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WOULD SCHOOL CHOICE CHANGE THE TEACHING PROFESSION?

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ABSTRACT

This paper investigates whether schools that face stronger choice-based incentives have greater demand for certain teacher characteristics and (if so) which teacher characteristics. Schools that face choice-based incentives should demand teachers who raise a schools' ability to attract students. Thus, in the long term, school choice would affect who became (and remained) a teacher if it affected schools' demand for certain teacher characteristics. Using data on traditional forms of choice (Tiebout choice, choice of private schools) and a new survey of charter school teachers, this paper finds evidence that suggests that school choice would change the teaching profession by demanding teachers with higher quality college education, more math and science skills, and a greater degree of effort and independence.

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I. Introduction

Teachers' organizations, such as the National Education Association and the American Federation of Teachers, have been largely antagonistic to school choice in its various forms (charter schools, vouchers, tax credits for private school tuition, and inter-district choice). This antagonistic stance has created the impression in Americans' minds that teachers only stand to lose from school choice. Yet, economics suggests that school choice could change the teaching profession in ways that many incumbent and potential teachers would like. In particular, theory suggests that schools that face choice-based incentives would have a greater demand for teachers who raise a schools' ability to attract students. In the long term, school choice would affect who became (and remained) a teacher if it affected schools' demand for certain teacher characteristics. This paper investigates whether schools that face stronger choice-based incentives exhibit greater demand for certain teacher characteristics and (if so) *which* teacher characteristics. Using data on traditional forms of choice (Tiebout choice, choice of private schools) and a new survey of charter school teachers, this paper finds evidence that school choice would change the teaching profession--particularly by raising the demand for teachers with high quality college education, math and science skills, and a greater degree of effort and independence.

If school choice were to affect schools' demand for certain teacher characteristics, then it would create winners and losers among incumbent teachers--some of whom would find greater, and others of whom would find less, demand for their services. Society should not, however, solely be interested in how choice would affect incumbent teachers' interests. Society may be equally interested in the interests of people who *would be* teachers in an environment of greater

school choice. Also, society is presumably mainly interested in the education children receive, which is a function of who chooses to teach (and, thus, indirectly a function of choice, if choice affects the demand for certain teacher characteristics).

One might expect that school choice would affect the teaching profession only very slowly, but this expectation is at least partly wrong. Consider the state of Arizona, where charter schools are very prevalent relative to the rest of the United States. (271 charter schools enrolled about 7 percent of Arizona's students in the 1998-99 school year.[1]) In Arizona, the vast majority of the *stock* of teaching jobs are in regular public schools, not charter schools. Yet, approximately half of the *flow* of new teaching positions is provided by charter schools. Therefore, a person who considers becoming a teacher (or switching to a new teaching job) in Arizona should be strongly affected by the wages and job characteristics of teaching positions offered by charter schools.

This paper's empirical strategy is based on a simple economic argument: If schools that face stronger choice-based incentives have greater demand for a certain teacher characteristic, the wage they pay for that characteristic should be greater *and* the amount of that characteristic they hire should be greater. In other words, schools should be moving up the supply curve for that characteristic. My test for whether a characteristic is demanded more by choice-driven schools is whether the characteristic is paid a higher wage *and* in greater abundance in them.

I perform this test using two types of evidence. I first analyze the traditional forms of choice, such as choice of private schools and Tiebout choice among public school districts

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[1] See *National Charter School Directory*, 1998-99. There is some dispute about Arizona's charter school enrollment, with figures ranging from 5 to 11 percent of total statewide enrollment for the 1998-99 school year.

(parents choosing a school by choosing a residence). Traditional forms of choice are useful because different metropolitan areas have different long-run, general equilibria with different amounts of traditional school choice. When comparing different metropolitan areas, the main empirical problem is identifying *exogenous* differences in their degree of traditional school choice. I attempt to solve this problem using instruments that are credible (described below). The teaching data that I use in this section of the paper comes from the Schools and Staffing Survey (SASS), a comprehensive survey of American public and private school teachers and administrators.

Traditional school choice does not, however, completely mimic the incentives that are created by reforms such as charter schools. Therefore, my second analysis compares teaching in charter schools to teaching in public and private schools. Essentially, the tests take the form: compared to public and private schools in their area (that serve similar students), do charter schools pay more for certain teacher characteristics and hire more of those characteristics? There are three empirical challenges for tests of this sort. First, it is important to compare schools in similar environments. Otherwise, one might attribute differences in schools' demands that are generated by, say, differences in local preferences to differences in the degree to which the schools are subjected to choice-based incentives. Second, it is important to ensure that the differences observed are not simply composition effects. That is, if a charter school entered and simply displaced some part of the local public school system which had always exhibited greater demand for the same characteristics that the charter school demands more, then the net increase in the demand for the characteristics would be zero. The third empirical challenge is that any study of teachers in choice schools is affected by the fact that most choice schools are new

schools. It can be hard to distinguish the aspects of teaching that are determined by the school's being a choice school versus the school's being a start-up school. This is one reason why it is useful to study traditional school choice. To implement this second part of the analysis, I compare data from a survey of charter school teachers and administrators (conducted specifically for this paper) to SASS data. The charter school teachers and administrators were asked questions identical to those in the SASS, in order to insure that their answers would be as comparable as possible.

II. The Teaching Profession and School Choice: What is Known

This paper is related to several issues that have recently received attention. There is a substantial literature that demonstrates that teachers' unions compress the distribution of teacher salaries within a district so that teachers with the same seniority and the same highest degree are likely to receive similar (if not identical) wages.[2] Even in districts that are not unionized, salary scales that resemble union scales are the rule. Although salary compression for a given level of seniority and highest degree is not complete, the differences are small.

Indeed, the evidence suggests that the differences are too small to make teaching an equally attractive occupation to people with more and less aptitude, more or fewer math and science skills, and so on. Murnane (1984), Manski (1987), Murnane and Olsen (1989,1990), and Monk (1994) present evidence that people with high aptitude or math and science skills are less likely to start teaching (even if one conditions on their having obtained teaching certification) and

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[2] A teacher' highest degree is usually either a baccalaureate or a master's degree. See Hoxby (1996) for a bibliography of the teachers' union literature.

less likely to remain in teaching if they do start. This problem has become more acute over time, as other professions such as management, law, and medicine have opened their doors to women. Women with high aptitude or math and science skills have chosen such professions over teaching, perhaps because such professions *do* reward higher productivity among workers of a given seniority.[3]

This paper is also related to the movement described as the "professionalization" of teaching. This movement comprises policies such as in-service training, apprenticeships and peer instruction, higher certification standards for new teachers (rarely for incumbent teachers), and rewards for teachers who earn additional credentials.[4] The movement also includes a proposal to give the National Board for Professional Teaching Standards (NBPTS), the body that accredits education schools, more control over the number and origin of undergraduate degrees granted in education each year.[5] In short, the reform movement contains an element (credentials) that is characteristic of most professions, but it does not combine it with the market orientation of most professions, where credentials maintain minimal standards and rewards are largely based on how the market values a professional. Professionals typically maintain a high degree of market

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[3] See Flyer and Rosen (1997).

[4] The policies described are currently encouraged by the National Association of Teachers and the American Federation of Teachers, whose "professionalization" agendas are described in on their webpages: www.nea.org/resolutions/ and www.aft.org/Edissues/teacherquality/index.htm. Readers may obtain a hard copy of these webpages from the author, should the links change.

[5] See Ballou and Podursky (1998).

orientation and independence.[6] In fact, "professionalization" is a misnomer for the movement as it currently stands, since the cluster of policies is more characteristic of craft unions (with their opposition to market orientation and their traditional reliance on credentials, especially at the point of entry). Yet, the rhetoric of the movement suggests that many teachers *do* want teaching to become more professional, in the sense of becoming filled with high productivity individuals who receive rewards closely linked to their performance.

Very little evidence has been compiled on how school choice affects teachers. Hoxby (1996) shows that Tiebout choice weakens the effect of teachers' unions on wages and schools' productivity, but does not directly examine how choice affects who goes into teaching or how teachers are rewarded.

There are a number of studies of charter and voucher schools that include comments, anecdotes, and even surveys of teachers. These include Finn, Manno, and Vanourek (forthcoming), the Pioneer Institute (1998), and the Goldwater Institute (1999). Such studies provide very helpful evidence on what teachers experience in choice schools, especially their job satisfaction, expectations of their students, frustration with the meager resources on which choice schools often depend, and dislike of the politically charged atmosphere in which choice schools operate. Unfortunately, these studies do not focus on variables that are interesting to economists, and they have the additional disadvantage that they do not present comparable data for public or private school teachers. It is more useful to know that charter school teachers have a certain level

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[6] The independence sometimes takes the form of self-employment or partnership, which are often found in the law, medicine, consulting, accounting, and so on. More often, the independence takes the form of a willingness to switch employers while remaining in the profession. This willingness need not be exercised regularly so long as professionals are rewarded based on the market's valuation of them.

of job satisfaction if one knows how public school teachers rated their job satisfaction when asked an identical question.

