



WORKING PAPER #11  
LOWERING THE BAR OR MOVING THE TARGET: A  
WAGE DECOMPOSITION OF MICHIGAN'S  
CHARTER AND TRADITIONAL PUBLIC SCHOOL  
TEACHERS

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## Introduction

School choice and teacher quality are two issues that are currently at the forefront of education policy debate. The wisdom of expanding school choice opportunities is hotly debated by opposing groups – advocates and opponents both want a quality education to be available to all children but they differ over the governance structure that will maximize the chances of meeting that goal. Opponents of school choice often voice concerns that the quality of the education received by students will suffer under choice. They worry that a market mechanism may exacerbate current inequities in schooling and that parents will not have access to the information they need to be discriminating consumers of educational services. Proponents often maintain that the only way to improve school quality on a large scale is through the market mechanism of choice. Some even argue that a fundamental cause of mediocrity in schools is the institutional structure necessary for democratic control of public schools (Chubb & Moe, 1990).

Another issue that is receiving a great deal of attention is teacher quality. Teacher quality matters. Most people, if for no other reason than their experiences as students, would agree that teachers make a difference in student learning. Parents recognize the importance of teacher quality every time they request a specific teacher for their child. In fact, according to a 1998 Harris poll, 90% of Americans believe that the most important factor in improving student achievement is having a well-qualified teacher in every classroom (Sparks, 2000). The federal government also recognizes the importance of teaching quality. The No Child Left Behind Act of 2001 requires that all teachers of core academic subjects be “highly qualified” by the end of the 2005-2006 school year. This requirement applies to all public schools, whether traditional or charters.

This paper brings together these two important issues, choice and teacher quality, by examining the impact that one choice program – Michigan’s charter schools – is having on teacher quality within the state. Michigan’s charter school teachers have different characteristics than the state’s traditional public school teachers and it is unclear whether this is a positive or negative development. Charter school opponents argue that charter schools are unwilling to pay for high quality teachers and instead hire young, uncertified, underqualified teachers to staff their schools. Charter school proponents argue that charter schools do take teacher quality seriously, but focus on demonstrated teaching ability rather than less meaningful bureaucratic criteria.

This paper analyzes the salary determinants of Michigan’s charter and traditional public schools using information from the 1999-2000 Schools and Staffing Survey. Salary determinants include school characteristics (e.g., urbanicity and student poverty), teacher characteristics (e.g., years of experience, certification status, and selectivity of undergraduate institution attended), and teacher perceptions of employment conditions (e.g., degree of influence in school decision making and school climate). Using the **Blinder-Oaxaca** wage decomposition technique, wage effects that are due to different characteristics of traditional and charter school teachers are disentangled from wage effects that are due to different administrator choices about valued teacher characteristics. For example, teachers in Michigan’s traditional schools generally have more experience and are more highly paid than their counterparts in charter schools. The decomposition allows wage differences due to higher experience endowments among teachers in traditional schools to be separated from wage effects due to the fact that traditional school administrators are willing to pay a higher return to experience than their charter school

counterparts. Understanding the current staffing choices being made by charter school administrators will assist policymakers in crafting thoughtful charter school accountability measures that promote high teacher quality without undermining innovation in teacher selection.

## Literature Review

The quality of a school's teaching force has a significant effect on student learning (Goldhaber, 2002; Sanders & Horn, 1998; Wenglinsky, 2000) and has a larger impact on student achievement than any other measurable factor under the control of the school (Rivkin, Hanushek, & Kain, 2000). While the importance of good teaching is well documented, the teacher characteristics correlated with good teaching have not been clearly established. Years of experience appear to be positively associated with teacher quality but this effect may only be strong during the first few years of a teacher's career (Goldhaber, 2002; Rivkin et al., 2000). Some studies have found that fully certified teachers outperform those who are not similarly credentialled (Darling-Hammond, Berry, & Thoreson, 2001) while others have found little difference between fully certified teachers and those who are teaching with emergency credentials (Goldhaber & Brewer, 2000). The possession of master's degrees does not appear to positively impact teacher quality (Rivkin et al., 2000) yet most teachers receive a higher salary for earning advanced degrees. The selectivity of a teacher's undergraduate institution (Ehrenberg & Brewer, 1994; Summers & Wolfe, 1977) and high scores on tests of verbal ability (Ehrenberg & Brewer, 1995) are both positively correlated with teacher quality. The possession of a major in the subject area taught has also been found to be associated with

higher teacher quality, particularly for math and science teachers (Monk, 1994). When modeling implicit salary schedules for Michigan's traditional public and charter schools, most of the above factors will be included in the analysis. The only exception is verbal ability – no measures of that variable are available in the data set.

It seems sensible for schools to select teachers with characteristics that are positively correlated with high quality teaching and to pay higher salaries to those teachers. This is not always happening. Ballou (1996) finds that, even when given a choice among applicants willing to accept the offered salary, traditional public school administrators do not tend to select applicants who graduated from more selective colleges or have a major in the subject area in which they are planning to teach. In addition, salary schedules often reward teachers only for years of experience and the possession of advanced degrees – this is the case in approximately 95% of traditional public school districts in the United States (Goldhaber, 2001). Given the controversy regarding the characteristics that are associated with good teaching, it is difficult to say whether or not this experience- and education-based salary schedule will attract and retain high quality teachers, but it does ignore many teacher characteristics that are correlated with quality.

The assertion has been made that schools facing competition will be more likely to base teacher hiring and retention decisions on quality considerations (Hanushek & Rivkin, 2001; Hoxby, 2000). Since charter schools face a competitive environment, they have an incentive to staff their schools with teachers who are seen as highly qualified. In addition, charters are a relatively new addition to the educational landscape and do not have a long history of rewarding years of experience and advanced degrees – this may

make it easier for them to design salary schedules that differ from the traditional public school norm.

While salary information for charter school teachers has been largely unavailable, previous researchers have been able to look at the characteristics of charter school teachers and compare them to the characteristics of traditional public school teachers. Charter school teachers are generally less experienced and less likely to be certified than traditional public school teachers (Bomotti, Ginsberg, & Cobb, 1999; Gill, Timpane, Ross, & Brewer, 2001; Podgursky & Ballou, 2001). Michigan's charter school teachers are even less experienced than their counterparts in other states (Horn & Miron, 1999). Previous research has also found that Michigan's charter school teachers are much more likely to be certified than charter school teachers in other states (Miron & Nelson, 2002). This finding is not surprising since Michigan, unlike many other states, requires all of its charter school teachers to hold regular certification.

A few studies include information on charter school salaries. Podgursky and Ballou (2001) find that charter school salaries are competitive with public school salaries for teachers with similar experience levels. They also find that the most important factors affecting initial salary offers by charter school administrators are the experience and education of the prospective teacher – this is similar to the criteria in the salary schedules used by most traditional public schools. Unlike traditional public schools, charter schools seem to be willing to pay more for teachers who attended selective colleges and tend to hire more teachers who attended selective colleges than traditional public schools do (Hoxby, 2000). In addition, almost one-third of charter schools pay bonuses for teachers in certain subject areas, most often math and science (Podgursky & Ballou, 2001)

Teachers make employment decisions based on both the salary offer and the nonwage characteristics for a particular position. Non-pecuniary job characteristics may offset the generally lower salaries offered by charter schools. Charter school teachers are typically quite satisfied with their positions but teachers in traditional public schools report high levels of satisfaction as well (Buckley & Fisler, 2002). Teachers in Colorado charter schools report a greater sense of empowerment in their classrooms (but less empowerment in their schools) than traditional public school teachers (Bomotti et al., 1999). When asked why they choose to teach in a charter school, the majority of teachers select “the freedom to teach the way I want” from a menu of possible responses (Koppich, Holmes, & Plecki, 1998). This is consistent with the Colorado finding of greater classroom empowerment in charter schools. More than one-quarter of charter school teachers also mention desirable student attributes as a factor in their employment decision (Koppich et al., 1998).

