, Free-lunch, and Disabled students in a school, the higher the number of students in both minimal and basic categories, with the effects of percent disability being higher than both poor and Black. Hispanic percent affects the percentage of students in a school scoring in the basic category. The percent of Blacks, Hispanics, and poor students have a negative effect on the percentage of students scoring in the advanced category in a school. And interestingly, a higher student-teacher ratio also has a negative effect on the number of students scoring at the advanced level, while it has no affect on scores in the lower levels.

To save time and space, in the remainder of the analysis we present and concentrate only on the charter school indicator variable coefficients, β s. The results are presented in Tables 5 to 8 for each year.[11] Each table contains a panel for each year. There are two sets of comparisons made. The first (Tables 5 and 7) compare the charter schools to similarly graded, non-charter schools in all districts in the state. The second (Tables 6 and 8) just compare charters to non-charters in districts that have both charters and non-charters.

The regression results across tables 5 through 8, covering 4th and 8th grade test scores are consistent for fourth graders in both years, but not for eighth graders. Each table contains 30 coefficients indicating the effects of charter schools on achievement of

[11] For 2001-02, we analyze "all" charter schools, "new" charters (defined as those that began in 2001-02), and those that were "older." That was not possible for 2000-01 because there were too few new schools with test data in that year. Thus we only report a summary table in Appendix A for the new/old dichotomy in 2001-02.

minimal, basic, and advanced levels of performance relative to proficient. The coefficients of other independent variables are indicated in footnotes but not included in the tables. Those other coefficients, however, are almost always in the anticipated direction as illustrated above in Table 4.

Overall the results indicate positive effects for charter schools. And the pattern of these effects is also consistent across various assumptions concerning comparison groups, subjects, and grades. Those coefficients that reach the standard levels of significance ($p < .05$, or higher) are indicated in **bold**. The coefficients that meet that test, but favor traditional schools over charter schools, are in ***italics***. A summary of these coefficients is presented in Table 9. However, we find nothing magic in a .05 or greater level of significance and we thus encourage to the reader to carefully peruse Tables 5 to 8.

With the clear exception of the 8th grade in the first year, for each grade and each comparison group, the number of significant scores favoring charter schools surpass those favoring traditional schools. Tables 5 to 8 provide 30 coefficients for each table. Across the 120 coefficients, 55 favor charter schools and 17 favor traditional schools. The estimations favoring traditional schools are usually in the 8th grade and most of them (13) are in the first year, 2000-01. We have no explanation for why this might be the case other than simply a cohort effect in that there may have been a number of students who joined charters that year in a "lateral" fashion after having been in traditional schools the year before. The next year, when schools were more mature, more 8th students may have been the charters earlier. We would still emphasize that the overall estimates are positive for charter schools.

(Table 9 Goes About Here.)

These aggregate results mask a number of more precise findings, however. The aggregate results are robust regardless of whether we compare charter schools to traditional schools in either "all districts" or just those with "charter schools." For example, for fourth grade, charter schools (top panel) have 19 significant coefficients favoring charters when we use "all districts" with fourth grade schools as a comparison, and 16 when we just compare them to traditional schools in districts with charter schools. And for neither comparison group are there any coefficients that favor non-charter fourth graders (Tables 5, 6 and 9). The same similarity exists for the eighth grade but with the reverse effects in the two years. Also in nearly all cases the coefficients track very similarly in size and sign for each comparison. The fact that these two different sets of districts are considerably different in terms of the means of National Percentile Rankings given in Table 3 makes us even more confident about our estimates. Our controls are able to account for considerable differences in the base scores.

Finally, and exploiting a valuable feature of our method, in all the tables, of the 17 coefficients favoring traditional schools, 10 are at the "advanced" level. This contrasts with only four of 55 positive coefficients favoring charters at the advanced level (8th grade language arts and social science for both comparisons groups). *What this means is that charter schools seem to be making their inroads by bringing students out of the minimal and basic levels in proportions higher than we would expect based on school characteristics.* The remaining advantages accruing to traditional schools seem to be the inordinate number of students achieving "advanced" status. Given the aggregate student populations served by charter verses traditional students, this is what we might expect and applaud. Traditional schools, with relatively higher numbers of middle and upper-

class students produce a greater than average proportion of "advanced" students. Charter schools succeed at the lower levels of "minimal" and "basic," hopefully preparing students for future success at higher levels of achievement.

How Much Difference Charters Make. Our estimation procedures allow us to calculate how much a difference on average being in a charter school means for each achievement category, for each test. The following table illustrates these calculations only for the reading test for 4th and 8th graders using all districts as the comparison group. The top panel indicates the charter coefficient results from Table 5 and 7. The first line in each section of the table below shows the average for all schools in all districts, the second just for charter schools, and the third the difference between the two. As indicated above the 4th grade cohort in 2000-01 (top of Panel A in Table 10), had the most favorable results for charter schools of all the cohorts. And this is reflected in the computed results. Being in a charter school would on average mean a school 3.5% less students scoring minimal, 9.5% less basic, 8.3% less proficient, but 21.4% *more* in advanced.

(Table 10 Goes About Here.)

On the other hand, the anomalous 8th graders in 2000-01, who did less well in charters, show a very different pattern (bottom half of Panel A). Although they would also have a few students less in the minimal category (7.3%), they would have 4.4% more in basic, 14.6% more in proficient, but 11.8% *fewer* students in advanced. That is consistent with the success of charter schools in pushing students into the proficient category, but not doing as well getting students into the advanced category.

The results in Panel B for both years are all favorable for charter schools, estimating fewer students in minimal and basic and more in proficient and advanced, but the differences are considerably less than in the first year. The full set of estimated differences appear in Appendix B of the paper.