Finally, one can gain insight into the effects of choice by comparing teachers in regular public and regular private schools. After all, private schools are routinely subject to market forces and have an incentive to employ teachers who attract tuition-paying students. Ballou (1996) and Ballou and Podgursky (1997, 1998) provide a comprehensive comparison of public and private school teachers. They find that private schools value teacher aptitude more in hiring decisions than public schools do. They also find that teacher pay is less compressed and more closely related to aptitude and scarce skills (such as math and science skills) in private schools than in public schools. There are several reasons, however, why private schools are not a perfect guide to what teachers will experience in choice schools. Because private school tuition is not government funded and parents who send their children to private schools must continue to pay taxes that support public schools, private schools face different financial constraints than choice schools. Also, private schools are more likely (than choice schools) to have a religious affiliation and to select students through admissions testing. Thus, the fact that private schools typically pay teacher salaries that are about 60 percent of local public school salaries (United States Department of Education, *Private School Universe Survey*) is probably due, in part, to the different financial constraints, religious affiliation, and student population of private schools.

III. Empirical Strategy

Consider first an empirical strategy that would work for comparing metropolitan areas with different degrees of school choice. The empirical strategy for comparing schools in

different sectors (public, private, and charter) is an extension of this strategy.

1. The Empirical Strategy for Comparing Metropolitan Areas with Different Degrees of Choice

One needs an index of the degree to which schools face incentives that are driven by parents' choice. Let us call this index "C" and reserve further discussion of it for a few paragraphs. Suppose for a moment that the supply of teachers is the same everywhere in the United States, in the sense that every characteristic of teachers (numbers of individuals, their degrees, the quality of their degrees, their skills, their motivation, and so on) is in the same supply everywhere. Then, a test of whether choice causes schools to demand more, on average, of a certain teacher characteristic *i* is whether $\alpha_1>0$ and $\beta_1>0$ in regressions of the form:

(1) $$Q_m^i = \alpha_0 + \alpha_1 C_m + \ldots + \epsilon_m$$

(2) $$P_m^i = \beta_0 + \beta_1 C_m + \ldots + \xi_m$$

where Q_m^i is the quantity of characteristic *i* in metropolitan area *m*, P_m^i is the wage of characteristic *i* in metropolitan area *m*, and C_m is the index of school choice in metropolitan area *m*. (As a rule, I assume that earnings increase logarithmically in the characteristics, so P_m^i should be considered in that light.) The problem with such a simple test is that there are other factors that raise a metropolitan area's demand for characteristic *i* and these factors may be correlated with the index of school choice. For example, if a metropolitan area has more employment in high technology industries, it may have a greater demand for teachers with math and science skills; and employment in high technology industries could just coincidentally be correlated with the index of school choice. Therefore, it is reasonable to control for observable factors that are likely to be determinants of demand for various teacher characteristics. Let $\boldsymbol{X}$ be this vector of factors. It is also necessary to seek good instruments for the index of school

choice. Such instruments are discussed below. In short, the test should be whether one can reject the joint hypothesis (at a conventional level of statistical significance) that the instrumental variables estimate of α_1 is less than or equal to zero and that the instrumental variables estimate of β_1 is less than or equal to zero, based on regressions of the form:

(3) $$Q_m^i = \alpha_0 + \alpha_1 C_m + \boldsymbol{X}_m \alpha_2 + \epsilon_m$$

(4) $$P_m^i = \beta_0 + \beta_1 C_m + \boldsymbol{X}_m \beta_2 + \xi_m \ .$$

The test will be more informative if metropolitan areas have comparable *supplies* of teachers (that is, if controlling for $\boldsymbol{X}$ makes metropolitan areas reasonably comparable in all other factors that affect the supply of teachers). An omitted determinant of the supply of teachers is, however, unlikely to generate a false conclusion that school choice raises (or lowers) the demand for a certain teacher characteristic. If the determinant of supply raises the supply of the characteristic and is positively correlated with school choice, then α_1 is likely to be greater than zero and β_1 is likely to be less than zero. Conversely, if the determinant of supply raises supply of the characteristic and is negatively correlated with school choice, then α_1 is likely to be less than zero and β_1 is likely to be greater than zero.

2. The Empirical Strategy for Comparing Public, Charter, and Private Schools

Now consider a modified empirical strategy that allows one to compare schools in different sectors: public, private, and charter. The tests will be based on the assumption that charter schools and private schools have greater choice-driven incentives than public schools. (The assumption is not that public schools have *no* choice-driven incentives, but that they have fewer such incentives because their revenues do not depend directly on the number of tuition-paying students they attract.) We can be agnostic about which, private or charter schools, face

greater choice-driven incentives, since we are primarily interested in the public school-charter school comparision.

Let D_j^{public} be an indicator that teacher *j* is in a regular public school; let $D_j^{charter}$ be an indicator that teacher *j* is in a charter school; and let $D_j^{private}$ be an indicator that teacher *j* is in a private school. Then, if charter schools demand more of teacher characteristic *i* than public schools do, $\delta_1 < \delta_2$ and $\gamma_1 < \gamma_2$ in the equations:

$$Q_j^i = \delta_1 D_j^{public} + \delta_2 D_j^{charter} + \delta_3 D_j^{private} + \boldsymbol{X}_k \delta_4 + \eta_j \quad (5)$$

$$P_j^i = \gamma_1 D_j^{public} + \gamma_2 D_j^{charter} + \gamma_3 D_j^{private} + \boldsymbol{X}_k \gamma_4 + \omega_j \ . \quad (6)$$

(I have written equation 6 to make it as parallel to equation 4 as possible, but one cannot estimate it as it written because one does not observe the wage that an individual teacher receives for each of her characteristics. I explain below how I estimate γ_1, γ_2, and γ_3.) Note that $\boldsymbol{X}$ has the subscript "*k*" to remind us that we need to control for the characteristics of the *community* in which the teacher's school is located, not for the teacher's own characteristics.

In this test, the identification problem is that the *existence* of a charter (or private) school may reflect factors in an area that also determine the area's demand for certain teacher characteristics. In principle, one can control for such factors by controlling for the vector $\boldsymbol{X}_k$, which contains the observable community determinants of the demand for characteristic *i*. I pursue this strategy. However, charter schools are not spread equally across the United States because of the significant differences in states' charter school laws. Thus, I focus on the results of an alternative strategy in which I do not depend entirely on controlling for the vector $\boldsymbol{X}_k$. I effectively restrict the sample of public school districts by weighting them according to presence of charter schools locally. Public school districts get a weight based on charter school enrollment

in their metropolitan area (or county, if the district is non-metropolitan). Private schools in the SASS data are not identified with counties or metropolitan areas (even in the restricted access version of the data), but only with states. Private schools are therefore weighted by the enrollment of charter schools in their state. Of course, many metropolitan areas and counties and some states get weights equal to zero under this procedure, and this is reasonable because many areas of the United States do not have laws that make charter schools possible. On the other hand, weighting the sample may exaggerate the difference between charter schools and the average public school if charter schools grow up, say, where public school districts are doing a particularly poor job of rewarding the teacher characteristics that parents value. This is really a matter of interpretation, not a matter of bias, but I do show the results with and without weighting in order to be as general as possible.

There is a additional problem with comparing schools, as opposed to comparing metropolitan areas. The problem is that charter schools may enter and simply replace a part of the public school sector which had demands for teacher characteristics that are the same as the demands that charter schools evince for teacher characteristics. Comparing the charter and public schools afterwards, one would observe a different between the sectors that could more accurately be described as a composition effect. One doubts whether such phenomena could be important, given the fact that charter schools would have little incentive to enter a market (and, possibly, little ability to survive in a market) if public schools already existed that displayed the conduct charter schools were going to display. Nevertheless, I attempt to test for such composition effects, exploiting the fact that no charter schools existed in the earlier SASS surveys. I examine public schools over time to see whether the public school sector in areas that

got the most charter schools (1) lost the largest quantity of teacher characteristics for which charter schools evince demand and (2) lost the part of the sector that paid high wages to teachers with the characteristics for which charter schools evince demand.

Regardless of how it was carried out, the test of composition effects would depend largely on two states, Arizona and Michigan, where charter school teachers are a sufficiently large share of all teachers that one might be able to discern whether the public school sector was changing as charter schools replaced part of it. Arizona passed its charter school law in 1994 and Michigan passed its law in 1993.[7] In order to have comparable "before" and "after" data, I have to turn to data collected by individual states. Only Michigan has appropriate data on teachers, so my test of composition effects focuses on Michigan, where the effects are likely to be discernable if they occur.

3. The Measurement of Teacher Characteristics and the Wages Paid to those Characteristics

I measure the quantity of teacher characteristics in metropolitan areas simply by taking the weighted average of the characteristics of teachers in the SASS, where the weights are the sample weights provided by SASS. I measure the wage of a teacher characteristic by estimating the slope of the relationship between teachers' log earnings and teachers' characteristics among teachers who are in the metropolitan area. That is, for each metropolitan area, I run a univariate regression of teachers' earnings on their values of the characteristic, and I obtain a slope for each metropolitan area.

For the regressions in which the school's sector (public, charter, private) is the measure of

[7] Most other states passed their laws after 1993 (the exceptions are Minnesota and California).

choice-based incentives, one simply needs to estimate an intercept for each sector, using equation 5, to get estimates of the quantity of the characteristic in each sector. One can then examine the effect of choice on the quantity of the characteristic by comparing these intercepts. To get estimates of the wage of the characteristic in each sector, one needs to move around the terms of equation 6 to get an estimating equation:

$$y_j = \lambda_1 D_j^{public} + \lambda_2 D_j^{charter} + \lambda_3 D_j^{private} + \gamma_1 D_j^{public} Q_j^i + \gamma_2 D_j^{charter} Q_j^i + \gamma_3 D_j^{private} Q_j^i + \boldsymbol{X}_k \gamma_4 + \omega_j \ . \tag{7}$$

In equation 7, λ_1 is the income of a public school teacher who has a zero quantity of the characteristic and γ_1 is the wage of the characteristic in the public sector.[8] Analogously, λ_2 is the income of a charter school teacher who has a zero quantity of the characteristic and γ_2 is the wage of the characteristic in the charter sector; and λ_3 is the income of a public school teacher who has a zero quantity of the characteristic and γ_3 is the wage of the characteristic in the private sector. One can then examine the effect of choice on the wage of the characteristic by comparing these coefficients.