#### Determinants of Teacher Salaries

Teacher salaries are a function of supply and demand. Each school requires a relatively inelastic number of teachers each school year. School or district administrators make salary offers that they hope will attract and retain teachers with desirable characteristics.

For Michigan’s traditional public schools, these offers are based on a district salary schedule that is negotiated with the teachers’ union. The base salary level and any wage differentials are established through the collective bargaining process. Wage differentials are usually limited to certification status, years of teaching experience, and

the earning of degrees beyond the baccalaureate level. In contrast, the majority of Michigan's charter schools do not establish salaries through the collective bargaining process. The only exception to this is the small number of charters that are authorized by the school board of a local district – they are bound by the district's collective bargaining agreement (*Charter school teachers*, 2002). Charter school operators are usually free to make wage offers that reflect differentials for characteristics the school operator feels are important. These might include selectivity of undergraduate institution attended, grade level taught, and subject matter taught.

Potential teachers consider these offers in light of any alternative employment offers that may be available and the nonpecuniary characteristics of a given position. Since only teachers who accepted wage offers for the 1999-2000 school year are considered in this model, we will assume that any alternative employment offers were less desirable than the teacher's current position. The nonpecuniary characteristics of a position are of interest because of the potential impact that they have on compensating wage differentials. These nonpecuniary characteristics of employment include school characteristics such as urbanicity and student poverty and the teacher's perception of employment conditions such as influence over school policy. Ideally, the school characteristics and teacher's perception of employment conditions would be measured at the time of the wage offer. This is not possible due to the limitations of the data so it will be assumed that school characteristics and teacher's perceptions during the school year are similar to those that existed at the time the wage offer was accepted.

To summarize, administrators make salary offers based on the characteristics of individual teachers and teachers accept or reject these offers based on the amount of the offer and the nonpecuniary characteristics of the job.

### ***The Legislative Framework***

Michigan's charter schools (which are legally designated as "Public School Academies" rather than as charter schools) were established in 1996 by Public Law 380, also known as Act 451. Article 1, part 6A, section 380.505 of this law discusses the restrictions placed on teacher hiring. It states that, "Except as otherwise provided by law, a public school academy shall use certificated teachers according to state board rule."

("The Revised School Code," 1976) There are three situations in which a charter school may use noncertificated individuals as teachers. These situations are; when a full time tenured or tenure track public university faculty member is the teacher in a charter that is operated by that state public university, when a full time member of a community college teaches a subject they have taught at that community college for at least five years and that community college is the operating entity, and in situations where a school district would be permitted to use noncertified teachers.

Twenty states in addition to Michigan require charter school teachers to be certified. Eleven states require that some percentage of teachers in a charter school be certified while five states and Washington, DC do not require teachers in charters to be certified (*Charter school teachers*, 2002).

The Michigan legislation does not mandate any restrictions on charter schools' salary levels or schedules and, outside of the certification requirement, does not discuss

desirable teacher qualifications. These matters are left to the individual school's discretion. Charter school operators establish teacher salaries in twenty-four states (including Michigan) and in Washington, DC. Collective bargaining agreements are the basis for charter school teacher salaries in ten states and procedures for setting salaries vary in the remaining three states that have charter schools (*Charter school teachers*, 2002).

Methodology

### **Description of the Sample**

This paper uses data collected as part of the 1999-2000 Schools and Staffing Surveys (SASS). Data from the public school teacher and school surveys and the charter school teacher and school surveys are included.

The sampling frame for the public school survey is the set of schools included in the 1997-98 Common Core of Data. Districts and principals are identified from the set of sampled schools. Teachers are then chosen from a list of current teachers provided by the selected schools. The weighted response rate for Michigan's school survey is 89.5% and the Michigan teacher survey has a 73.5% weighted response rate (Gruber, Wiley, Broughman, Strizek, & Burian-Fitzgerald, 2002).

The charter school survey is a population survey, rather than a sample. All charter schools that were operational in 1998-1999 and were still open in the 1999-2000 school year are included in the survey. The weighted response rate for the charter school survey is 86.1% and the weighted response rate for the teacher survey is 71.8% (Gruber et al., 2002).

## Data Cleaning

This analysis uses a sub-sample of the public and charter school teacher survey data. Only teachers who characterize themselves as regular full-time teachers are included in the sample. Respondents who describe themselves as regular part-time teachers, itinerant teachers, long-term substitutes, short-term substitutes, teacher's aides, student teachers, administrators, media specialists, other professional staff, or support staff are dropped from the sample. This results in the exclusion of 11.7% of the sample. Almost half of these excluded cases were itinerant teachers – teachers who provide instruction at more than one school. Itinerant teachers were excluded because the salary and school characteristic information for these teachers would only reflect the location where they completed the survey (which may not have been the school where they taught most of the time) and because they may have adjusted their salary information to reflect the portion that they thought “belonged” with that school’s survey.

The unweighted traditional public school sample includes 723 teachers. These teachers are weighted in the analysis to represent 86,507 traditional public school teachers made up of 45,401 elementary school teachers and 41,106 secondary school teachers. For middle schools, I defer to NCES’s classification. If middle schools contain any combination of grades 5 and below, they are considered elementary schools. Otherwise, they are considered secondary schools.

The unweighted charter school sample includes 468 teachers. The charter school weighted sample represents 1,954 teachers- 1,332 elementary school teachers and 622 secondary school teachers.

Cases with any missing variables are dropped from the final analysis. Table 1 shows the number of cases that are dropped from each sample because of missing values for particular variables. If a variable is not listed, there are no missing cases for that particular variable.

Variable	Traditional Public Schools	Charter Schools
Initial number of cases	723	468
- selectivity of undergraduate institution	-19	-30
- percent minority students	-3	-16
- has master's degree	-3	-8
- percentage of students eligible for free and reduced lunch	-90	-86
Final number of cases	616	356

Note: The numbers do not add up because some cases had missing values for more than one variable.

The missing cases for selectivity of undergraduate institution includes 38 cases where teachers did not report the requested information. There are 11 additional cases where teachers did report their undergraduate institution but that university is not ranked by Barron's. Most of these are theological seminaries or institutions located outside of the United States.

The frequency distributions for percentage of minority students and percentage of students eligible for free and reduced lunch were examined to make sure that the missing cases did not produce an unusual distribution. The missing cases for each variable did not appear to come from a particular part of the distribution.

*Variables used in the Model*

Lnwage: The dependent variable used in this model is the log of teacher's self-reported academic year base teaching salary. Michigan's charter school teachers earn significantly less than traditional school teachers in the state (see Table 2) but this may reflect lower endowments for certain characteristics among charter school teachers rather than simply being the result of depressed pay scales.