V Conclusions

It is clear to us that charter schools provide additional options for students and families not only in our one large city, Milwaukee, but also in a number of other medium-sized cities and towns throughout the state. In many districts, charters are providing the major alternative forms of education apart from the traditional systems that are in place and operating quite satisfactorily for many families. It is also clear that charter schools are offering options to students who do not match the overall demographic makeup of the districts in which they reside. This will create more diverse students populations in these schools.

Although we have provided some cautions, with the exception of one 8th grade cohort, the achievement test results for charter schools in Wisconsin for 2000-01 and 2001-02 must be interpreted positively. The results of logistic regressions that control for various school characteristics indicate that charter schools are better than traditional public schools at insuring that students achieve the proficient level of performance. Given the demographic characteristics of charter compared to non-charter school students, this is not a trivial accomplishment.

References

Chubb, John, and Terry Moe. 1990. *Politics, Markets, and America's Schools*. Washington, D.C.: Brookings Institution Press.

Greene, Jay. 2001. *An Evaluation of the Florida A-Plus Accountability and School Choice Program.* Manhattan Institute for Policy Research, New York.

Greene, Jay, Forester, Greg Forester and MarcusWinters. 2003. *Apples to Apples: An Evaluation of Charter Schools Serving General Student Populations.* Manhattan Institute for Policy Research, New York.

Henig, Jeffrey R. 1994. *Rethinking School Choice: Limits of the Market Metaphor*. Princeton: Princeton University Press.

Hess, Frederick M. 2000. "Hints of the Pick-Axe: The impact of competition on public schooling in Milwaukee." Paper presented at annual meeting of the American Educational Research Association, 24-28 April, New Orleans, La.

Jackson, John E., "A Seemingly Unrelated Regresson Model for Analyzing Multiparty Elections," *Political Analysis* 10(1) 2002, 49-65.

Hill, Paul T. and Robin J. Lake, Mary Beth Celio. 2002. *Charter Schools and Accountability in Public Education.* Washington, D.C. Brookings Institution.

Mikhailov, Nikolai, Richard G. Niemi, and David L. Weimer, "Application of Theil Group Logit Methods to District-Level Vote Shares: Tests of Prospective and Retrospective Voting in the 1991, 1993, and 1997 Polish Elections," *Electoral Studies* 21(4) 2002, 631-648.

Metcalf, Kim K. 1998. *A Comparative Evaluation of the Cleveland Scholarship and Tutoring Grant Program Year One: 1996-1997*. Bloomington, Ind.: Indiana University School of Education and the Junior Achievement Evaluation Project, Smith Research Center.

---. 1999. *Evaluation of the Cleveland Scholarship and Tutoring Grant Program, 1996-1999.* Bloomington, Ind.: The Indiana Center for Evaluation.

Miron, Gary, and Christopher Nelson. 2002. *What's Public About Charter Schools?* Thousand Oaks, Ca. Corwin Press.

Mintrom, Michael. 2000. *Leveraging LocalIinnovation: The case of Michigan's charter schools*. East Lansing, MI: Michigan State University.

Mintrom, Michael, and David N. Plank. 2000. The emerging market for schooling: Evidence from Michigan. Paper presented at Conference on Vouchers, Charters,

and Public Education, at the Program on Education Policy and Governance, Harvard University, 9-10 March, Cambridge, Mass.

Peterson, Paul, William Howell, and David Campbell. 2002. The Education Gap Vouchers and Urban Schools. Brookings Institute, Washington D.C.

Peterson, Paul E., William G. Howell, and Jay P. Greene. 1999. *An Evaluation of the Cleveland Voucher Program after Two Years*. Cambridge, Mass.: Program on Education Policy and Governance, Harvard University.

Peterson, Paul E., William G. Howell, and Jay P. Greene. 1997. *An Evaluation of the Cleveland Voucher Program after Two Years*. Cambridge, Mass.: Program on Education Policy and Governance, Harvard University.

RPP International. 2000. *The State of Charter Schools.* U.S Department of Education. Washington, D.C.

Rouse, Cecilia Elena. 1998. Private school vouchers and student achievement: An evaluation of the Milwaukee Parental Choice Program. *Quarterly Journal of Economics* 113:553.

---. 1998. *Schools and Student Achievement: More Evidence from the Milwaukee Parental Choice Program*. Princeton: Princeton University and National Bureau for Economic Research.

Schneider, Mark, Paul Teske, and Melissa Marshall. 2000. *Choosing Schools: Consumer Choice and the Quality of American Schools*. Princeton: Princeton University Press.

Smith, Kevin B. 2003. *The Ideology of Education*. State University of New York Press, Albany.

Smith, Kevin B., and Kenneth J. Meier. 1995. *The Case Against School Choice: Politics, Markets, and Fools.* Armonk, NY: M.E. Sharpe.

Theil, Henri, "On Estimation of Relationships Involving Qualitative Variables," *American Journal of Sociology* 76(1) 1970, 103-154.

Tomz, Michael, Joshua A. Tucker, and Jason Wittenberg, "An Easy and Accurate Regression Model for Multiparty Electoral Data," *Political Analysis* 10(1) 2002, 66-83.

Vergari, Sandra. 2002. *The Charter School Landscape*. Pittsburgh, PA. University of Pittsburgh Press.

Wells, Amy Stuart (ed.). 2002. *Where Charter School Policy Fails: The Problems of Accountability and Equity*. New York, NY. Teachers College Press.

Witte, John F. 1995. *Fifth Year Report: Milwaukee Parental Choice Program*. Madison: University of Wisconsin Department of Political Science and the Robert M. La Follette Institute of Public Affairs.

-----. 2000. *The Market Approach to Education: An Analysis of America's First Voucher Program*. Princeton: Princeton University Press.