4. Instrumental Variables for the Metropolitan Area Measures of School Choice

Equations 3 and 4 are estimated by instrumental variables. The set of instruments is:

$$(\boldsymbol{S}_m, \boldsymbol{R}_m, \boldsymbol{X}_m) \ , \tag{8}$$

where $\boldsymbol{S}_m$ is a vector of variables that measure the number of larger and smaller streams in a metropolitan area, and $\boldsymbol{R}_m$ is a vector of measures of the population density of nine Jewish and

[8] One might wish to allow the relationship between y_j and $\boldsymbol{X}_j$ to depend on the sector, but this would be impractical given the small number of charter schools. One gets from equation 6 to equation 7 by noting that $P_j^i=[y_j-(\lambda_1 D_j^{public}+\lambda_2 D_j^{charter}+\lambda_3 D_j^{private})]/Q_j^i$.

Christian denominations in 1950. The rationale for this set of instruments is as follows.

Metropolitan areas in the United States vary greatly in the degree to which parents can easily choose a residence in another school district (Tiebout choice) and the tuition that parents have to pay to send their children to a private school of a given quality. Tiebout choice, or traditional choice among public school districts, varies among metropolitan areas mainly because of arbitrary topographic and historical factors. I exploit topographic variation (streams) to identify the effects of Tiebout choice. The tuition for a private school of a given quality varies among metropolitan areas mainly because of historic differences in the population density of various religious groups, which have left some areas with private schools that are well-endowed or have an established donor base. In other areas, private schools have little or no income from contributions with which to subsidize tuition. I exploit variation in religious populations (in 1950, a time at which "traditional" donor bases had been established) to identify the effects of traditional private school choice.

In the United States, Tiebout choice varies from no-choice metropolitan areas like Miami, where one school district contains the entire metropolitan area, to many-choice metropolitan areas like Boston, where there are 70 districts within a 30-minute commute of downtown and more in the entire metropolitan area. Most metropolitan areas are, of course, somewhere between these two extremes. A typical metropolitan area has an amount of choice that corresponds to having four equal-sized school districts (or a greater number of less equally sized districts).

How does one measure the degree of Tiebout choice in a metropolitan area? A particularly good measure is equal to 1 minus a Herfindahl index based on the enrollment shares

of districts in the metropolitan area.[9] This measure has an intuitive interpretation. It is the probability that, in a random encounter, two students in the metropolitan area would be enrolled in different school districts. If there were only one district, as in Miami, this probability would be equal to one. If there were many districts, as in Boston, this probability would be very small (less than 0.05). Formally, the measure is equal to:

$$C_m^{Tiebout} = 1 - \sum_{j=1}^{J} s_{jm}^2 \quad (9)$$

where s_{jm} is equal to the district j's share of enrollment in its metropolitan area (designated by m).

The instrumental variables for this measure should be variables that affect the formation of school districts in a metropolitan area but do not directly affect school districts' conduct. As explained in Hoxby (2000), streams and rivers provide good instruments because, early in American history, they were natural barriers that influenced the drawing of district boundaries. They probably have no direct effect on how schools conduct themselves now.[10]

The number of private school places (of a given quality) that are available at a given tuition varies among metropolitan area in the United States.[11] For instance, in some metropolitan areas, up to 15 percent of the elementary student population is enrolled in private schools where

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[9] Hoxby (forthcoming) describes measures of Tiebout choice in detail.

[10] In order to leave room for a good discussion of the charter school survey data, which is original to this paper, I provide only a cursory explanation of the empirical strategy for identifying the effects of Tiebout choice. Readers will find much more detail in Hoxby (forthcoming).

[11] The quality of a private school can be measured in various ways, the simplest of which is simply the amount of money the private school spends on educating a student. Expenditure sometimes understates the true cost of educating a private school student because, especially in schools with religious affiliation, labor is donated by volunteers and church buildings are used for educational purposes.

tuition is about two-thirds of the schools' per-pupil expenditure. (Typical amounts for schools with religious affiliation would be tuition of about 1600 dollars and expenditure of about 2300 dollars). In other metropolitan areas, fewer than 1 percent of the elementary school population is enrolled in such schools (although places might be available in schools where tuition is higher and there are no tuition subsidies). In a typical metropolitan area, about 6 percent of the elementary school population is enrolled in such schools. In short, the supply of private schooling varies among metropolitan areas, and (thus) the degree to which parents have choice between public and private schools varies among metropolitan areas.

It is reasonable to use the actual share of students who attend private school in a metropolitan area as a measure of private school availability *if* the measure is instrumented with credible instruments. In this case, the best available set of instrumental variables are the population densities of nine religious denominations in 1950 because, at that time, religious groups were building the foundations of the endowments and established donor populations that now allow private schools to offer places at subsidized tuition. So long as one controls for the current ethnic composition of metropolitan areas, the religious composition of 50 years ago probably has no direct effect on how schools conduct themselves now.[12]

IV. Data

The empirical strategy just described requires data on teachers, school districts, private schooling, demographics, geography (streams), and religion. Because the other data are

[12] In order to leave room for a discussion of the charter school survey data, I provide only a cursory explanation of the empirical strategy for identifying the effects of traditional private school choice. Readers will find much more detail in Hoxby (1994).

described elsewhere, I focus mainly on the teacher data in this section.[13]

The SASS is a stratified random sample of public and private school teachers and administrators in the United States. It includes weights to make its statistics nationally representative. I mainly use the 1993-94 sample, which includes 47,105 public school teachers. For some variables, I pool the 1993-94 sample with the 1990-91 sample (46,705 public school teachers) in order to maximize the number of teachers who represent each metropolitan area.[14] I use several SASS variables including the teacher's salary, her years of teaching experience, an indicator for whether she plans to stay in teaching for the next few years, the college at which she earned her baccalaureate degree, an indicator for whether she was a mathematics or science major, the number of undergraduate and graduate courses she has taken in mathematics and science, an indicator for whether she earned her baccalaureate degree in a field of the arts and sciences (as opposed to a degree in education), the number of hours per week (on top of required hours) that she spent on activities related to her students' academic progress, and the number of hours per week (on top of required hours) that she spent on activities related to her students' extra-curricular progress.[15]

To obtain information on charter school teachers that was comparable to information in the SASS data, I distributed three surveys (one for an administrator and two for randomly selected teachers) to every charter school that was listed as being in operation in October 1998.

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[13] For more detailed descriptions of the other data, see Hoxby (2000) and Hoxby (1994).

[14] In practice, pooling the two samples does not affect the point estimates much, but it does increase the precision of the estimates.

[15] There is very little variation in required hours per week for full-time teachers.

The goal of the survey was to provide evidence on who becomes a charter school teacher and what charter school teaching is like as a job (in terms of both duties and rewards). The *Charter School Directory* was the main source of charter school addresses and enrollment information, although it was supplemented by information available on states' charter school websites. A "reminder" postcard was sent and respondents were given a gift certificate towards the purchase of a book. The response rate to the survey was approximately 70 percent (slightly lower for administrators; slightly higher for teachers). The questions were taken from the SASS administrator survey (for the charter school administrator survey) and the SASS teacher survey (for the charter school teacher survey). For the purposes of this paper, it is most important to know that teachers and administrators were asked about teachers' pay, required hours of work, actual hours of work on various activities, teaching and other labor market experience, college background, union membership, and career plans. They were also asked about their own demographic background, their students, the school atmosphere, and their degree of autonomy. Finally, they were asked an optional, open-ended question: "What would you like us to know about your experience as a charter school teacher (administrator)?"

The SASS does not contain a measure of individual teachers' proficiency. The omission is largely unavoidable since, given most states' certification requirements, few teachers in the survey would have taken proficiency tests, and those who would have done so would not necessarily have taken comparable tests. The SASS does, however, contain information about each teacher's college, and a teacher's college is a good indicator of the quality of her education and, to some extent, of her aptitude. In other words, the rating of a teacher's college is a summary statistic of the skills which she had when she completed her degree. (Colleges select

students taking account of their aptitude, high school grades, extracurricular activities, and character. Thus, the selectivity of a teacher's college summarizes a complex set of information on aptitude, industriousness, leadership, creativity, and so on.) The most obvious way to use the college selectivity information would be to assign each teacher the average SAT score of students at the college that she attended. This does not work well in practice because, for teachers, most of the action in college selectivity is among colleges of no to moderately low selectivity, where average SAT scores are poorly defined because so many students do not take an admissions test. Therefore, I use the rating that the college received in the 1982 version of *Barron's Profiles of American Colleges*.[16] I assign the number 9 to colleges that *Barron's* labels "most competitive," the number 8 to colleges that *Barron's* labels "highly competitive plus," and so on down to the number 1 for colleges that are non-selective (that is, colleges that admit nearly any student with a high school diploma or GED).