	Traditional Public Schools	Charter Schools
Less than \$25,000	1.3	6.6
\$25,001 – 35,000	19.0	78.7
\$35,001 – 45,000	22.9	11.0
\$45,001 - \$55,000	25.6	3.5
\$55,000 +	31.3	.2

All numbers are expressed in percentages unless otherwise specified.

Teacher characteristics: All of these variables pertain to teacher characteristics that school employers may find desirable or, in the case of the union variable, that may change the nature of the salary offer process.

Exper and Expersq: These variables reflect a teacher's total years of teaching experience in both public and private schools. The quadratic form of this variable is also included to reflect the diminishing marginal return to teacher quality of increasing years of experience. Charter school teachers in Michigan have fewer years of teaching experience than their counterparts in traditional public schools (see Table 3).

	Traditional Public Schools	Charter Schools
One year	5.2	20.8
Two or Three years	7.7	35.4
Four or Five years	12.6	19.0
Six to Ten years	16.7	12.4
Eleven or more years	57.8	12.3

Certif: This dummy variable is based on whether or not a teacher is certified in his or her main teaching assignment<sup>1</sup>. The regression includes a certification variable with “1” representing possession of a regular, advanced, provisional, or probational certificate and “0” representing teachers reporting temporary, emergency, or no certification. Table 4 provides a breakdown of teachers’ certification status for their main teaching assignment.

Table 4: Certification in Main Teaching Assignment of Michigan’s Public School Teachers		
	Traditional Public Schools	Charter Schools
Regular, advanced, provisional, or probational certificate	96.6	72.9
Temporary or emergency certificate or uncertified	3.4	27.1

Michigan’s charter school teachers are much less likely to possess a regular, advanced, provisional, or probational certificate in their main assignment area than traditional school teachers. This finding is surprising given that Miron and Nelson (2002) report that 92.8% of Michigan’s charter school teachers describe themselves as certified to teach in Michigan and, as discussed above, Michigan law requires teachers to be certified in almost all cases. This is not simply due to a large proportion of charter school teachers

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<sup>1</sup> A teacher is considered certified if he or she possesses a regular, advanced, provisional, or probational certificate. In Michigan, provisional certificates are issued to teachers who have completed all the requirements for certification but have fewer than three years of teaching experience. The Schools and Staffing Survey listed this type of certificate as “probational.” The survey defined a “provisional” certificate as one given to persons who are currently participating in an alternative certification program. During the survey period, Michigan did not have any state approved alternative certification programs. Due to the potential confusion over the survey’s wording, both responses were treated as meeting the requirements for a provisional certificate in Michigan.

who are certified in subjects other than their main teaching assignment. Table 5 reports the highest certificate held in any subject area and there is still a large proportion of Michigan charter school teachers who do not report regular, advanced, provisional, or probational certification. Highest certificate held is not included in the regression since it is so highly correlated with certification in main teaching assignment.

	Traditional Public Schools	Charter Schools
Regular, advanced, provisional, or probational certificate	98.0	77.1
Temporary or emergency certificate or uncertified	2.0	22.9

Masters: This dummy variable reflects whether or not teachers possess master's degrees. No distinction is made between degrees in education, in subject matter specializations, or in other fields. Traditional public school teachers are much more likely to have master's degrees than teachers in charter schools are (Table 6).

	Traditional Public Schools	Charter Schools
Has master's degree	55.9	21.0
Does not have master's degree	44.1	79.0

Collrank: Collrank describes the selectivity of the undergraduate institution that the teacher attended. The descriptions in Table 7 are based on ratings from the Barron's 2001 Profiles of American Colleges and were used to create three dummy variables – colcom1 for attendance at most and highly competitive colleges, colcom2 for attendance at a very competitive college, and colcom3 for attendance at a less competitive or noncompetitive college.

Table 7: Selectivity of Undergraduate Institutions Attended by Michigan's Public School Teachers		
	Traditional Public Schools	Charter Schools
Most competitive	.2	.7
Highly competitive	3.2	3.4
Very competitive	20.9	22.1
Competitive	57.6	47.2
Less competitive	16.7	18.6
Noncompetitive	1.5	8.0

Union: This dummy variable describes whether teachers are members of a “teacher’s union or an employee association similar to a union.” Almost all of Michigan’s full time traditional public school teachers report union membership (98.3%) while very few full time charter public school teachers are members of teacher’s unions (7.2%).

Teamin: This dummy variable describes the teacher’s race – white or non-white. Charter schools have a much larger percentage of non-white teachers than traditional public schools.

Table 8: Race of Michigan's Public School Teachers		
	Traditional Public Schools	Charter Schools
White	89.5	75.4
Non-white	10.5	24.6

Teamale: This dummy variable describes the teacher’s gender – female or male.

Elemtch: This reflects whether a teacher is an elementary (as opposed to secondary) school teacher.

Scitch, Mathtch, and Spedtch: These dummy variables reflect whether or not a teacher's main assignment is in science, mathematics, or special education, respectively. These fields of specialization were chosen because they are commonly considered shortage areas.<sup>2</sup>

Mathmaj, Scimaj: There is evidence that science and math teachers who majored in their subject area may be more effective than science and math teachers who did not. These variables reflect whether teachers majored in one of these subjects. These variables are also interacted with the variables describing whether or not a teacher's main assignment is in one of these areas.

School Characteristics: These variables pertain to characteristics of the school or the school's students that may affect compensating wage differentials demanded by teachers.

Centcity: This variable describes the urbanicity of the school. This is a dummy variable with "1" representing a central city location. "0" represents urban fringes, large towns, small towns, and rural areas.

Rursmall: This dummy variable represents a school that is located in a rural area or small town.

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<sup>2</sup> Each of these variables was also interacted with the certification variable to determine whether teachers who are certified in these fields receive a salary premium beyond the premium for certification in non-shortage areas. This interaction did not have any significant impact on the results for charter schools and it produced a covariance matrix for traditional public schools that was very close to singular. Because of this problem, the interaction was dropped from the regression.

Miner: Miner reflects the percentage of non-white students in a school.

Miner is also interacted with the teacher race dummy since the compensating differentials demanded by white and non-white teachers may operate differently.

Pctfrl: This variable describes the percentage of students in the school eligible for free and reduced lunch.

Schsize: This categorical variable describes the size of a school's enrollment.

The categories are "1" for enrollments of fewer than 50 students, "2" for enrollments of 50-99, "3" for 100-149, "4" for 150-199, "5" for 200-349, "6" for 350-499, "7" for 500-749, "8" for 750-999, "9" for 1000-1199, "10" for 1200-1499, "11" for 1500-1999, and "12" for enrollments of more than 2000 students. School size is also interacted with the Sectch variable since secondary schools tend to be much larger than elementary schools. Teacher's school size preferences may differ depending on whether the teacher works at the elementary or secondary level.<sup>3</sup>

Teacher's Perceptions of Employment Conditions: These variables pertain to teacher's perceptions about characteristics of the school or the school's students. As with the actual characteristics of the school, these perceptions may affect compensating wage differentials demanded by teachers.

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<sup>3</sup> The categorical variable is used rather than the actual enrollment because the dataset has missing cases for the latter while the categorical variable does not have any missing cases.

Students: This scaled variable reflects teacher's perceptions of problems at the school, particularly problems related to student behavior such as disrespect, apathy, alcohol and drug abuse, and tardiness and absenteeism. The larger the scaled value for this variable, the less of a problem these factors are. This variable, and the following two variables, are based on teacher responses to a series of survey questions (see Appendix A). The variables used in the regression were first scaled using a Rasch Rating Scale Model. The resulting logit values were then transformed to a Z-scale for ease in interpretation.