Table 1. Expansion of Wisconsin Charter Schools, 1993-2003

	Additions		Closings		Total	
Year	Startup	Conversions	Startup	Conversions	Schools	Enrollment*
1993-94	0	0	0	0	0	0
1994-95	1	0	0	0	1	0
1995-96	3	4	0	0	8	343
1996-97	2	3	0	0	13	764
1997-98	5	0	0	0	18	1217
1998-99	13	8	1	0	38	1658
1999-00	13	3	1	0	53	3936
2000-01	28	10	2	0	89	10072
2001-02	12	10	1	0	110	15312
2002-03	21	3	4	0	130	19037
Total	98	41	9	0	---	------

SOURCE: Wisconsin Department of Public Instruction, 2003.

* These numbers underestimate the number of students in charter schools because a handful of smaller charter schools do not appear in official school enrollment counts, usually in earlier years. In 1994-95, the total enrollment was probably between 40 and 60.

Table 2. Race and Income of Wisconsin Charter and Non-Charter School Students

Panel A: 2000-01

	RACE					INCOME	
	African-American	Asian	Hispanic	Native American	White	Free-Lunch	No. of Schools
State %	10.0	3.3	4.5	1.4	80.7	24.1	
Charter %	35.72	4.32	12.93	1.12	45.77	30.33	N=90
Non-Charter %	9.75	3.28	4.45	1.39	81.12	24.46	N=2148
Milwaukee Charter %	60.64	3.18	20.89	1.32	13.96	44.55	N=12
Milwaukee Non-Charter %	61.36	4.38	14.58	.92	18.76	68.37	N=205
Non-Milwaukee Charter %	10.23	5.79	4.78	.91	78.28	15.79	N=78
Non-Milwaukee Non-Charter %	3.45	3.14	3.21	1.45	88.74	19.10	N=1943

Panel B: 2001-02

	RACE					INCOME	
	African-American	Asian	Hispanic	Native American	White	Free-Lunch	No. of Schools
State %	10.1	3.4	5.0	1.4	80.2	26.1	
Charter %	37.79	4.41	12.84	1.25	43.72	35.52	N=111
Non-Charter %	9.67	3.33	4.82	1.43	80.75	25.88	N=2173
Milwaukee Charter %	55.39	3.73	17.37	.78	22.27	46.12	N=23
Milwaukee Non-Charter %	61.59	4.33	15.65	.91	17.53	72.59	N=205
Non-Milwaukee Charter %	9.32	5.50	5.50	1.27	78.41	18.45	N=88
Non-Milwaukee Non-Charter %	3.60	3.22	3.56	1.49	88.14	20.42	N=1968

Data for Milwaukee charter school demographics includes non-instrumentality charter schools.

Table 3. Mean National Percentile Ranks, Charter and Comparisons, 4th and 8th Grades, 2000-01 and 2001-02

Panel A

Mean National Percentile Rank for Schools Reporting 4th Grade Terra Nova Scores, 2000-2001

	Reading	Language	Math	Science	Social Studies
Charter N=15	63.47 (19.25)	59.20 (18.17)	55.67 (20.07)	58.67 (23.44)	60.20 (19.57)
Comparison Non-charter N=193	52.78 (15.40)	49.92 (15.36)	49.09 (16.56)	47.98 (19.14)	54.13 (15.81)
Non-charter w/o charter competition N=930	66.68 (8.35)	63.79 (10.10)	64.34 (9.74)	65.85 (10.12)	68.34 (8.36)
State NPR from DPI	65	62	62	63	66
State Mean as taken from data N=1138	64.28 (11.35)	61.37 (12.43)	61.64 (12.73)	62.73 (14.05)	65.82 (11.52)

Data taken from the Wisconsin Department of Public Instruction School Performance Report Data for the 2000-2001 school year. Data provided is for all schools reporting data to DPI within the standards protecting student confidentiality.

Mean National Percentile Rank for 8th Grade Terra Nova 2000-2001

	Reading	Language	Math	Science	Social Studies
Charter N=21	52.48 (21.11)	45.14 (20.71)	47.71 (20.21)	49.24 (20.21)	51.57 (19.77)
Comparison Non-Charter N=104	53.38 (20.46)	47.93 (19.12)	51.07 (22.37)	49.50 (22.37)	51.43 (20.42)
Non-charter w/o charter competition N=429	70.57 (6.76)	64.35 (7.46)	71.00 (8.38)	70.61 (7.13)	69.59 (6.57)
State NPR from DPI	68	62	69	67	67
State Mean as taken from data N=554	66.66 (13.50)	60.54 (13.30)	66.37 (15.37)	65.84 (15.02)	65.50 (13.52)

Data taken from the Wisconsin Department of Public Instruction School Performance Report Data for the 2000-2001 school year. Data provided is for all schools reporting data to DPI within the standards protecting student confidentiality.

Table 3. Mean National Percentile Ranks, Charter and Comparisons, 4th and 8th Grades, 2000-01 and 2001-02

Panel B

Mean National Percentile Rank for Schools Reporting 4th Grade Terra Nova Scores, 2001-2002

	Reading	Language	Math	Science	Social Studies
Charter N=19	58.84 (22.05)	58.05 (20.80)	53.90 (23.24)	54.11 (26.46)	59.05 (26.26)
Comparison Non-charter N=210	54.35 (16.43)	55.88 (15.44)	52.58 (17.03)	48.27 (18.36)	54.75 (17.12)
Non-charter w/o charter competition N=909	69.08 (8.88)	68.17 (9.29)	66.37 (10.30)	64.98 (8.94)	70.09 (8.90)
State NPR from DPI	67	67	64	62	68
State Mean as taken from data N=1138	66.19 (12.40)	65.73 (11.97)	63.62 (13.29)	61.72 (13.41)	67.08 (12.82)

Data taken from the Wisconsin Department of Public Instruction School Performance Report Data for the 2001-2002 school year. Data provided is for all schools reporting data to DPI within the standards protecting student confidentiality.