Administrative data on school districts come from the Common Core of Data (CCD), a universe of administrative data on America's 15,304 school districts. Demographic data were created by aggregating the districts in the School District Data Book (SDDB) up into metropolitan areas. The SDDB is a school district-level special summary of the 1990 Census of Population and Housing. The SDDB is the source of data on the share of enrollment in private schools. The SDDB and the CCD are the sources of data for most of the variables (all at the metropolitan level) in the vector $\boldsymbol{X}_m$: the population, the land area, the log of mean household

[16] The year 1982 was chosen because it is a middle ground. Older teachers attended college before 1982 so a less recent index would be more appropriate for them. Younger teachers attended college after 1982 so an more less recent index would be more appropriate for them. The *Barron's* rankings exhibit, however, a fair amount of stability, so the choice of the index year is not crucial to the results.

income, the Gini Coefficient based on household income, the share of households with incomes less than 17,500 dollars, the share of households with incomes greater than 75,000 dollars, the share of the population who are black, the share of the population who are Hispanic, the share of the population aged 19 or younger, the share of the population aged 64 or older, the share of the population with at least some college education, the share of the population with a four year college education, and indicators for the 9 census regions of the United States. The remaining variable in the vector $\boldsymbol{X_m}$ is the share of teachers who are members of organizations that engage in collective bargaining. The source for this variable is the author's 1992 update of the Employment Files of the 1987 Census of Governments.[17]

For the test of composition effects, I use a few variables collected by Michigan and Arizona for their "school report cards." The variables are teacher experience, degrees, and salaries.

The numbers of larger and smaller streams come from inspection of the 24,000 quadrangle series of maps and from the Geographic Names Information System (GNIS), all of which are products of the United States Geographic Survey (USGS). The religious data are from 1950 edition of the Survey of Churches and Church Membership. I use the population density of nine denominations (which together account for most of the religiously affiliated private schooling in the United States): Baptist, Catholic, Episcopalian, Friends, Jewish, Lutheran, Methodist, Mormon, and Presbyterian.

Tables in the appendix show descriptive statistics for teaching related variables.

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[17] Relatively few districts began doing collective bargaining for the first time between 1987 and 1992. Thus, most unionization information is contained in the 1987 Census of Governments and little updating is required.

V. The Effects of Traditional Choice on the Teaching Profession: Results

All of the tables have a similar structure. Dependent variables are listed across the top of the table. For each dependent variable, there are two columns. The one on the left shows the coefficients from the quantity-of-the-characteristic equation (equation 3). The one of the right shows the coefficients of interest from the wage-paid-to-the-characteristic equation (equation 4). Coefficients on the other control variables are not shown, but the control variables are listed in the notes to the table. It is worth noting that the estimated coefficients on the control variables are what one might expect. For instance, in metropolitan areas where the population is more educated, teachers have attended more selective colleges.[18] Because I need to use instrumental variables, I estimate linear probability models, rather than probit models, when the dependent variable is a binary variable.[19]

The test in this section is whether both quantity and the wage of the characteristic are increasing in the measures of choice (which are instrumented). Consider Table 1, which shows the effects of traditional choice on some measures of the quality of teachers' college education. The first column of Table I shows that teachers who work in a metropolitan area with more Tiebout and more private school choice attended more selective colleges. An area with maximal Tiebout choice has teachers who attended colleges that were ranked 0.403 levels higher than an

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[18] These results are available from the author and will be placed in an appendix if there is a demand for them.

[19] That is, is impractical to estimate probit or multinomial probit models with instrumental variables and Moulton standard errors. Note that the *Barron's* rating is categorical, so multinomial probit would be the most appropriate estimation methods if it were practical.

area with minimal Tiebout choice.[20] An area with a high degree of private school choice has teachers who attended colleges that were ranked 0.13 (0.627·0.2) levels higher than an area with minimal private school choice.

Investigation reveals that, for teachers, nearly all of the action in the *Barron's* ranking is among colleges assigned the numbers 6 ("competitive plus") to 9 (non-selective). This is not surprising. Teachers are known to be disproportionately drawn from the bottom half of the college-going population's aptitude distribution.[21]

Therefore, the second dependent variable in Table 1 is an indicator for the ranking being greater than or equal to 6. Compared to a teacher in a metropolitan area with minimal Tiebout choice, a teacher in an area with maximal Tiebout choice is 8.4 percent more likely to attend a college that is at least "competitive plus" in selectivity. A high degree of private school choice gives an additional 5.4 (0.270·0.2) percent boost to teachers' probability of attending a college that is at least "competitive plus." In short, the quantity of the characteristic "attended a college that is at least competitive plus" is higher in metropolitan areas with more traditional choice. The next column shows the log wages associated with that characteristic. Compared to a teacher in a metropolitan area with minimal Tiebout choice, a teacher in an area with maximal Tiebout choice gets a wage that is 8.0 percent higher if she attended a college that is at least "competitive plus" in selectivity. The degree of private school choice does not have a statistically significant

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[20] Unless I explicitly state otherwise, all estimates that I discuss are statistically significantly different from zero at the 10 percent level at least. The vast majority are statistically significant at the 5 percent level.

[21] This is an oft-repeated fact. See Murnane (1984), Murnane and Olsen (1989,1990), Manski (1997), or Monk (1994).

effect on the wage for this characteristic. Overall, it appears that schools that are in metropolitan areas with more Tiebout choice *are* moving up the supply curve for teachers' college quality. That is, they have a greater demand for teachers' college quality. It is unclear whether metropolitan areas with more private school choice also have greater demand.

The next column shows results when the dependent variable is an indicator for the ranking being greater than or equal to 7 ("competitive"). A teacher in an area with maximal Tiebout choice is 16.5 percent more likely to attend a college that is at least "competitive" than is a teacher in an area with minimal Tiebout choice. A teacher in an area with a high degree of private school choice is 5.3 (0.268·0.2) percent more likely to attend a college that is at least "competitive" than is a teacher in an area with minimal private school choice. A teacher in an area with maximal Tiebout choice gets a wage that is 6.6 percent higher if she attended a college that is at least "competitive" in selectivity. The degree of private school choice does not have a statistically significant effect on the wage for this characteristic. In short, the estimates in the two right-hand columns of Table I confirm the estimates in the two middle columns: schools in environments of greater Tiebout choice demand more college quality from teachers.

Table II is motivated by the substantial body of evidence that suggests that schools have a particular need for teachers who have math or science skills. Indeed, schools have a need for teachers who have baccalaureate degrees in any field of the arts and sciences (as opposed to education) because they have subject knowledge that is useful in grades 7 through 12. The table shows that, in areas with more traditional school choice, teachers are more likely to have math and science skills. To commence, note that only 7.2 percent of teachers in the United States were math or science majors. A teacher in an area with maximal Tiebout choice is 1.1 percentage

points more likely (or 15.2 percent more likely) to be a math or science major and took 0.238 more math and science courses than is a teacher in an area with minimal Tiebout choice. A teacher in an area with a high degree of private school choice is 0.70 percentage points more likely (9.7 percent more likely) to be a math or science major and took 0.20 (0.978·0.2) more math and science courses than a teacher in an area with minimal private school choice. Among teachers who have math and science skills, those who work in metropolitan areas with more traditional choice earn more. A teacher who is a math or science major earns 15.6 percent more if she is in an area with maximal Tiebout choice (as opposed to an area with minimal Tiebout choice) and earns 14.1 (0.704·0.2) percent more if she is an area with a high degree of private school choice (as opposed a minimal degree of private school choice).

The two right-hand columns of the table show that there are roughly similar results for a teacher's having majored in a subject area. A teacher in an area with maximal Tiebout choice is 2.6 percentage points more likely to have majored in a field of the arts and sciences and the wage for this characteristic is 5.6 percent higher in an area with maximum Tiebout choice. The degree of private school choice in an area does not have a statistically significant effect on teachers' probability of having majored in a subject area, but it does have a positive, statistically significant effect on the wage of this characteristic. Overall, Table 2 suggests that schools in environments with more traditional choice have a greater demand for teachers with subject area skills, particularly skills in math and science.

Table III examine two measures of effort and one measure of control that are reported by

teachers.[22] The first two variables in the table are the number of hours that the teacher spends on instructional tasks (like tutoring) and the number of hours that the teacher spends on non-instructional tasks (like directing a school play) *beyond* the required hours in their contracts. The third dependent variable is the teacher's assessment of the control that she exercise over her teaching (particularly teaching methods and the organization of material). Private school choice does not have a statistically significant effect on extra hours, either instructional or non-instructional. However, compared to teachers in an area with minimal Tiebout choice, teachers in an area with maximal Tiebout choice spend 2.3 extra hours per week on instructional work and 1.1 extra hours per week on non-instructional work. Also, compared to teachers in an area with minimal Tiebout choice, teachers in an area with maximal Tiebout choice spend earn 0.7 percent more for every extra instructional hour per week and 0.3 percent more for every non-instructional hour per week. In short, it appears that schools that face Tiebout choice demand more effort and independence from their teachers. It is unclear what effect private school choice has.

Table IV shows the relationships between traditional choice and teachers' credentials. There is almost no variation in whether teachers in the SASS have a baccalaureate degree, but there is variation in whether they have master's degrees, whether they are certified at all, and whether they are certified in the area in which they actually teach. (In most states, there is little restriction on a teacher's--once certified--taking on assignments that are relatively remote from the field in which she was certified.) It is worth noting that many teachers' union contracts (and

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[22] Interestingly enough, the teachers' self-reports are highly correlated with their administrators' reports regarding the effort and control that they (administrators) think that their teachers exert.

other teachers' contracts) *specify* salary increases for master's degrees and for being certified. Therefore, what one is examining in Table IV is whether traditional school choice motivates schools to make such salary increases larger than they would be in the absence of choice.