Influence: This scaled variable reflects the influence that teacher's feel they have over school policy. A larger value indicates the perception of greater influence.

Climate: This scaled variable is based on series of questions related to school climate. Areas include the teacher's perceptions of working conditions, collegiality, and administrator behavior. A smaller value for this variable reflects positive teacher perceptions.

## **Description of the Model**

In this model, the variables discussed above are used to predict the log of teacher's annual base salaries:

$$\ln W_i = \mathbf{b}_0 + \mathbf{b}_1 T_i + \mathbf{b}_2 S_i + \mathbf{b}_3 P_i$$

Where W is the teacher's annual base salary,

T is the vector of teacher characteristics,

S is the vector of school and student characteristics, and

P is the vector of teacher's perceptions of employment conditions.

Variables include measures of teacher characteristics (e.g., years of experience and selectivity of undergraduate institution attended); school characteristics (e.g., urbanicity and student poverty); and teacher perceptions of employment conditions (e.g., degree of influence in school decision making and school climate). Separate regressions are run for charter and traditional public school teachers; this generates implicit salary functions for each type of school. The Blinder-Oaxaca decomposition method is then used to separate wage effects due to different characteristics of charter and traditional public school teachers from wage effects that are the result of different reward structures being used in charter and traditional public schools.

#### *The Blinder-Oaxaca Wage Decomposition Methodology*

The Blinder-Oaxaca decomposition method is used to statistically separate wage gaps due to actual differences between two populations and differences due to employer preferences (Blinder, 1973; Oaxaca, 1973). While most commonly used in studies of gender and racial discrimination, the model can be used to look at different preferences between two groups of employers. In this study, it is used to look at preferences of charter school teachers and administrators compared to the preferences of traditional public school teachers and administrators.

The method is based on the standard wage regressions for two populations:

$$\ln W^a = \mathbf{b}_0^a + \mathbf{b}_k^a X^a + \mathbf{e}^a$$

(1)

$$\ln W^b = \mathbf{b}_0^b + \mathbf{b}_k^b X^b + \mathbf{e}^b$$

(2)

where the “a” superscript denotes the first population of interest,

the “b” superscript denotes the second population of interest,

W is the individual’s wage, and

X is the vector of observable employee and school characteristics

Next, the fact that the mean  $\ln W$  for each group is equal to the sum of the means of each X times the predicted  $\beta$  for each X is exploited to produce an equation describing the difference between the average  $\ln W$  for each group:

$$\overline{(\ln W^a - \ln W^b)} = (\hat{\mathbf{b}}_0^a - \hat{\mathbf{b}}_0^b) + (\hat{\mathbf{b}}_k^a \overline{X_k^a} - \hat{\mathbf{b}}_k^b \overline{X_k^b})$$

(3)

Finally, simple algebraic manipulation yields the equation:

$$\overline{(\ln W^a - \ln W^b)} = \hat{\mathbf{b}}_k^a (\overline{X_k^a} - \overline{X_k^b}) + (\hat{\mathbf{b}}_0^a - \hat{\mathbf{b}}_0^b) + \overline{X_k^b} (\hat{\mathbf{b}}_k^a - \hat{\mathbf{b}}_k^b)$$

(4)

The first term is the salary difference due to different average values for each observable characteristic among the two groups. The second term is the difference in intercepts for each of the two groups. The third term is the portion of salary difference that is the result of a different reward structure being used for the two groups. This third term is quite useful because it allows the coefficients for each of our characteristics to

vary between groups, rather than simply being captured in an overall dummy variable for charter school teachers.

There are two main limitations to this method – the index number problem and the fact that analysis is done at the mean. The index number problem refers to the fact that the decision to make one group the reference group and the other the comparison group may affect the results. In other words, if equation (5) was used in place of equation (4), it could change the results of the analysis.

$$(5) \quad \overline{(\ln W^b - \ln W^a)} = \hat{\mathbf{b}}_k^b (\overline{X}_k^b - \overline{X}_k^a) + (\hat{\mathbf{b}}_0^b - \hat{\mathbf{b}}_0^a) + \overline{X}_k^a (\hat{\mathbf{b}}_k^b - \hat{\mathbf{b}}_k^a)$$

In this analysis, traditional public school teachers are used as the reference group for the primary discussion. The analysis was also repeated with charter school teachers as the reference group. When charter teachers are used as the reference group, the results of the wage decomposition are quite different from the results when traditional teachers are the reference group (results with charter teachers as the reference group are available from the author upon request). This is not surprising since the two groups are so different from each other. If the final term in equations 4 and 5 is based on very different values for  $\overline{X}_k$ , it will change the magnitude of the effect that the different pay scales have on the wage difference. If the  $\mathbf{b}$ 's are quite different, it will change the apparent wage difference due to different observable characteristics. This limitation is not problematic – the choice of reference group changes the nature of the questions asked but it does not affect the integrity of the answers to those questions. When traditional public school teachers are used as the reference group, we discover how much the wage gap would

close if traditional public school teachers had the same characteristics as charter school teachers and if charter school administrators rewarded measured characteristics in the same manner as public school administrators. If charter teachers had been used as the reference group, the questions would have been the effect on the wage gap if charter school teachers had the same characteristics and if public school administrators rewarded measured characteristics in the same manner as charter school administrators. Both sets of questions are interesting – this analysis attempts to answer only the first set.

The second limitation – that the analysis is done at the mean – is not addressed in this study. While economists have attempted to address this problem, there is no generally agreed upon solution. The results that follow should be interpreted with caution if the reader is interested in teachers whose characteristics look quite different from those of the average teacher.

## Results of the Regressions and Decomposition

### *Summary statistics for selected variables*

The average charter school teacher in the sample has a substantially lower salary than the average teacher in a traditional public school – 33% less (see Table 9). This is the result of several factors including salaries that are generally set at a lower base level, lower endowments of financially rewarded characteristics (such as experience) than teachers in traditional public schools, and a different reward structure than that used in traditional public schools. The disaggregation of this \$15,560 average salary difference will be the subject of a later section of the paper.

The average traditional public school teacher is much more experienced than the average charter school teacher. This is not surprising – Michigan’s charter school law was not enacted until 1996 so teachers who began their careers with charters would have fewer years of experience than the average traditional public school teacher’s sixteen years of experience. The lower salaries in charters and the fact that most charter schools do not participate in the state’s retirement system gives experienced traditional public school teachers a strong financial incentive to remain in the traditional system even if they are inclined to move to a charter for non-pecuniary reasons.

As mentioned earlier, the overwhelming majority of Michigan’s traditional public teachers is certified. This is not true in Michigan’s charter schools and this finding is troubling since charters are legally required to hire certified teachers. Assuming that charter school operators are not deliberately ignoring the law, this may indicate that they are having difficulty finding certified personnel. Speculation as to the source of this difficulty will wait until the regression results allow for a *ceteris paribus* analysis.

Traditional public school teachers are more likely to have master’s degrees than charter school teachers but their larger number of years in teaching is a likely reason for this difference. Charter school teachers are more likely to have graduated from less or noncompetitive colleges than traditional public school teachers. As with certification, this may be influenced by the demographics of Michigan’s charter schools.