Mean National Percentile Rank for 8th Grade Terra Nova 2001-2002

	Reading	Language	Math	Science	Social Studies
Charter N=27	54.33 (18.38)	52.63 (19.47)	51.78 (24.74)	51.56 (22.47)	52.93 (21.00)
Comparison Non-Charter N=101	52.23 (18.56)	50.44 (19.14)	51.58 (24.45)	47.58 (21.06)	50.29 (21.06)
Non-charter w/o charter competition N=432	66.95 (6.94)	66.83 (7.21)	74.06 (8.31)	67.94 (7.79)	69.48 (7.30)
State NPR from DPI	65	64	71	65	67
State Mean as taken from data N=560	63.69 (12.27)	63.19 (12.97)	68.93 (16.59)	63.48 (14.75)	65.22 (14.23)

Data taken from the Wisconsin Department of Public Instruction School Performance Report Data for the 2001-2002 school year. Data provided is for all schools reporting data to DPI within the standards protecting student confidentiality.

Table 4. 4th Grade Full Logistic Regression Model, Weighted, All Districts, 2000-01 and 2001-02, Reading Test Only.

Panel A – 2000-01

Independent Variables	Estimated Proportion Minimal	Estimated Proportion Basic	Estimated Proportion Advanced
Charter	**-.979**	**-1.533**	**.908**
	(.358)	(.313)	(.252)
	[.006]	[.000]	[.000]
Black %	**.018**	**.012**	**-.012**
	(.002)	(.002)	(.002)
	[.000]	[.000]	[.000]
Hispanic %	**.018**	**.017**	**-.007**
	(.005)	(.004)	(.003)
	[.000]	[.000]	[.039]
Asian %	**.015**	**.019**	**-.014**
	(.007)	(.007)	(.005)
	[.051]	[.004]	[.010]
Native American%	**.015**	.005	-.006
	(.007)	(.006)	(.005)
	[.022]	[.434]	[.236]
Free Lunch %	**.017**	**.010**	**-.010**
	(.003)	(.003)	(.002)
	[.000]	[.000]	[.000]
% Taking the Test	-.019	-.020	.002
	(.012)	(.011)	(.009)
	[.107]	[.057]	[.839]
Mean Student-Teacher Ratio	**-.029**	-.008	.010
	(.011)	(.010)	(.008)
	[.012]	[.394]	[.234]
% Disabled	**.059**	**.022**	.002
	(.005)	(.005)	(.004)
	[.000]	[.000]	[.623]
% Limited English	-.003	.001	-.000
	(.007)	(.007)	(.005)
	[.667]	[.819]	[.980]
Constant	**-4.174**	**-2.624**	**-1.205**
	(.197)	(.173)	(.139)
	[.000]	[.000]	[.000]

Standard errors are in parenthesis below the coefficient. P-values are in the brackets below the standard errors.

Panel B – 2001-02

Independent Variables	Estimated Proportion Minimal	Estimated Proportion Basic	Estimated Proportion Advanced
Charter	**-.623**	**-.827**	-.021
	(.280)	(.245)	(.180)
	[.026]	[.001]	[.905]
Black %	**.012**	**.008**	**-.011**
	(.002)	(.002)	(.002)
	[.000]	[.001]	[.000]
Hispanic %	.006	.007	-.006
	(.006)	(.005)	(.004)
	[.303]	[.148]	[.069]
Asian %	.010	**.019**	.003
	(.009)	(.007)	(.006)
	[.222]	[.009]	[.626]
Native American%	.005	.005	-.005
	(.007)	(.006)	(.004)
	[.420]	[.344]	[.227]
Free Lunch %	**.019**	**.015**	**-.017**
	(.002)	(.002)	(.002)
	[.000]	[.000]	[.000]
% Taking the Test	-.008	.007	**.021**
	(.013)	(.011)	(.008)
	[.536]	[.515]	[.010]
Mean Student-Teacher Ratio	.003	.016	-.005
	(.016)	(.014)	(.010)
	[.855]	[.239]	[.611]
% Disabled	**.047**	**.021**	-.000
	(.005)	(.005)	(.003)
	[.000]	[.000]	[.981]
% Limited English	-.011	-.007	-.002
	(.009)	(.008)	(.006)
	[.251]	[.381]	[.719]
Constant	**-4.636**	**-3.293**	**-.728**
	(.261)	(.228)	(.167)
	[.000]	[.000]	[.000]

Standard errors are in parenthesis below the coefficient. P-values are in the brackets below the standard errors.

Table 5. 4th Grade Logistic Regressions, Weighted, All Districts, 2000-01 and 2001-02*

Panel A – 2000-01

All Charters	Reading	LanguageArts	Math	Science	Social Science
Minimal					
Coefficient	**-0.979**	**-0.892**	**-1.128**	**-1.234**	**-1.017**
St. Error	**0.358**	**0.360**	**0.361**	**0.358**	**0.351**
z value	**-2.74**	**-2.48**	**-3.12**	**-3.44**	**-2.90**
P > | z |	**0.000**	**0.013**	**0.002**	**0.001**	**0.004**
Basic					
Coefficient	**-1.533**	**-2.344**	**-0.782**	**-2.243**	**-2.123**
St. Error	**0.313**	**0.262**	**0.269**	**0.287**	**0.328**
z value	**-4.90**	**-8.94**	**-2.91**	**-7.82**	**-6.47**
P > | z |	**0.000**	**0.000**	**0.004**	**0.000**	**0.000**
Advanced					
Coefficient	**0.908**	**0.445**	0.115	0.064	-0.351
St. Error	**0.252**	**0.227**	0.263	0.247	0.189
z value	**3.61**	**1.96**	0.44	0.26	-1.86
P > | z |	**0.000**	**0.050**	0.662	0.797	0.063