Examining the master's degree columns, one sees that traditional forms of choice have no statistically significant effect on the quantity of master's degrees and have small, negative effects on the wage increases associated with master's degrees. A teacher in an area with maximal Tiebout choice gets a wage that is 2 percent lower if she has a master's degree than she would in an area with minimal Tiebout choice. A teacher in an area with a great deal of private school choice gets a wage that is 1.5 (0.2*-0.075) percent lower if she has a master's degree than she would in an area with minimal private school choice. Traditional choice has no statistically significant effects on the quantity of or the wage paid to certification (in any field). It does appear, however, that Tiebout choice raises the demand for teachers who are certified to teach in the area in which they actually teach. Their quantity is 5.8 percentage points greater and their wages are 8.7 percent higher in areas with maximal Tiebout choice. In practice, this result is probably closely related to the math and science results in Table II because math and science can be a major source of teachers teaching outside the area in which they have been certified.

Tables Va and Vb are an interesting digression. They are motivated by the difficulty that schools have retaining teachers who are graduates of selective colleges or who have math and science skills. The coefficients on the interactions between the school choice variables and the variables that indicate that the teacher is skilled suggest that schools that face greater school choice retain skilled teachers longer. (Both the experience and the teachers' self-reported plans

suggest this.[23]) This may be a consequence of such teachers being more highly paid in districts that face more choice-based incentives.

In summary, Tables I through V suggest that traditional forms of school choice increase schools' demand for teachers who were educated at selective colleges, math and science skills, subject area skills, effort, and perhaps independence. The traditional forms of choice do not appear to increase schools' demand for teachers who have master's degrees or who are certified to teach.

VI. Results Comparing Charter, Public, and Private School Teachers

Table VI is identical in structure to Table 1, except that the school choice variables are replaced by indicator variables for public, charter, and private schools. The results shown are from equations 5 and 7, which are estimated at the individual teacher level with standard errors that allow for school grouping. Charter school teachers' data are weighted by the number of students in their schools so that the data represent the charter school scene as it exists across the nation today.[24] For public and private school teachers, I show statistics that are weighted to be representative of the areas where charter schools operate (as described above). Results with alternative weights are available from the author.

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[23] Specifically, the table shows that math and science teachers are more likely to leave teaching. They have 1.2 fewer years of experience and are 5.5 percent less likely to say that they plan to continue teaching. Their tendency to leave early is mitigated in areas with significant school choice. In an area with maximal Tiebout choice and a high degree of private school choice, math and science teachers have only 0.4 fewer years of experience (-1.190+0.422+1.904·0.2) and are no less likely to say that they plan to continue teaching.

[24] In other words, the sampling method purposely oversampled teachers in small charter schools, some of which have only a few teachers. The weights undo the oversampling.

The main test, in these tables, is whether the coefficients on the charter school indicators show that charter schools hire *more* of a teacher characteristic than public schools do and pay a *higher* wage to that characteristic. If there are statistically significant *positive* differences between the charter and public school coefficients in the quantity equation and between the charter and public school coefficients in the wage equation, one may infer that charter schools have a greater demand for the teacher characteristic. For example, consider the middle columns of Table VI, which have the indicator for a teacher's college being at least "competitive plus" as the dependent variable. All else equal, about 20.3 percent of public school teachers are from such colleges, 36.1 percent of charter school teachers are from such colleges, and 36.4 percent of private school teachers are from such colleges. In the public sector, teachers from such colleges are paid 3.1 percent more. In charter schools, they are paid 6.6 percent more. The differences between the public and charter school coefficients (in both the quantity and wage regressions) are statistically significant at the 5 percent level in one-sided t-tests. This suggests that charter schools demand more teachers who have graduated from colleges that are at least "competitive plus." The other columns in Table VI reinforce this conclusion, if a bit less resoundingly. For instance, all else equal, 81.4 percent of public school teachers are from colleges that are at least "competitive," and 88.2 percent charter school teachers are. Public school teachers from "competitive" colleges are paid 1.9 percent more; charter school teachers from "competitive" colleges are paid 3.9 percent more.

Table VII has the same structure and topic as Table II: math, science, and subject area skills. It shows that, all else equal, about 7.9 percent of public school teachers, 10.3 percent of charter school teachers, and 6.8 percent of private school teachers are math or science majors. In

the public sector, math and science majors are paid about 4.4 percent more. In charter schools, they are paid about 8.4 percent more. The public and charter school wage coefficients are statistically significantly different at the 5 percent level, but the public and charter school quantity coefficients are not. Similar statements made be made with respect to the number of math and science courses. The results for subject area majors confirm the results for math and science majors. All else equal, about 36.7 percent of public school teachers, 56.1 percent of charter school teachers, and 41.9 percent of private school teachers majored in a subject area. In the public sector, subject area majors earn a 4.0 wage premium, while in charter schools, they earn about 6.5 percent more. These differences are statistically significant at the 5 percent level. All in all, it appears that charter schools demand more teachers who have majored in a subject area, especially math or science.

Table VIII corresponds to Table III and examines measures of effort and control. The two left-hand columns indicate that, all else equal, public school teachers work 8.693 extra instructional hours per week, charter school teachers work 13.417 extra instructional hours per week, and private school teachers work 8.678 extra instructional hours per week. The difference between the charter and public school teachers is highly statistically significant. In the public sector, teachers are paid 0.05 percent *less* for every extra instructional hour they work (the number is statistically significant even though very small). In charter schools, they are paid 4.9 percent more. The differences between the public and charter school coefficients (in both the quantity and wage regressions) are statistically significant at the 5 percent level in one-sided t-tests. This suggests that charter schools demand teachers who are willing to put in extra instructional time. Interesting enough, teachers in all sectors work about the same number of

non-instructional hours per week. The point estimates in the wage equation are higher for charter and private school teachers than for public school teachers, and the charter-public difference in the wage for non-instructional hours is marginally statistically significant. The other columns in Table VI reinforce this conclusion, if a bit less resoundingly. In public schools, teachers claim to have control over their teaching of 4.8 on a 6 point scale. Charter and private school teachers claim to have control over their teaching of about 5.6 on a 6 point scale. Public sector teachers are paid 3.5 percent *less* for every point of control they claim to have; charter and private school teachers are paid about 3 percent more for every point of control they claim to have. In the two right-hand columns, the differences between the charter and public school teachers are highly statistically significant.

Table IX, like Table IV, examines credentials and school choice. The table shows that, all else equal, about 43.7 percent of public school teachers, 41.3 percent of charter school teachers, and 28.4 percent of private school teachers have master's degrees. In the public sector, teachers with master's degrees are paid about 24.9 percent more. In charter schools, they are paid about 20.0 percent more. Furthermore, nearly all public school teachers are certified, while only 87.4 percent of charter and 65.2 percent of private school teachers are. In the public sector, where there is almost no variation in certification, it is hard to determine what the wage premium for certification is. In private schools, there appears to be a small negative premium of 1.4 percent. The point estimate for charter schools is similar but not statistically significant. These results suggest that private schools may actually *prefer* non-certified teachers, and that charter schools probably have less a demand for them than public schools do. About 97.4 percent of public school teachers claim to be certified in their teaching area, while only 82.6 percent of

charter and 54.4 percent of private school teachers do. The public school teachers earn a substantial wage premium of 9.4 percent, compared to a premium that is not statistically significantly different from zero for charter teachers and a 2.1 percent premium for private school teachers. All in all, it appears that public schools have greater demand for degrees and certification than private or charter schools.

In Table X, I use administrative data from Michigan school districts to test for composition effects. The table attempts to show whether charter schools are simply taking a pre-existing part of the local public schools and giving it the charter school nomenclature. For instance, if there were an innovative magnet school in the district with specially qualified teachers, its place and teachers could possibly be taken by a charter school. This seems unlikely, since charter schools get smaller per-pupil budgets than public schools, but it is a possibility that is worthy of investigation.

The table shows statistics on teacher salaries, degrees, and attendance in districts where charter schools have taken over no enrollment, more than zero but less than five percent of enrollment, and more than five percent of enrollment. The 1994-95 school year is the "before-charter-schools" year; the 1998-99 school year is the "after" year. If composition effects exist, then the before-after changes in the teacher variables should reflect the degree of charter school incursion. In fact, one would be hard-pressed to find any differences in the patterns between the three types of districts, let alone a pattern that supports the notion of composition effects. For instance, if charter schools disproportionately took energetic, high effort teachers, then one would expect the teacher attendance rate to fall in districts with large charter school incursions. In fact, the teacher attendance rate does not change at all (in any of the three types of districts).

In short, there do not appear to be composition effects in the districts in which they would be most likely to be found if they existed.

VII. Other Differences between Charter, Public, and Private Schools

It is worth noting answers to some other survey questions. In describing their past jobs and what job they would be doing if they were not in their current job, charter school teachers described a *much* broader array of occupations than did public school teachers. Many have held jobs in business, public service organizations, or colleges. Charter school administrators described an even wider array of occupations than charter school teachers did. In short, one reason that charter school teachers have teaching experience of about 10 years, compared to public and private school teachers who have experience of about 15 years, is that they have experience in other occupations. Of course, part of the difference in experience is an artifact of the start-up nature of many charter schools.