Michigan’s charter school teachers are more likely to be non-white than traditional public school teachers. This may be the result of active recruiting of minority teachers by charter school operators or there may be characteristics of charter schools (such as an embracing of cultural diversity) that make them more attractive to some

minority teachers. Charter school teachers are more likely to be teaching elementary age students (rather than secondary) when compared to traditional public school teachers. This reflects the large proportion of charter schools that include or are limited to the elementary grades.

Charter school teachers are less likely to be male than teachers in traditional public schools. This is not surprising given the lower salaries in charter schools and the large proportion of elementary schools. Few charter school teachers report that special education is their main teaching assignment. This may reflect a smaller proportion of special education students enrolled in these schools or it may be the result of a strong commitment to inclusion in charter schools and an accompanying reduction in the need for special education teachers.

Michigan's charter schools are much more likely to be located in central city areas than traditional public schools. The average minority enrollment in charters is over 50% and over 40% of students are eligible for free and reduced lunch. This is strikingly different from the average traditional public school and may have a significant impact on the teachers who choose to accept positions in charter schools.

Charter schools tend to be smaller than the average traditional public school. Given that many charters are elementary schools and that they are so new, this is not surprising.

Teachers in charter schools have slightly more positive perceptions of their students than teachers in traditional public schools. This is true despite the challenging demographics faced by many charter school teachers. Charter school teachers also feel that they have much more influence over school policy than teachers in traditional public

schools. This is not surprising since charters are generally smaller and have less entrenched bureaucracy than their traditional public school counterparts.

Table 9: Mean values of selected variables		
Variable	Traditional Public Schools	Charter Schools
Annual salary	47,067 (13,088)	31,508 (6,009)
Log of wages	10.719 (.287)	10.342 (.175)
Total experience (years)	16.007 (10.830)	5.588 (6.438)
Certified teacher	.957 (.203)	.744 (.437)
Master's degree	.535 (.499)	.220 (.414)
Graduate of most or highly competitive college	.050 (.218)	.043 (.204)
Graduate of very competitive college	.196 (.397)	.196 (.398)
Graduate of less or noncompetitive college	.169 (.375)	.269 (.444)
Teacher union member	.979 (.143)	.096 (.295)
Teacher non-white	.091 (.288)	.229 (.420)
Teacher male	.383 (.486)	.265 (.442)
Elementary level teacher	.293 (.456)	.571 (.496)
Science main assignment	.104 (.305)	.067 (.249)
Math main assign.	.090 (.286)	.094 (.292)
Special education main assign.	.129 (.335)	.028 (.165)
Majored in science	.087 (.282)	.049 (.216)
Majored in math	.051 (.221)	.041 (.198)
School in central city	.166 (.372)	.491 (.500)

School in rural area/small town	.272 (.446)	.128 (.335)
% minority students in school	17.656 (26.630)	52.095 (41.234)
% students in school eligible for free and reduced lunch	27.163 (26.497)	40.467 (30.533)
School size	7.191 (2.475)	4.957 (1.632)
Teacher perception of students	.318 (1.038)	.374 (.990)
Teacher perception of influence over school policy	-.027 (.950)	.329 (1.128)
Teacher perception of school climate	-.114 (1.021)	-.044 (1.114)

Numbers in parentheses are standard deviations

### *Results of the Regressions*

#### Traditional Public Schools:

Traditional public schools in Michigan almost all use the single salary schedule.

This schedule pays certified teachers based on their years of experience and the acquisition of advanced degrees. Teacher salaries do not reflect whether or not the teacher is certified for the subject(s) he or she is actually teaching. They also reward advanced degrees in any subject equally – a teacher with a master’s degree in mathematics receives the same pay as a teacher with a master’s in geriatric care.

Given the parameters of the uniform salary schedule, it is not surprising that experience and possession of a master’s degree are practically and statistically significant determinants of traditional public school teacher’s salaries. Teachers are paid roughly 4% for each year of teaching experience they have and receive around a 6.7% salary premium for possession of a master’s degree (see Table 10). While it appears that certification is rewarded, the magnitude of the reward is unclear – there are so few uncertified teachers in the sample that the coefficient for certification is not statistically significant.

Certification, experience, and master's degree would be the only important determinants of salaries if teachers were randomly distributed across Michigan's traditional public schools but teachers are not randomly assigned to schools. Teachers have preferences regarding their employment and can express these preferences by demanding compensating differentials under certain conditions.

We might expect teachers who graduated from highly selective colleges to seek out districts and schools with higher salaries since graduates of selective colleges can demand more in the general labor market and we would expect graduates of less competitive colleges to have lower salary expectations. It does not appear that this is the case in traditional public schools – graduates of less or noncompetitive colleges earn roughly 4% more than graduates of competitive colleges. Either the graduates of less prestigious institutions are primarily the ones seeking higher salaries or administrators in traditional public schools prefer these graduates of less prestigious schools. Previous studies (Ballou, 1996; Berliner, 1987; Wise, Darling-Hammond, & Berry, 1987) suggest that the latter may be the case – given a choice, traditional school administrators may be selecting graduates of less selective colleges. This may be the result of geographical considerations that are not included in the model – many teachers work in schools near the high schools that they themselves attended and the pattern of college attendance from various parts of the state may be affecting selection. Also, administrators may be concerned that graduates of more prestigious universities will not remain in teaching for long (Berliner, 1987). They may be willing to forgo college selectivity if they feel that it will improve teacher retention rates. There may also be a tendency for school administrators to be biased against bright candidates (Berliner, 1987). One study

reported that, “It is commonplace for administrators to report that...’the smarter you are, the worse you will do” (Wise et al., 1987, p.59).

A final explanation has to do with the interview instrument used by many public school districts to aid in teacher selection. There is evidence (Berliner, 1987; Wise et al., 1987) that these interview instruments may be biased against graduates of prestigious institutions. Berliner (1987) found that the teacher selection instrument he examined was “severely biased in favor of conventional affective responses, and against content-oriented or more cognitively-oriented individuals” (p. 10). This also appears to be true of the instrument that I examined – an instrument that is heavily used in Michigan’s traditional public schools. For example, one question asks prospective teachers what they enjoy about teaching. According to the rating scale provided with the instrument, the appropriate answer would discuss students rather than the teacher’s enjoyment of his or her subject matter. This focus on the affective domain is found throughout the instrument. If teachers from less selective schools are more likely to provide answers in the affective – rather than content – domain, than graduates of more rigorous schools, the instrument will be biased towards the selection of teachers who graduated from less selective colleges. If traditional public school administrators are heavily dependent on the results of these teacher selection instruments (anecdotally, this appears to be the case in Michigan), this may explain why high paying schools appear to be avoiding the graduates of prestigious undergraduate institutions.

Teacher race, gender, and level taught are all insignificant indicators. The 95% confidence intervals for all three of these variables straddle zero. The same is true for a main assignment of science and math. There is a substantial premium (7%) for teachers

whose main assignment is special education. The premium paid to teachers whose main assignment is special education is the result of contractually agreed upon compensation for the additional duties (such as paperwork requirements and attendance at IEP meetings) that these teachers face when compared to regular education teachers. This extra compensation for special education teachers is often included in contract negotiations between Michigan's school districts and union personnel.