Panel B – 2001-02

All Charters	Reading	LanguageArts	Math	Science	Social Science
Minimal					
Coefficient	**-0.623**	**-0.809**	0.036	**-0.524**	0.357
St. Error	**0.280**	**0.277**	0.272	**0.251**	0.266
z value	**-2.23**	**-2.92**	0.13	**-2.09**	1.34
P > | z |	**0.026**	**0.003**	0.895	**0.037**	0.180
Basic					
Coefficient	**-0.827**	**-0.837**	-0.348	**-0.600**	-0.023
St. Error	**0.245**	**0.221**	0.215	**0.230**	0.280
z value	**-3.38**	**-3.79**	-1.62	**-2.61**	-0.08
P > | z |	**0.001**	**0.000**	0.106	**0.009**	0.933
Advanced					
Coefficient	-0.021	-0.175	0.251	0.349	**0.382**
St. Error	0.180	0.156	0.174	0.193	**0.177**
z value	-0.12	-1.12	1.44	1.81	**2.16**
P > | z |	0.905	0.263	0.149	0.071	**0.031**

* Regressions also include school-level: Percent Black, Percent Hispanic, Percent Asian/Pacific Islander, Percent Free-or Reduced Free-Lunch; Percent Eligible Tested; Mean Student-Teacher Ratio; Percent disabled (with IEP); and Percent Limit English.

Table 6. 4th Grade Logistic Regressions, Weighted, Charter Districts, 2000-01 and 2001-02*

Panel A – 2000-01

All Charters	Reading	LanguageArts	Math	Science	Social Science
Minimal					
Coefficient	**-1.032**	**-0.837**	**-1.092**	**-1.396**	**-0.981**
St. Error	**0.354**	**0.394**	**0.405**	**0.381**	**0.379**
z value	**-2.92**	**-2.13**	**-2.70**	**-3.66**	**-2.59**
P > | z |	**0.004**	**0.033**	**0.007**	**0.000**	**0.010**
Basic					
Coefficient	**-1.712**	**-2.393**	**-0.851**	**-1.949**	**-1.965**
St. Error	**0.261**	**0.223**	**0.224**	**0.265**	**0.286**
z value	**-6.56**	**-10.75**	**-3.80**	**-7.34**	**-6.87**
P > | z |	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Advanced					
Coefficient	**0.758**	0.517	0.070	-0.061	-0.262
St. Error	**0.324**	0.277	0.324	0.308	0.249
z value	**2.34**	1.87	0.22	-0.20	-1.05
P > | z |	**0.019**	0.062	0.829	0.843	0.293

Panel B – 2001-02

All Charters	Reading	LanguageArts	Math	Science	Social Science
Minimal					
Coefficient	**-0.619**	**-0.765**	0.120	**-0.601**	0.389
St. Error	**0.269**	**0.284**	0.322	**0.298**	0.270
z value	**-2.30**	**-2.69**	0.37	**-2.02**	1.44
P > | z |	**0.021**	**0.007**	0.709	**0.044**	0.149
Basic					
Coefficient	**-0.928**	**-0.967**	-0.406	**-0.748**	-0.189
St. Error	**0.235**	**0.206**	0.221	**0.224**	0.236
z value	**-3.95**	**-4.70**	-1.84	**-3.34**	-0.80
P > | z |	**0.000**	**0.000**	0.066	**0.001**	0.422
Advanced					
Coefficient	-0.157	-0.228	0.232	0.250	0.265
St. Error	0.259	0.219	0.242	0.271	0.242
z value	-0.61	-1.04	0.96	0.92	1.09
P > | z |	0.542	0.298	0.339	0.356	0.274

* Regressions also include school-level: Percent Black, Percent Hispanic, Percent Asian/Pacific Islander, Percent Free-or Reduced Free-Lunch; Percent Eligible Tested; Mean Student-Teacher Ratio; Percent disabled (with IEP); and Percent Limit English.

Table 7. 8th Grade Logistic Regressions, Weighted, All Districts, 2000-01 and 2001-02*

Panel A – 2000-01

All Charters	Reading	LanguageArts	Math	Science	Social Science
Minimal					
Coefficient	**-1.266**	-0.456	***1.150***	***0.730***	-0.199
St. Error	**0.282**	0.288	***0.272***	***0.286***	0.281
z value	**-4.49**	-1.58	***4.23***	***2.55***	-0.71
P > | z |	**0.000**	0.114	***0.000***	***0.011***	0.479
Basic					
Coefficient	0.088	0.100	***1.139***	0.152	-0.156
St. Error	0.211	0.159	***0.173***	0.183	0.227
z value	0.42	0.63	***6.58***	0.83	-0.68
P > | z |	0.678	0.529	***0.000***	0.405	0.494
Advanced					
Coefficient	***-0.863***	***-0.775***	-0.120	***-0.495***	***-0.764***
St. Error	***0.162***	***0.172***	0.249	***0.181***	***0.189***
z value	***-5.33***	***-4.49***	-0.48	***-2.74***	***-4.05***
P > | z |	***0.000***	***0.000***	0.630	***0.006***	***0.000***

Panel B – 2001-02

All Charters	Reading	LanguageArts	Math	Science	Social Science
Minimal					
Coefficient	**-1.216**	-0.255	**-1.095**	**-0.642**	***1.068***
St. Error	**0.221**	0.260	**0.234**	**0.234**	***0.233***
z value	**-5.51**	-0.98	**-4.68**	**-2.74**	***4.59***
P > | z |	**0.000**	0.327	**0.000**	**0.006**	***0.000***
Basic					
Coefficient	**-1.400**	**-1.056**	**-1.250**	**-0.895**	0.195
St. Error	**0.162**	**0.173**	**0.184**	**0.140**	0.199
z value	**-8.65**	**-6.10**	**-6.78**	**-6.41**	0.98
P > | z |	**0.000**	**0.000**	**0.000**	**0.000**	0.327
Advanced					
Coefficient	-0.077	**0.630**	***-0.391***	0.076	**1.500**
St. Error	0.173	**0.161**	***0.179***	0.172	**0.155**
z value	-0.45	**3.91**	***-2.18***	0.44	**9.66**
P > | z |	0.655	**0.000**	***0.029***	0.658	**0.000**

* Regressions also include school-level: Percent Black, Percent Hispanic, Percent Asian/Pacific Islander, Percent Free-or Reduced Free-Lunch; Percent Eligible Tested; Mean Student-Teacher Ratio; Percent disabled (with IEP); Percent Limit English; and an indicator variable for if the school is at-risk or not.