Charter, public, and private school teachers are all about equally likely to say that they plan to continue teaching. This result is surprising because one would expect charter school teachers to be more likely to stop teaching, given that they are younger, often on their first job, and trying out an experimental type of school. One does not expect veteran public school teachers, whose jobs contain few surprises and who are vested in their district's benefit plans, to behave like teachers testing new waters.

The average charter school teacher earns 8.2 percent less than the average public school teacher (32,070 dollars as opposed to 34,690 dollars), but she earns 50 percent more than the average private school teacher, whose salary is 21,286 dollars. Charter school teachers are more

likely to earn additional pay as a bonus for merit or extra work than are public school teachers (2,407 dollars as opposed to 582 dollars). Charter school teachers do, however, have more required hours per week (37.9 for charter, 33.6 for public, and 31.9 for private school teachers) in addition to their greater "extra" hours. Charter school teachers' open-ended responses often featured descriptions of the extra work they found themselves doing (cleaning, construction, and so on), but the statistics suggest that their non-instructional work may be more unusual in its *content* than in the time it takes. If one takes account of extra pay and extra hours and computes an hourly wage for each group, one finds that charter school teachers earned about 12.6 dollars per hour, public school teachers earned about 15.5 dollars per hour, and private school teachers earned about 9.7 dollars per hour.

It is worth noting that many administrators wrote on their surveys that they had simply adopted the local school district's salary scale when they started up their charter school. They usually wrote this to introduce the statement that they were in the midst of completely revamping their salary scale, having come to realize the district's salary scale did not allow them to recruit and retain the teachers they wanted.

The union question was the sole question that is not identical to the question in the SASS. A chronic problem in questions about teachers' unions is that teachers frequently are not given enough information to know whether they are being asked if they are represented by a *union* (which engages in collective bargaining and other union activities) or whether they are being asked if they belong to a professional association. To clarify the question, I substituted the word "union" for "teachers' organization" and prompted the teacher by mentioning "NEA affiliates" and "AFT affiliates." In any case, 23 percent of charter school teachers report being members of

a union, whereas 80 percent and 56 percent of public and private school teachers report being members of a "teachers' organization." The numbers for the public and private school teachers certainly exaggerate the extent of unionization. The employment files of the Census of Governments suggest a number like 65 percent for the public school teachers. There is no good source for unionization among private school teachers, but 56 percent is far beyond any number suggested by observers of private schools.

Charter and private school teachers are slightly more likely to report having assigned homework in the past week (87 and 84 percent) than are public school teachers (80 percent).

Finally, teachers responded to a number of questions about the degree of influence and control they exercise over various aspect of their schools. The teachers gave responses on integer scale from 1 to 6, where 1 was "no control/influence" and 6 was "complete control/influence." A clear pattern emerges from the 10 responses. Charter school teachers think that they have the most influence over school policy, although they claim to have about the same control over classroom decisions as private school teachers. Compared to charter and private school teachers, public school teachers think they have much less influence over school policy and much less control over classroom decisions. It is worth noting that, by an overwhelming margin, the most prominent theme in charter school teachers' open-ended responses was "autonomy." Nearly half of the 62 percent of teachers who chose to write something decided to write about autonomy. No other theme was discussed by more than 20 percent of writers.

VIII. Conclusions

I commenced this paper with the assertion that many people assume that American

teachers only stand to lose from school choice, despite the fact that economics suggests that choice could have some benefits for the teaching profession. The evidence presented in this paper suggests that school choice could change the teaching profession by raising the demand for teachers with high quality college education, raising the demand for teachers with subject area (especially math and science) skills, raising the demand for teachers who make extra effort and are independent, and lowering the demand for certification. Although some incumbent teachers would dislike such changes, other incumbent teachers and some prospective teachers would like them. Note that theory suggests that the teacher characteristics for which choice raises demand are characteristics that parents value when they make choices. Presumably, society cares not just about whether parents like these characteristics, but about the power of these characteristics to produce better educated children. Such an investigation is beyond the scope of this paper.

In summary, evidence based on both traditional forms of choice (Tiebout choice among public school districts, choice of private schools) and charter school teachers suggests that school choice would create a more high-powered incentive environment within the teaching profession, in the sense that teachers would be required to have higher levels of human capital and effort in return for higher marginal wages for such characteristics.[25] Under increased school choice, less able or motivated incumbent teachers might find themselves earning smaller salary increases than some of their peers. Such teachers might be more likely to leave the teaching profession early. This would reverse the current pattern, in which able teachers are more likely to exit early.

It is worth emphasizing that, at least for new teachers, selection into the profession could

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[25] Specifically, I mean "high-powered" as the phrase is used in the literature on mechanism design.

change quickly in an environment where growing choice schools offered a disproportionate share of the new teaching positions. It would take longer for the changed nature of selection into teaching to make itself felt among the ranks of veteran teachers. Such teachers would notice change only when their schools began to feel competition for students from choice schools and, as a consequence, began to feel stronger incentives to demand teachers whose characteristics attract parents.

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Table I
Traditional Forms of School Choice & College Education Quality among Teachers
Instrumental Variables Estimates[a]

Measure of College Quality:	Barron's Rating of the Selectivity of Teachers' College (1=nonselective, 9=most selective)		Teacher's College was at least "Competitive Plus" in Selectivity[b]		Teacher's College was at least "Competitive" in Selectivity[c]	
	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic
Index of Choice among Public School Districts in Teacher's Metropolitan Area	0.403**	0.042	0.084**	0.080**	0.165**	0.066**
	(0.041)	(0.049)	(0.010)	(0.042)	(0.015)	(0.032)
Share of Students who Attend Private Schools in Teachers' Metropolitan Area	0.627**	1.033	0.270**	0.281	0.268**	0.274
	(0.250)	(0.649)	(0.103)	(0.692)	(0.096)	(0.687)
Other Control Variables	yes[d]	yes[d]	yes[d]	yes[d]	yes[d]	yes[d]
Number of Observations (metropolitan areas)	292	292	292	292	292	292
Number of Teachers on whom metro area statistics are based	26,474	26,474	26,474	26,474	26,474	26,474

[a] This table shows instrumental variables estimates of equations 3 and 4 in the text. The observations are metropolitan areas. The source for teacher data is the 1993-94 SASS data (the relevant questions were not asked in the 1990-91 SASS). One asterisk indicates the coefficient estimate is statistically significantly different from zero at the 10 percent level. Two asterisks indicate that the coefficient estimate is statistically significantly different from zero at the 5 percent level. Additional sources of data are the CCD, SDDB, GNIS, Survey of Churches and Church Membership 1950, and United States Geographic Survey maps. The instruments are the number of larger and smaller streams in the metropolitan area (which are significant determinants of the amount of Tiebout choice) and the population density of 9 religious denominations in 1950 (which are significant determinants of the supply of private schooling).

[b] Colleges that are "Competitive Plus" consider applicants who have grade point averages of B- at least and who rank in the top 67% of their graduating class. These colleges typically report median SAT scores between 500 and 525.

See next page for additional notes.

[c] Colleges that are "Competitive" consider applicants who have grade point averages of C+ at least and who rank in the top 67% of their graduating class. These colleges typically report median SAT scores between 425 and 500.

[d] The control variables that are not shown are all measured at the metropolitan area level. They are the population, land area, log of mean household income, Gini Coefficient based on household income, share of households with incomes less than 17,500 dollars, share of households with incomes greater than 75,000 dollars, share of the population who are black, share of the population who are Hispanic, share of the population aged 19 or younger, share of the population aged 65 or older, share of the population with at least some college education, share of the population with a four year college education, share of public school teachers who are represented by an organization that does collective bargaining, and indicators for the 9 census regions of the United States.

Table II
Traditional Forms of School Choice & Math, Science, and Subject Area Skills among Teachers
Instrumental Variables Estimates[a]

Measure of Skills:	Teacher was a Math or Science Major		Number of College Courses Teacher Took in Math and Science		Teacher Majored in a Subject Area (not education)	
	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic
Index of Choice among Public School Districts in Teacher's Metropolitan Area	0.011**	0.156**	0.238**	0.026	0.026**	0.056*
	(0.006)	(0.054)	(0.117)	(0.022)	(0.010)	(0.029)
Share of Students who Attend Private Schools in Teachers' Metropolitan Area	0.035*	0.704**	0.978*	0.311**	0.064	0.226*
	(0.019)	(0.247)	(0.546)	(0.117)	(0.067)	(0.126)
Other Control Variables	yes[b]	yes[b]	yes[b]	yes[b]	yes[b]	yes[b]
Number of Observations (metropolitan areas)	308	308	308	308	308	308
Number of Teachers on whom metropolitan area statistics are based	53,846	53,846	53,846	53,846	53,846	53,846

[a] This table shows instrumental variables estimates of equations 3 and 4 in the text. The observations are metropolitan areas. The source for teacher data is the 1993-94 SASS data (the relevant questions were not asked in the 1990-91 SASS). One asterisk indicates the coefficient estimate is statistically significantly different from zero at the 10 percent level. Two asterisks indicate that the coefficient estimate is statistically significantly different from zero at the 5 percent level. Additional sources of data are the CCD, SDDB, GNIS, Survey of Churches and Church Membership 1950, and United States Geographic Survey maps. The instruments are the number of larger and smaller streams in the metropolitan area (which are significant determinants of the amount of Tiebout choice) and the population density of 9 religious denominations in 1950 (which are significant determinants of the supply of private schooling).