Teachers in rural areas have salaries that are roughly 9% less than their suburban counterparts. This probably reflects the lower cost of living in these areas and the fact that many rural districts are relatively poor and cannot offer large salaries. Teachers in central cities do not make significantly more than suburban teachers – there does not appear to be a compensating differential offered in exchange for the higher cost of living and longer commutes in many of Michigan's cities.

No wage differential exists for schools with a high percentage of students eligible for free and reduced lunch. While not statistically significant ( $p=.018$ ), it appears that schools with a high percentage of minority students pay lower salaries than schools with fewer minority students. This is only the case when high minority schools are employing white teachers – the effect disappears when the interaction between % minority students and a non-white teacher is included.

Larger schools pay roughly 1.5% more than smaller schools. The reason for this relationship between salaries and school size is unclear. Historically, larger schools have paid more than smaller schools (Labaree, 1989) but traditional public school salaries are now set at the district, not school, level. Districts with larger schools (these are often not larger districts – the correlation between district and school size is only .2) appear to be

paying higher salaries than districts with smaller schools. This may be related to cost savings associated with having fewer, larger schools within a district.

Of the variables pertaining to teacher's perceptions of employment conditions, none are statistically significant. If the direction of the salary differential for the climate is correct, teachers demand a premium to teach schools with a less desirable climate. If the direction of the differentials for perception of students and perception of influence over school policy are correct, teachers who face fewer problem behaviors in their students and who have more influence over school policy receive higher salaries than teachers in less desirable situations.

#### Charter public schools:

Charter schools in Michigan are required to staff their schools with certified teachers. Given this mandate and the fact that many of their teachers are not certified, it is reasonable to expect these schools to be willing to pay a salary premium to certified teachers. This is not the case – teachers who are certified in their main assignment are not paid significantly more than uncertified teachers (see table 10).

Experience and the possession of a master's degree are both rewarded financially by charter schools but to a lesser degree than in traditional public schools. Since experience is related to teacher quality, the small (1.5%) premium for each additional year of experience is consistent with rewarding quality predictors. Given the dearth of evidence that advanced degrees are associated with higher teacher quality, the 8% premium paid for a master's degree is a bit surprising. Charters may be forced to offer

this premium in order to compete with traditional public schools or administrators may value advanced degrees more than educational researchers do.

Unlike traditional public schools, charters do not offer perverse financial incentives to graduates of less or noncompetitive colleges. They pay a premium of almost 7% to graduates of most or highly competitive colleges. While not statistically significant, this premium is practically significant. Other than this premium for top schools, charter school administrators appear to be indifferent (from a salary standpoint) to the quality of a teacher's undergraduate institution.

Teachers who belong to a union make significantly more than their non-unionized counterparts. Most of these teachers probably teach in charters that are chartered by the local school district and are covered by the district's collective bargaining agreement.

Non-white charter school teachers are paid almost 11% more than white teachers. Many of Michigan's charters are located in urban areas and have a large minority population. Several stress multiculturalism in their curriculums. Either administrators in these schools are willing to pay a premium for minority teachers or minority teachers select charters, whatever their location or curriculum, that pay the most.

Unlike traditional schools, charters pay a premium to secondary school teachers. Since secondary teachers often have more non-education employment possibilities than elementary teachers, this compensating differential makes sense if schools want to attract and retain high quality secondary teachers.

The subject specialization variables need to be interpreted with caution. While it is at first counterintuitive that teachers whose main assignment is science make almost 8% less than teachers of other subjects, this is more than offset by the 9.5% premium paid

to teachers who majored in science. The net effect is a premium of roughly 1.5% offered to science majors who are teaching science as their main assignment (The interaction of the two was not statistically or practically significant). The results are similar for math teachers but are not as robust.

As with traditional public schools, charters located in central cities do not pay more than those in suburban areas. There are so few Michigan charters in rural areas that a meaningful analysis of any differential for rural schools could not be done. No practically significant salary differential exists for high poverty charter schools. Again, this is similar to the results for traditional public schools.

Charter teachers in schools with a high percentage of minority students are paid substantially more than charter teachers with a lower percentage of minority students. If the percentage of minority students in a school increases from 20% to 70%, the average teacher's salary will increase by 5%. This salary premium appears to be relevant only for white teachers. The student and teacher race interaction term is non-zero only when the teacher's race is non-white. When the teacher is not white, the effect of the interaction negates the effect of the percentage of minority students variable. There is evidence that white teachers are more likely to leave teaching positions when their students are black (Freeman, Scafidi, & Sjoquist, 2002) so it is not unreasonable to expect white teachers to demand a salary premium to teach in high minority schools.

Teacher's perception of influence over school policy is positively related to salaries. This is counterintuitive – we would expect teachers to be willing to trade off increased influence for lower salaries. It is possible that teachers dislike influence over school policy but a more plausible explanation is that charter administrators who allow

teachers to have greater influence over school policy also tend to value their teachers and this greater valuation of teachers is reflected in higher salaries. The results for perception of school climate probably reflects the direction, if not the magnitude, of any salary differential. Charter school teachers appear to demand a premium to teach in schools with a less desirable climate.

Explanatory power of the models:

The traditional and charter wage regressions are able to explain roughly 70% and 40%, respectively, of the salary variation between teachers (see Table 10). The lower explanatory power of the charter regressions is a function of several factors. Virtually all traditional public schools in Michigan use a single salary schedule that rewards teachers for years of teaching experience and for advanced degrees. Charter schools are much less likely to be limited to this type of schedule. The exception is charters that are operated by school districts are included in the district's collective bargaining agreements -- they use the same salary schedule as the traditional public schools in the district. If charters choose to use very complex, nuanced salary schedules, whether explicitly or implicitly, these would be difficult to model and would lower the explanatory power of the regression used here.

Second, charter schools may also be rewarding traits such as teacher's undergraduate GPA or verbal ability that could not be included in the model due to the limitations of the data. This type of reward schedule would also explain the lower  $R^2$  in the charter analysis.

A third possibility is that various charter schools are developing a variety of innovative, but very clear, salary schedules and that aggregation of the data across schools masks the clarity of each individual's school salary schedules. Almost 75% of Michigan's charter schools are operated by for-profit Educational Management Organizations (EMO's) (Miron & Nelson, 2002). It is likely that each of these EMO's has a clear salary schedule but aggregating across EMO introduces quite a bit of heterogeneity. A final possibility is that charter schools do not have particularly coherent salary schedules and that salary decisions are made somewhat capriciously. This would also reduce the explanatory power of the models.