Table 8. 8th Grade Logistic Regressions, Weighted, Charter Districts, 2000-01 and 2001-02*

Panel A – 2000-01

All Charters	Reading	LanguageArts	Math	Science	Social Science
Minimal					
Coefficient	**-1.152**	**-0.590**	***1.103***	0.407	-0.223
St. Error	**0.205**	**0.205**	***0.336***	0.243	0.230
z value	**-5.62**	**-2.88**	***3.29***	1.67	-0.97
P > | z |	**0.000**	**0.004**	***0.001***	0.094	0.332
Basic					
Coefficient	-0.156	-0.054	***1.095***	0.334	-0.239
St. Error	0.133	0.159	***0.241***	0.263	0.182
z value	-1.18	-0.34	***4.54***	1.27	-1.31
P > | z |	0.239	0.736	***0.000***	0.205	0.190
Advanced					
Coefficient	***-1.031***	***-1.020***	-0.268	***-0.749***	***-0.853***
St. Error	***0.255***	***0.263***	0.259	***0.238***	***0.284***
z value	***-4.04***	***-3.88***	-1.03	***-3.15***	***-3.01***
P > | z |	***0.000***	***0.000***	0.301	***0.002***	***0.003***

Panel B – 2001-02

All Charters	Reading	LanguageArts	Math	Science	Social Science
Minimal					
Coefficient	**-1.042**	-0.289	**-1.197**	-0.602	***0.712***
St. Error	**0.288**	0.337	**0.353**	0.327	***0.313***
z value	**-3.62**	-0.86	**-3.39**	-1.84	***2.27***
P > | z |	**0.000**	0.391	**0.001**	0.065	***0.023***
Basic					
Coefficient	**-1.099**	**-0.668**	**-1.296**	**-0.828**	-0.024
St. Error	**0.181**	**0.259**	**0.355**	**0.211**	0.230
z value	**-6.07**	**-2.57**	**-3.65**	**-3.93**	-0.10
P > | z |	**0.000**	**0.010**	**0.000**	**0.000**	0.918
Advanced					
Coefficient	-0.190	**0.627**	***-0.722***	0.000	**1.261**
St. Error	0.244	**0.247**	***0.252***	0.230	**0.281**
z value	-0.78	**2.54**	***-2.86***	0.00	**4.49**
P > | z |	0.436	**0.011**	***0.004***	1.000	**0.000**

* Regressions also include school-level: Percent Black, Percent Hispanic, Percent Asian/Pacific Islander, Percent Free-or Reduced Free-Lunch; Percent Eligible Tested; Mean Student-Teacher Ratio; Percent disabled (with IEP); and Percent Limit English; and an indicator variable for if the school is at-risk or not.

Table 9. Summary of Significant (P<.05) Coefficients for 4th and 8th Grade Regressions, 2000-01 and 2001-02

Fourth Grade

	2000-01 Favoring		2001-02 Favoring	
	Charters	Non-Charters	Charters	Non-Charters
Comparison: ALL Districts (Table 5)	12	0	7	0
Comparison: Charter Districts (Table 6)	10	0	6	0

Eighth Grade

	2000-01 Favoring		2001-02 Favoring	
	Charters	Non-Charters	Charters	Non-Charters
Comparison: ALL Districts (Table 7)	1	7	9	2
Comparison: Charter Districts (Table 8)	2	6	8	2

Table 10. Achievement Level Results for Charter School Coefficients (4th and 8th Grade Full Logistic Regression Models, Weighted, All Districts, 2000-01 and 2001-02, Reading Test Only).

Panel A – 2000-01

Independent Variables	Estimated Proportion Minimal	Estimated Proportion Basic	Estimated Proportion Advanced
Charter	**-.979** (.358) [.006]	**-1.533** (.313) [.000]	**.908** (.252) [.000]

4th Grade Reading	Minimal	Basic	Proficient	Advanced
Average	5.2%	11.8%	64.6%	18.4%
Charter Regression Average	1.7%	2.2%	56.3%	39.8%
Difference	-3.5%	-9.5%	-8.3%	21.4%
8th Grade Reading	**Minimal**	**Basic**	**Proficient**	**Advanced**
Average	11.5%	11.1%	51.8%	25.6%
Charter Regression Average	4.2%	15.5%	66.4%	13.9%
Difference	-7.3%	4.4%	14.6%	-11.8%

Panel B – 2001-02

Independent Variables	Estimated Proportion Minimal	Estimated Proportion Basic	Estimated Proportion Advanced
Charter	**-.623** (.280) [.026]	**-.827** (.245) [.001]	-.021 (.180) [.905]

4th Grade Reading	Minimal	Basic	Proficient	Advanced
Average	4.9%	10.6%	64.9%	19.6%
Charter Regression Average	2.9%	5.1%	71.0%	21.0%
Difference	-2.0%	-5.5%	6.1%	1.4%
8th Grade Reading	**Minimal**	**Basic**	**Proficient**	**Advanced**
Average	10.2%	12.1%	58.8%	18.9%
Charter Regression Average	3.7%	3.6%	71.3%	21.4%
Difference	-6.6%	-8.5%	12.5%	2.5%

Appendix A

The test data did not allow us to analyze "new" compared to old test data for 2000-01. However, we did so in 2001-02 by creating an indicator variable for charters in their first year, and another for all other charter schools. The comparison school districts and weighting were done exactly in the analysis presented in the main body of the text. The results are quite startling and conform to our expectations based on case study evidence.