[b] The control variables that are not shown are all measured at the metropolitan area level. They are the population, land area, log of mean household income, Gini Coefficient based on household income, share of households with incomes less than 17,500 dollars, share of households with incomes greater than 75,000 dollars, share of the population who are black, share of the population who are Hispanic, share of the population aged 19 or younger, share of the population aged 65 or older, share of the population with at least some college education, share of the population with a four year college education, share of public school teachers who are represented by an organization that does collective bargaining, and indicators for the 9 census regions of the United States.

Table III
Traditional Forms of School Choice & Effort and Independence among Teachers
Instrumental Variables Estimates[a]

Measure of Effort/Independence:	Extra Instructional Hours Teachers Work (on top of required hours)		Extra Non-Instructional Hours Teachers Work (on top of required hrs)		Control Teachers have over Teaching Methods (scale of 1 to 6)	
	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic
Index of Choice among Public School Districts in Teacher's Metropolitan Area	2.279**	0.007**	1.095**	0.003*	0.076	0.010
	(0.659)	(0.003)	(0.507)	(0.002)	(0.102)	(0.008)
Share of Students who Attend Private Schools in Teachers' Metropolitan Area	0.872	0.031	1.122	0.033	0.646*	0.036
	(0.639)	(0.117)	(0.775)	(0.063)	(0.392)	(0.031)
Other Control Variables	yes[b]	yes[b]	yes[b]	yes[b]	yes[b]	yes[b]
Number of Observations (metropolitan areas)	308	308	308	308	308	308
Number of Teachers on whom metropolitan area statistics are based	53,846	53,846	53,846	53,846	53,846	53,846

[a] This table shows instrumental variables estimates of equations 3 and 4 in the text. The observations are metropolitan areas. The source for teacher data is the 1993-94 SASS data (the relevant questions were not asked in the 1990-91 SASS). One asterisk indicates the coefficient estimate is statistically significantly different from zero at the 10 percent level. Two asterisks indicate that the coefficient estimate is statistically significantly different from zero at the 5 percent level. Additional sources of data are the CCD, SDDB, GNIS, Survey of Churches and Church Membership 1950, and United States Geographic Survey maps. The instruments are the number of larger and smaller streams in the metropolitan area (which are significant determinants of the amount of Tiebout choice) and the population density of 9 religious denominations in 1950 (which are significant determinants of the supply of private schooling).

[b] The control variables that are not shown are all measured at the metropolitan area level. They are the population, land area, log of mean household income, Gini Coefficient based on household income, share of households with incomes less than 17,500 dollars, share of households with incomes greater than 75,000 dollars, share of the population who are black, share of the population who are Hispanic, share of the population aged 19 or younger, share of the population aged 65 or older, share of the population with at least some college education, share of the population with a four year college education, share of public school teachers who are represented by an organization that does collective bargaining, and indicators for the 9 census regions of the United States.

Table IV
Traditional Forms of School Choice & Credentials among Teachers
Instrumental Variables Estimates[a]

Measure of Credentials:	Master's Degree		Certified to Teach		Certified in Teaching Area	
	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic
Index of Choice among Public School Districts in Teacher's Metropolitan Area	0.006 (0.010)	-0.020** (0.006)	-0.024 (0.017)	0.003 (0.037)	0.058** (0.018)	0.087* (0.048)
Share of Students who Attend Private Schools in Teachers' Metropolitan Area	0.039 (0.043)	0.075** (0.027)	-0.004 (0.007)	0.011 (0.025)	0.038 (0.074)	0.020 (0.050)
Other Control Variables	yes[b]	yes[b]	yes[b]	yes[b]	yes[b]	yes[b]
Number of Observations (metropolitan areas)	308	308	308	308	308	308
Number of Teachers on whom metropolitan area statistics are based	53,846	53,846	53,846	53,846	53,846	53,846

[a] This table shows instrumental variables estimates of equations 3 and 4 in the text. The observations are metropolitan areas. The source for teacher data is the 1993-94 SASS data (the relevant questions were not asked in the 1990-91 SASS). One asterisk indicates the coefficient estimate is statistically significantly different from zero at the 10 percent level. Two asterisks indicate that the coefficient estimate is statistically significantly different from zero at the 5 percent level. Additional sources of data are the CCD, SDDB, GNIS, Survey of Churches and Church Membership 1950, and United States Geographic Survey maps. The instruments are the number of larger and smaller streams in the metropolitan area (which are significant determinants of the amount of Tiebout choice) and the population density of 9 religious denominations in 1950 (which are significant determinants of the supply of private schooling).

[b] The control variables that are not shown are all measured at the metropolitan area level. They are the population, land area, log of mean household income, Gini Coefficient based on household income, share of households with incomes less than 17,500 dollars, share of households with incomes greater than 75,000 dollars, share of the population who are black, share of the population who are Hispanic, share of the population aged 19 or younger, share of the population aged 65 or older, share of the population with at least some college education, share of the population with a four year college education, share of public school teachers who are represented by an organization that does collective bargaining, and indicators for the 9 census regions of the United States.

Table Va
Other Effects of Traditional Forms of School Choice
Instrumental Variables Estimates[a]

	Teacher's Years of Teaching Experience	Teacher Plans to Continue Teaching for at least the Next Few Years
Teacher's College was at least "Competitive"[b]	-2.439**	-0.084**
	(0.987)	(0.043)
Teacher's College was at least "Competitive"[b] · Index of Choice among Public School Districts	0.621*	0.041**
	(0.382)	(0.022)
Teacher's College was at least "Competitive"[b] · Percent of Students who Attend Private Schools	0.666*	0.071
	(0.388)	(0.170)
Index of Choice among Public School Districts in Teacher's Metropolitan Area	1.992**	-0.052
	(0.785)	(0.034)
Share of Students who Attend Private Schools in Teachers' Metropolitan Area	15.717**	-0.203
	(3.677)	(0.161)
Other Control Variables	yes[c]	yes[c]
Number of Observations	26,474	26,474
Number of Metropolitan Areas Represented	292	292

Table Vb
Other Effects of Traditional Forms of School Choice
Instrumental Variables Estimates[a]

	Teacher's Years of Teaching Experience	Teacher Plans to Continue Teaching for at least the Next Few Years
Teacher mainly teaches secondary Math or Science	-1.190**	-0.055**
	(0.605)	(0.028)
Teacher mainly teaches secondary Math or Science · Index of Choice among Public School Districts	0.422*	0.039*
	(0.263)	(0.023)
Teacher mainly teaches secondary Math or Science · Percent of Students who Attend Private Schools	1.904*	0.146*
	(1.112)	(0.082)
Index of Choice among Public School Districts in Teacher's Metropolitan Area	-1.739**	-0.033
	(0.553)	(0.023)
Share of Students who Attend Private Schools in Teachers' Metropolitan Area	16.712**	-0.103
	(2.346)	(0.098)
Other Control Variables	yes[c]	yes[c]
Number of Observations	53,846	53,846
Number of Metropolitan Areas Represented	308	308

Table VI
Schools with Different Levels of Choice & College Quality among Teachers[a]

Measure of College Quality:	Barron's Rating of the Selectivity of Teachers' College (1=nonselective, 9=most selective)		Teacher's College was at least "Competitive Plus" in Selectivity[b]		Teacher's College was at least "Competitive" in Selectivity[c]	
	quantity of this characteristic	log wage paid to this characteristic	quantity of this characteristic	log wage paid to this characteristic	quantity of this characteristic	log wage paid to this characteristic
Public School	2.260 (0.085)	0.0074 (0.0019)	0.203 (0.044)	0.031 (0.006)	0.814 (0.016)	0.019 (0.005)
Charter School	2.814 (0.202)	0.0281 (0.0114)	0.361 (0.088)	0.066 (0.016)	0.882 (0.045)	0.039 (0.013)
Private School	2.559 (0.116)	0.0222 (0.0030)	0.364 (0.061)	0.045 (0.009)	0.839 (0.023)	0.034 (0.008)
Other Control Variables	yes[d]	yes[d]	yes[d]	yes[d]	yes[d]	yes[d]
Number of Public School Teacher observations	93,810	93,810	93,810	93,810	93,810	93,810
Number of Charter School Teacher observations	1,090	1,090	1,090	1,090	1,090	1,090
Number of Private School Teacher observations	15,014	15,014	15,014	15,014	15,014	15,014

[a] The observations are teachers. The standard errors allow for grouping at the school level. The source for teacher data is the 1990-91 SASS, the 1993-94 SASS, and the charter school survey. Additional sources of data are the CCD and SDDB.

[b] Colleges that are "Competitive Plus" consider applicants who have grade point averages of B- at least and who rank in the top 67% of their graduating class. These colleges typically report median SAT scores between 500 and 525.

[c] Colleges that are "Competitive" consider applicants who have grade point averages of C+ at least and who rank in the top 67% of their graduating class. These colleges typically report median SAT scores between 425 and 500.

See next page for additional notes.

[d] The control variables that are not shown are all measured at the local school district level. They are the population, land area, log of mean household income, Gini Coefficient based on household income, share of households with incomes less than 17,500 dollars, share of households with incomes greater than 75,000 dollars, share of the population who are black, share of the population who are Hispanic, share of the population aged 19 or younger, share of the population aged 65 or older, share of the population with at least some college education, share of the population with a four year college education, and indicators for the 50 states of the United States.