Table 10: Results of the Regressions		
Variable	Traditional Public Schools	Charter Schools
R-squared	.726	.403
Total experience (years)	.041** (.003)	.015** (.004)
Total experience squared	-.001** (.000)	-.0003** (.000)
Certified teacher	.067 (.048)	.020 .024
Master's degree	.133** (.018)	.080** (.026)
Graduate of most or highly competitive college	-.072* (.042)	.068 (.046)
Graduate of very competitive college	-.002 (.017)	.012 (.021)
Graduate of less or noncompetitive college	.042** (.021)	-.002 (.019)
Teacher union member	-.043 (.066)	.063** (.030)
Teacher non-white	-.039 (.056)	.109** (.043)
Teacher male	.005 (.017)	-.029 (.018)
Elementary level teacher	.073 (.086)	-.095* (.056)
Science main assignment	.047 (.031)	-.078** (.032)

Math main assignment	.033 (.042)	-.045 (.051)
Special education main assignment	.073** (.023)	-.022 (.045)
Majored in science	-.037 (.029)	.095** (.030)
Majored in and teaching science as main assignment	-.014 (.050)	-.042 (.058)
Majored in math	.051 (.059)	.062* (.035)
Majored in and teaching math as main assignment	-.046 (.077)	-.027 (.070)
School in central city	.031 (.027)	.022 (.024)
School in rural area/small town	-.090** (.018)	-.0003 (.022)
% minority students in school	-.001** (.000)	.001** (.000)
Student and teacher race interaction	.001* (.001)	-.001** (.001)
% students in school eligible for free and reduced lunch	-.0005 (.000)	.0001 (.000)
School size	.015** (.004)	.018** (.008)
Size and level interaction	-.007 (.012)	.004 (.010)
Teacher perception of students	.016 (.011)	-.009 (.013)
Teacher perception of influence over school policy	.013 (.010)	.023** (.007)
Teacher perception of school climate	.016 (.011)	.019 (.013)
Constant	10.160** (.090)	10.139** (.050)

Numbers in parentheses are robust standard errors. \*\* indicates significance at  $\alpha = .05$  and \* indicates significance at  $\alpha = .10$ .

### *Results of the Wage Decomposition*

The average charter school teacher in Michigan makes \$15,560 less than the average Michigan traditional public school teacher. We have seen that part of this pay difference can be explained by the fact that charter school teachers have different endowments of certain characteristics than traditional public school teachers. For

example, they are less experienced, less likely to be certified, and less likely to possess master's degrees. They are also more likely to teach poor, minority, urban students but this does not seem to affect the wages paid to Michigan's traditional and charter public school teachers. Different endowments of observable characteristics of charter and traditional schools accounts for roughly 66% of the pay differential between charter and traditional public school teachers (see Table 11).

Another part of the pay difference may be the result of different types of reward structures in charter and traditional schools. We saw earlier that traditional public schools and charter schools both reward teachers for experience but traditional public schools reward this trait more heavily than charter public schools. We also noted in the regressions that charter schools value graduation from a selective college and will pay a premium for this characteristic – traditional public schools do not reward teachers for being alumni of highly selective colleges. This second set of differences – different reward structures -- accounts for approximately 34% of the pay differential between charter and traditional public school teachers.

Column one of Table 11 is the salary difference due to different average values for each observable characteristic among the two groups, traditional and charter school teachers. Column two is the portion of salary difference that is the result of a different reward structure being used for the two groups.

The log of wages for the average traditional public school teacher is 10.719; it is 10.342 for the average charter school teacher. It is this .377 difference in mean salaries that is being explained by a combination of different average values for various characteristics and different reward structures between the two groups. Positive signs

indicate that traditional school teachers, the reference group, have more of a given characteristic (column one) or are rewarded more highly for a given characteristic (column two) than charter school teachers.

Variables were included in table 11 when there was enough variation in each sample for the individual regressions (from which Table 11 is derived) to be meaningful and the decomposition results yielded information that was practically significant or when the variable is of great interest to policymakers.

The difference in experience between traditional and charter public school teachers is substantial and explains a large portion of the salary differential. Using the regression coefficients for experience and experience squared for a traditional public school teacher (the reference group), the salary differential due to years of experience is .24 – almost the entire amount of the endowment differential. Adding to this endowment differential is the fact that traditional public school salary structures reward each year of experience more than charter schools. For a teacher with the mean number of years of experience (16 years, based on the traditional public school teacher sample), almost the entire difference due to reward structure can be explained by the experience difference

While the magnitude of the effects are smaller, the direction of the impact for certification and for possession of a master's degree is the same as experience – traditional school teachers are more likely to possess these characteristics than charter school teachers and they are more highly paid for them as well.

Traditional school teachers are less likely to be graduates of less or noncompetitive colleges than charter teachers. The positive coefficient in column two for that variable reflects the fact that schools in the traditional sample with higher salaries

were more likely to hire these graduates of less selective colleges than traditional schools with lower salaries. This perverse selection of graduates from less selective colleges did not appear to be a problem in charter schools.

Traditional school teachers are less likely to be non-white than charter school teachers. This is not surprising given that charters are willing to pay a premium (.034) for minority teachers that traditional public schools do not offer.

Traditional school teachers are less likely to be elementary school teachers than charter teachers. As discussed earlier, this is because most charter schools in Michigan focus on the elementary grades. When charters do offer secondary education, they are willing to pay a .095 premium to secondary school teachers. This is not true in traditional public schools.

Since science, math, and special education are considered shortage fields, we might have expected charter school administrators to be willing to pay a premium for teachers of those subjects, particularly those who majored in one of those subjects in college. This does not appear to be the case. None of the reward structure differences for these variables are practically significant.

The students in traditional schools are more likely to be white than charter students.<sup>4</sup> Traditional school teachers receive lower salaries as % minority enrollment increases in a school; charter schools pay teachers a premium as minority enrollment increases. The charter premium is probably a better reflection of market conditions than the traditional disincentive. The poverty variable, % students in school eligible for free

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<sup>4</sup> The variable is % minority students in school. The positive sign on the endowment difference coefficient is the result of the negative sign on the regression coefficient for this variable multiplied by the negative sign that results from a lower average endowment. Endowment difference=  $-.001(17.656-52.095)$

and reduced lunch, shows a similar pattern but may be misleading because the underlying regressions were not statistically significant.

Traditional public schools tend to be larger than charter schools. This may reflect the fact that charters may not have added all of their grades yet (adding one grade per year is not unusual) or charters may deliberately trying to maintain a somewhat smaller size than traditional public schools because they feel that parents find that attribute attractive. As school size increases, traditional public schools pay a smaller salary premium than charter schools. Charters may be able to offer higher salaries when they are larger since they reap the benefits of economies of scale as they become larger and can choose to pass these benefits directly to the teachers in that school. Traditional public schools are embedded within larger districts so any benefits from economies of scale will be spread among all the schools in the district and any salary increases must be distributed to all teachers in the district through collective bargaining.

Table 11: Endowment and reward structure differences for selected variables		
Variable	Average Endowment Differences	Reward Structure Differences
Decomposition of .377 difference	.252	.129
Total experience (years)	.423	.141
Total experience squared	-.214	-.028
Certified teacher	.014	.034
Master's degree	.042	.012
Graduate of less or noncompetitive college	-.004	.012
Teacher non-white	.005	-.034
Elementary level teacher	-.020	.096
Science main assignment	.002	.008
Math main assign.	.000	.007
Special education main assign.	.007	.003
Majored in science	-.001	-.007
Majored in math	.001	.000
% minority students in school	.034	-.092
% students in school eligible for free and reduced lunch	.006	-.024
School size	.033	-.017

### Summary and Discussion of Results

One of the most obvious differences between traditional and charter public school teachers is the difference in their average salaries – charter school teachers are paid 33% less than the teachers in traditional schools. A portion of this salary difference can be explained by different characteristics of teachers in the two types of schools. Charter school teachers have less experience, fewer advanced degrees, and are less likely to be certified than traditional public school teachers and are paid less as a result. They are also more likely to have graduated from a less or noncompetitive college. On the positive side, charter school teachers are more likely to be members of minority groups than traditional public school teachers. While there is not a clear consensus on this point,

most policymakers would like to see greater minority representation in the ranks of teachers.