Nearly all the significant results occur in "old" charter schools. As indicated in Appendix Table A.1, the charter school advantage accrues to charter schools in operation before 2001-02. There is only one 4th grade test that is significant in new charter schools. This confirms common sense in that the tests were given in February of 2002, which would be five months beyond opening a new school. It also shifts the impression derived from considering all 120 coefficients in these tables. Overall, close to one-half of the estimated coefficients favored charter schools (55 of 120). However, if we concentrate only on "old charter" schools, of the 60 estimated coefficients in 2001-02, 29 are significant in favor of charter schools (compared to 6 favoring traditional schools). Given that all traditional schools are old by our definition, this comparison is clearly appropriate.

But perhaps more importantly, the contrast between new and old schools suggests that the schools are making the difference. If the charter effect was nothing more than unmeasured selection biases, the presence of better students would kick in immediately … but it does not. Over time we will be able to assess if age of school (measured as years in operation) has an additional, or perhaps declining effect.

Appendix Table A.1. Summary of Significant (P<.05) Coefficients for 4th and 8th Grade, for 2001-02 New and Old (more than 1 year) Charters.

Fourth Grade

	"All" Charters Favoring		"New" Charters Favoring		"Old" Charters Favoring	
	Charters	Non-Charters	Charters	Non-Charters	Charters	Non-Charters
Comparison: ALL Districts (Table 5)	5	1	1	0	5	1
Comparison: Charter Districts (Table 6)	6	1	1	0	6	1

Eighth Grade

	"All" Charters Favoring		"New" Charters Favoring		"Old" Charters Favoring	
	Charters	Non-Charters	Charters	Non-Charters	Charters	Non-Charters
Comparison: ALL Districts (Table 7)	10	2	0	0	10	2
Comparison: Charter Districts (Table 8)	7	2	0	0	8	2

Appendix B

Appendix Table B.1. Achievement Equivalents of Charter Effects in Table 5. 4th Grade Logistic Regressions, Weighted, All Districts, 2000-01 and 2001-02*

Panel A – 2000-01

Reading	Minimal	Basic	Proficient	Advanced
Average	5.2%	11.8%	64.6%	18.4%
Charter Regression Average	1.7%	2.2%	56.3%	39.8%
Difference	-3.5%	-9.5%	-8.3%	21.4%
Language Arts				
Average	4.3%	22.5%	45.1%	28.2%
Charter Regression Average	1.9%	2.3%	48.5%	47.3%
Difference	-2.4%	-20.2%	3.4%	19.1%
Math				
Average	4.1%	25.7%	46.7%	23.5%
Charter Regression Average	1.6%	13.7%	54.2%	30.6%
Difference	-2.6%	-12.0%	7.5%	7.1%
Science				
Average	4.8%	18.7%	51.1%	25.4%
Charter Regression Average	1.7%	2.4%	62.6%	33.2%
Difference	-3.1%	-16.3%	11.5%	7.8%
Social Studies				
Average	4.8%	12.9%	47.0%	35.3%
Charter Regression Average	2.3%	2.1%	62.5%	33.1%
Difference	-2.5%	-10.9%	15.6%	-2.2%

Panel B – 2001-02

Reading	Minimal	Basic	Proficient	Advanced
Average	4.9%	10.6%	64.9%	19.6%
Charter Regression Average	2.9%	5.1%	71.0%	21.0%
Difference	-2.0%	-5.5%	6.1%	1.4%
Language Arts				
Average	3.6%	17.1%	44.9%	34.4%
Charter Regression Average	1.9%	8.9%	54.2%	34.9%
Difference	-1.7%	-8.2%	9.3%	0.5%
Math				
Average	3.4%	22.8%	46.2%	27.6%
Charter Regression Average	3.5%	15.9%	45.6%	35.1%
Difference	0.1%	-6.9%	-0.6%	7.4%
Science				
Average	3.8%	14.5%	60.8%	20.9%
Charter Regression Average	2.2%	7.9%	60.4%	29.5%
Difference	-1.5%	-6.6%	-0.4%	8.5%
Social Studies				
Average	4.1%	9.7%	44.2%	42.0%
Charter Regression Average	4.8%	7.8%	36.5%	50.9%
Difference	0.7%	-1.9%	-7.7%	8.8%

Appendix Table B.2. Achievement Equivalents of Charter Effects in Table 6. 4th Grade Logistic Regressions, Weighted, Charter Districts, 2000-01 and 2001-02*

Panel A – 2000-01

Reading	Minimal	Basic	Proficient	Advanced
Average	11.3%	18.2%	57.7%	12.8%
Charter Regression Average	4.4%	3.6%	62.5%	29.5%
Difference	-6.9%	-14.7%	4.8%	16.8%
Language Arts				
Average	10.3%	30.0%	40.3%	19.4%
Charter Regression Average	5.6%	3.4%	50.4%	40.6%
Difference	-4.7%	-26.6%	10.1%	21.2%
Math				
Average	11.0%	35.0%	39.0%	15.0%
Charter Regression Average	5.0%	20.3%	52.9%	21.8%
Difference	-6.0%	-14.7%	13.9%	6.8%
Science				
Average	13.9%	27.7%	41.7%	16.7%
Charter Regression Average	5.3%	6.1%	64.3%	24.3%
Difference	-8.6%	-21.6%	22.6%	7.5%
Social Studies				
Average	12.5%	18.8%	44.4%	24.3%
Charter Regression Average	6.7%	3.7%	63.0%	26.6%
Difference	-5.9%	-15.0%	18.6%	2.3%