Table VII
Schools with Different Levels of Choice & Math, Science, and Subject Area Skills among Teachers[a]

Measure of Skills:	Teacher was a Math or Science Major		Number of College Courses Teacher Took in Math and Science		Teacher Majored in a Subject Area (not education)	
	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic
Public School	0.079 (0.005)	0.044 (0.004)	1.068 (0.507)	-0.0005 (0.0004)	0.367 (0.060)	0.040 (0.003)
Charter School	0.103 (0.019)	0.084 (0.024)	4.232 (2.209)	0.0032 (0.0023)	0.561 (0.177)	0.065 (0.018)
Private School	0.068 (0.008)	0.092 (0.009)	2.019 (0.769)	0.0040 (0.0011)	0.419 (0.082)	0.076 (0.007)
Other Control Variables	yes[b]	yes[b]	yes[b]	yes[b]	yes[b]	yes[b]
Number of Public School Teacher observations	93,810	93,810	93,810	93,810	93,810	93,810
Number of Charter School Teacher observations	1,090	1,090	1,090	1,090	1,090	1,090
Number of Private School Teacher observations	15,014	15,014	15,014	15,014	15,014	15,014

[a] The observations are teachers. The standard errors allow for grouping at the school level. The source for teacher data is the 1990-91 SASS, the 1993-94 SASS, and the charter school survey. Additional sources of data are the CCD and SDDB.

[b] The control variables that are not shown are all measured at the local school district level. They are the population, land area, log of mean household income, Gini Coefficient based on household income, share of households with incomes less than 17,500 dollars, share of households with incomes greater than 75,000 dollars, share of the population who are black, share of the population who are Hispanic, share of the population aged 19 or younger, share of the population aged 65 or older, share of the population with at least some college education, share of the population with a four year college education, and indicators for the 50 states of the United States.

Table VIII
Schools with Different Levels of Choice & Effort and Independence among Teachers[a]

Measure of Effort/Independence:	Extra Instructional Hours Teachers Work (on top of required hours)		Extra Non-Instructional Hours Teachers Work (on top of required hrs)		Control Teachers have over Teaching Methods (scale of 1 to 6)[c]	
	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic
Public School	8.693 (0.403)	-0.0005 (0.0002)	3.334 (0.095)	0.0013 (0.0002)	4.851 (0.064)	-0.035 (0.002)
Charter School	13.417 (1.742)	0.0049 (0.0024)	3.297 (2.017)	0.0032 (0.0017)	5.563 (0.102)	0.030 (0.016)
Private School	8.678 (0.764)	0.0058 (0.0005)	3.188 (1.233)	0.0025 (0.0004)	5.590 (0.070)	0.033 (0.005)
Other Control Variables	yes[c]	yes[c]	yes[c]	yes[c]	yes[c]	yes[c]
Number of Public School Teacher observations	93,810	93,810	93,810	93,810	93,810	93,810
Number of Charter School Teacher observations	1,090	1,090	1,090	1,090	1,090	1,090
Number of Private School Teacher observations	15,014	15,014	15,014	15,014	15,014	15,014

[a] The observations are teachers. The standard errors allow for grouping at the school level. The source for teacher data is the 1990-91 SASS, the 1993-94 SASS, and the charter school survey. Additional sources of data are the CCD and SDDB.

[b] This variable is coded on a scale from 1 to 6, where 6 is maximum influence and maximum control.

[c] The control variables that are not shown are all measured at the local school district level. They are the population, land area, log of mean household income, Gini Coefficient based on household income, share of households with incomes less than 17,500 dollars, share of households with incomes greater than 75,000 dollars, share of the population who are black, share of the population who are Hispanic, share of the population aged 19 or younger, share of the population aged 65 or older, share of the population with at least some college education, share of the population with a four year college education, and indicators for the 50 states of the United States.

Table IX
Schools with Different Levels of Choice & Credential among Teachers[a]

Measure of Credentials:	Master's Degree		Certified to Teach		Certified in Teaching Area	
	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic	effect on quantity of this characteristic	effect on log wage paid to this characteristic
Public School	0.437 (0.002)	0.249 (0.004)	0.998 (0.001)	0.001 (0.007)	0.974 (0.001)	0.094 (0.010)
Charter School	0.413 (0.018)	0.200 (0.043)	0.874 (0.029)	-0.016 (0.022)	0.826 (0.036)	0.017 (0.016)
Private School	0.284 (0.005)	0.211 (0.009)	0.652 (0.007)	-0.014 (0.006)	0.544 (0.007)	0.021 (0.010)
Other Control Variables	yes[c]	yes[c]	yes[c]	yes[c]	yes[c]	yes[c]
Number of Public School Teacher observations	93,810	93,810	93,810	93,810	93,810	93,810
Number of Charter School Teacher observations	1,090	1,090	1,090	1,090	1,090	1,090
Number of Private School Teacher observations	15,014	15,014	15,014	15,014	15,014	15,014

[a] The observations are teachers. The standard errors allow for grouping at the school level. The source for teacher data is the 1990-91 SASS, the 1993-94 SASS, and the charter school survey. Additional sources of data are the CCD and SDDB.

[b] This variable is coded on a scale from 1 to 6, where 6 is maximum influence and maximum control.

[c] The control variables that are not shown are all measured at the local school district level. They are the population, land area, log of mean household income, Gini Coefficient based on household income, share of households with incomes less than 17,500 dollars, share of households with incomes greater than 75,000 dollars, share of the population who are black, share of the population who are Hispanic, share of the population aged 19 or younger, share of the population aged 65 or older, share of the population with at least some college education, share of the population with a four year college education, and indicators for the 50 states of the United States.

Table X
Test for Composition Effects: Michigan Districts

		no charter schools	charter schools>=0 & <=5% of enrllmnt	charter schools>=5% of enrllmnt
Average Teacher Salary ($1998)	1994-95 school yr	42,952	45,944	48,325
	1998-99 school yr	42,917	45,397	48,185
% of Teachers with MAs	1994-95 school yr	0.42	0.40	0.46
	1998-99 school yr	0.45	0.43	0.51
Teacher Attendance	1994-95 school yr	0.97	0.96	0.96
	1998-99 school yr	0.97	0.96	0.96

Source: Author's calculations using Michigan Department of Education data (available online: www.state.mi.us).

Appendix Table I
Mean Characteristics of Charter, Public, and Private School Teachers[a]

	Charter Teachers	Public Tchrs (comparable to Charter Tchrs)[b]	Public Tchrs (nationally representatve)[c]	Private Tchrs (comparable to Charter Tchrs)[b]	Private Tchrs (nationally representatve)[c]
female	0.77	0.64	0.72	0.75	0.77
white	0.90	0.76	0.86	0.85	0.92
black	0.06	0.05	0.08	0.04	0.03
Hispanic	0.03	0.10	0.04	0.04	0.03
Asian	0.01	0.07	0.01	0.06	0.01
American Indian	0.01	0.03	0.01	0.01	0.01
family income,1998$	58,929.54	71,137.74	69,355.15	58,045.89	57,133.27
year of birth	1960.13	1949.24	1949.69	1951.02	1949.81
attended private college	0.31	0.20	0.25	0.46	0.51
%ile, avg verbal SAT	60.97	49.02	44.04	59.11	59.12
%ile, avg math SAT	49.49	39.17	34.47	48.74	48.57
certified teacher?	0.87	0.96	0.97	0.54	0.65

[a] The table contains the mean characteristics of charter, public, and private school teachers. See Appendix Table II for the number of observations in each category. The sources of the data are the charter school survey and the SASS.

[b] Teachers are weighted by the number of charter school students in their state-urbanicity cell to make them more comparable to charter school teachers, who are not evenly distributed throughout the United States.

[c] Teachers are weighted by SASS weights designed to make the statistics nationally representative.

Appendix Table II
Mean Characteristics of Charter, Public, and Private School Teachers[a]

	Charter Teachers	Public Tchrs (comparable to Charter Tchrs)[b]	Public Tchrs (nationally representatve)[c]	Private Tchrs (comparable to Charter Tchrs)[b]	Private Tchrs (nationally representatve)[c]
experience	10.16	16.38	17.15	15.27	13.47
plan to keep teaching	0.79	0.79	0.79	0.81	0.79
salary	32,069.52	34,689.98	32,392.34	21,286.23	20,030.05
additional pay/bonus	2,406.98	581.81	714.44	n/a	n/a
required hours per week	37.91	33.61	33.59	31.86	33.41
member of a union	0.23	0.81	0.82	0.56	0.56
assign homework	0.87	0.80	0.78	0.84	0.81
influence on curriculum[c]	4.98	3.25	3.14	4.53	4.34
influence on discipline[c]	4.89	3.26	3.21	4.44	4.35
influence on in-service training [c]	4.48	3.08	3.06	3.63	3.66
influence on student grouping [c]	4.40	3.17	3.18	3.83	3.88
control over discipline [c]	5.13	4.35	4.34	5.15	5.25
control over homework [c]	5.40	4.90	4.89	5.36	5.43
Number of Observations	1,090	93,810	93,810	15,014	15,014

[a] The table contains the mean characteristics of charter, public, and private school teachers. The sources of the data are the charter school survey and the SASS.
[b] Teachers are weighted by the number of charter school students in their state-urbanicity cell to make them more comparable to charter school teachers, who are not evenly distributed throughout the United States.
[c] Teachers are weighted by SASS weights designed to make the statistics nationally representative.
[d] This variable is coded on a scale from 1 to 6, where 6 is maximum influence and maximum control.