Panel B – 2001-02

Reading	Minimal	Basic	Proficient	Advanced
Average	10.2%	17.6%	60.2%	12.1%
Charter Regression Average	6.6%	8.4%	72.6%	12.4%
Difference	-3.6%	-9.2%	12.4%	0.4%
Language Arts				
Average	7.9%	23.8%	43.7%	24.7%
Charter Regression Average	4.8%	11.9%	57.4%	25.8%
Difference	-3.1%	-11.9%	13.8%	1.2%
Math				
Average	8.8%	32.2%	40.2%	18.9%
Charter Regression Average	10.4%	22.5%	42.2%	25.0%
Difference	1.6%	-9.7%	2.0%	6.1%
Science				
Average	11.5%	24.6%	50.6%	13.3%
Charter Regression Average	7.4%	13.6%	59.1%	19.9%
Difference	-4.1%	-11.0%	8.5%	6.6%
Social Studies				
Average	11.3%	16.3%	43.6%	28.7%
Charter Regression Average	15.0%	12.2%	39.2%	33.6%
Difference	3.7%	-4.2%	-4.4%	4.9%

Appendix Table B.3. Achievement Equivalents of Charter Effects in Table 7. 8th Grade Logistic Regressions, Weighted, All Districts, 2000-01 and 2001-02*

Panel A – 2000-01

Reading	Minimal	Basic	Proficient	Advanced
Average	11.5%	11.1%	51.8%	25.6%
Charter Regression Average	4.2%	15.5%	66.4%	13.9%
Difference	-7.3%	4.4%	14.6%	-11.8%
Language Arts				
Average	7.8%	24.2%	44.0%	24.0%
Charter Regression Average	5.7%	30.8%	50.7%	12.7%
Difference	-2.1%	6.6%	6.7%	-11.3%
Math				
Average	16.3%	41.2%	28.4%	14.2%
Charter Regression Average	23.3%	58.2%	12.9%	5.7%
Difference	7.0%	17.0%	-15.6%	-8.5%
Science				
Average	8.9%	25.1%	44.8%	21.2%
Charter Regression Average	17.5%	27.7%	42.5%	12.3%
Difference	8.6%	2.6%	-2.3%	-8.9%
Social Studies				
Average	4.6%	11.2%	45.7%	38.5%
Charter Regression Average	4.9%	12.5%	59.3%	23.3%
Difference	0.3%	1.3%	13.7%	-15.2%

Panel B – 2001-02

Reading	Minimal	Basic	Proficient	Advanced
Average	10.2%	12.1%	58.8%	18.9%
Charter Regression Average	3.7%	3.6%	71.3%	21.4%
Difference	-6.6%	-8.5%	12.5%	2.5%
Language Arts				
Average	5.5%	21.0%	53.2%	20.3%
Charter Regression Average	4.1%	7.1%	51.8%	37.0%
Difference	-1.3%	-13.9%	-1.5%	16.7%
Math				
Average	16.2%	36.3%	30.5%	17.1%
Charter Regression Average	9.4%	18.0%	52.7%	20.0%
Difference	-6.8%	-18.3%	22.2%	2.9%
Science				
Average	10.8%	26.2%	45.0%	18.0%
Charter Regression Average	7.1%	13.2%	55.6%	24.1%
Difference	-3.8%	-12.9%	10.7%	6.0%
Social Studies				
Average	4.5%	11.0%	46.7%	37.8%
Charter Regression Average	5.4%	5.5%	19.2%	69.9%
Difference	0.9%	-5.5%	-27.4%	32.0%

Appendix Table B.4. Achievement Equivalents of Charter Effects in Table 8. 8th Grade Logistic Regressions, Weighted, Charter Districts, 2000-01 and 2001-02*

Panel A – 2000-01

Reading	Minimal	Basic	Proficient	Advanced
Average	19.1%	14.1%	46.8%	20.0%
Charter Regression Average	8.4%	16.8%	65.0%	9.9%
Difference	-10.7%	2.6%	18.2%	-10.1%
Language Arts				
Average	13.5%	29.6%	38.1%	18.9%
Charter Regression Average	25.0%	28.9%	39.2%	7.0%
Difference	11.5%	-0.8%	1.1%	-11.9%
Math				
Average	27.7%	39.3%	22.2%	10.9%
Charter Regression Average	36.0%	50.8%	9.6%	3.6%
Difference	8.4%	11.5%	-12.6%	-7.3%
Science				
Average	18.7%	29.6%	36.5%	15.2%
Charter Regression Average	24.9%	36.5%	32.3%	6.3%
Difference	6.1%	6.9%	-4.2%	-8.8%
Social Studies				
Average	10.0%	17.6%	43.0%	29.3%
Charter Regression Average	9.4%	26.1%	50.0%	14.6%
Difference	-0.7%	8.4%	7.0%	-14.8%

Panel B – 2001-02

Reading	Minimal	Basic	Proficient	Advanced
Average	16.8%	15.2%	53.3%	14.8%
Charter Regression Average	7.8%	6.6%	69.7%	16.0%
Difference	-9.1%	-8.5%	16.4%	1.2%
Language Arts				
Average	10.2%	26.9%	47.2%	15.7%
Charter Regression Average	7.8%	14.1%	48.2%	30.0%
Difference	-2.4%	-12.8%	0.9%	14.3%
Math				
Average	28.5%	35.2%	23.2%	13.1%
Charter Regression Average	18.0%	20.2%	48.5%	13.3%
Difference	-10.5%	-15.1%	25.3%	0.2%
Science				
Average	20.3%	30.1%	36.4%	13.2%
Charter Regression Average	15.1%	17.8%	49.3%	17.8%
Difference	-5.2%	-12.3%	12.9%	4.7%
Social Studies				
Average	10.2%	17.0%	43.4%	29.4%
Charter Regression Average	11.3%	9.0%	23.5%	56.2%
Difference	1.1%	-8.0%	-19.9%	26.8%