The remainder of the salary difference can be explained by differences in the salary structures of traditional and charter schools. Charter school administrators are valuing some of the same characteristics as traditional school administrators when determining teacher salaries but are not valuing them to the same degree. Teachers are paid more for experience, advanced degrees, and certification but the magnitude of the reward for these characteristics is smaller than in traditional public schools. Unlike traditional public schools, charters do not appear to prefer teachers who are graduates of less selective colleges. While they have a greater proportion of these graduates, they do not pay them more than they pay graduates of more selective colleges. The generally lower salary levels may be making it difficult for charters to attract graduates of middle tier colleges, forcing them to hire graduates of less selective colleges, but they are not willing to pay more for them than for graduates of more selective colleges. In contrast, it appears that some traditional school administrators may prefer graduates of less selective colleges to graduates of middle tier colleges.

Charter school administrators are also willing to offer additional pay in some situations where traditional school administrators are unwilling or unable to do so. Charter teachers at the secondary level and charter teachers who are members of minority groups make more than their elementary level, white counterparts.

Charter schools with a high percentage of non-white students pay higher salaries than schools with fewer minority students; the reverse is true in traditional public schools. Given the oft-lamented fact that minority students in traditional public schools are more

likely to have low quality teachers than white students (by almost any measure of quality), the willingness of charters to provide a financial incentive to make these schools more attractive to teachers may have a positive impact on equity.

## Analysis and Conclusions

In Michigan, current programs designed to increase parental choice appear to be in conflict with policymakers' goals for increasing teacher quality. The low salaries offered by charter public schools and the lack of participation in the public school retirement system discourage high quality teachers from teaching in the state's charter schools.

The lower salaries offered by charter public schools may not reflect the preference of charter school operators – charters may be forced to offer noncompetitive salaries since, unlike traditional public schools, Michigan's charter schools must pay for their capital needs out of operating funds or seek outside support. Charters cannot assess millages to fund their capital needs and the tendency of charters to pay lower salaries, focus on elementary age children, and not provide students with transportation to and from school may reflect attempts to free up operating funds for capital needs. The increasing availability of federal funds for charter school capital needs may make this less of an issue in the future.

Another characteristic of the current system that works against increasing teacher quality is that parents do not have an easily accessible source of information about the quality of their children's teachers. Until the teacher quality provisions of No Child Left Behind are implemented by the state, charter school administrators are not required to offer parents information about the credentials of the school's teachers. The efficient operation of the market may be restricted by a lack of information available to the average consumer.

Most of Michigan's charter schools choose not to participate in the state's defined benefit pension plan for teachers, MPSERS. This discourages experienced teachers in

traditional public schools from moving to charters. It may also make charters less attractive to high quality applicants choosing between traditional and charter public schools. If these applicants plan to remain in teaching for an extended period of time, MPSEERS participation may give traditional public schools a competitive edge.

These problems – inequitable funding, the lack of accessible teacher quality information, and lack of participation in the state’s teacher retirement system – are amenable to policy intervention. If the potential benefits of choice are to become a reality, policies must be put in place to ensure that charters are able to maintain a high quality teaching force and are encouraged to do so.

Michigan’s charter schools are demonstrating innovation in their salary structures but the scope of these innovations appears to be limited. While the traditional determinants of teacher salaries -- experience and advanced degrees -- are less heavily emphasized in charter school salary structures, they are still the most heavily rewarded observable characteristics of charter school teachers.

There are signs that carefully designed choice programs could have a beneficial effect on teacher quality. Charter school administrators appear to be more responsive to teacher preferences than administrators in traditional public schools. Teachers who work in environments that are seen as less desirable are paid a premium to do so – the reverse is often the case in traditional public schools. There also seems to be a relationship between charter school salaries and alternative employment opportunities. While data limitations make some findings more robust than others, secondary school teachers and teachers who majored in math or science are paid a premium in charters. The omnipresent single salary schedule used by Michigan’s traditional public schools does

not allow for differentials of this sort and may be discouraging some teachers from entering and remaining in teaching.

One important limitation of this analysis is the large amount of unexplained variation in the charter school model. If a significant portion of this unexplained variation is due to factors such as verbal ability or undergraduate GPA (factors not included in the data set), charter school administrators may be more innovative than they appear and their salary structures more coherent than indicated by this analysis.

Another limitation is that the aggregation of all charter schools together may be masking a variety of innovative practices and making them appear less coherent than they actually are. The within-school sample sizes for this data set do not allow for a careful analysis of this possibility but further case study research within schools and within EMOs would allow the testing of this hypothesis.

Charter schools are changing the educational landscape in Michigan and many other states. As choice programs evolve, it would behoove policymakers to consider the impact that these programs have on teacher quality. The details of choice programs matter a great deal. Even the most staunch supporter of choice would probably agree that poorly designed policy can force charters to make decisions that are not in the best interests of the school's children. It appears that this is the case in Michigan – on average, the quality of Michigan's charter public teachers is lower than the quality of the teachers in the state's traditional public schools. This may not be a reflection of poor decision making on the part of charter schools operators but may, instead, reflect policies in need of thoughtful reform.

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## Appendix A<sup>5</sup>

### Description of Measures

*Perception of Teacher Influence.* Teachers were asked 7 questions about their perceptions of teacher influence in their school. The questions were all presented with a five response option Likert scale and all questions were polarized to be positive (high scores indicate higher perceptions of influence). Teachers indicated the degree to which they exerted influence over each aspect of school policy presented. The text of the questions for this scale is as follows:

Using the scale of 1-5 where 1 means “No influence” and 5 means “A great deal of influence,” how much actual influence do you think teachers have over school policy AT THIS SCHOOL in each of the following areas?	No influence				A great deal of influence
Setting performance standards for students at this school	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Establishing curriculum	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Determining the contents of in-service professional development programs	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Evaluating teachers	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Hiring new full-time teachers	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Setting discipline policy	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Deciding how the school budget will be spent	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

<sup>5</sup> This appendix was co-authored by Lisa Ray

*Perception of Problems.* Teachers were asked to indicate whether they believed that various problems were prevalent within their school. The 22 problems focused on undesirable student behaviors and challenging home situations. Response choices were presented with a four-point Likert scale ranging from being a serious problem to not a problem, and all items on this scale were polarized so that low scores indicated serious student problems. Item text for the Perception of Problems scale is presented below:

To what extent is each of the following matters a problem in this school? Indicate whether it is a serious problem, a moderate problem, a minor problem, or not a problem in this school.

	Serious	Moderate	Minor	Not a problem
Student tardiness	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Student absenteeism	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Teacher absenteeism	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Students cutting class	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Physical conflicts among students	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Robbery or theft	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Vandalism of school property	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Student pregnancy	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Student use of alcohol	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>

Student drug abuse	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Student possession of weapons	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Student disrespect for teachers	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Students dropping out	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Student apathy	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Lack of parent involvement	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Poverty	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Students come to school unprepared to learn	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Poor student health	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>

*Perception of School Climate.* Teachers were asked 18 questions concerning their perceptions of school climate. The four-point Likert scale presented response options that allowed teachers to indicate the strength of their agreement with hypothetical statements about their school. Sixteen of the statements were negatively polarized so that lower scores indicated better school climate, and 5 of the items were positively polarized (indicated by an asterisk) so that higher scores indicated better school climate. The text of the questions for this scale is as follows:

Do you agree or disagree with each of the following statements?

Mark (X) one box on each line.	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
The principal lets staff members know what is expected of them.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
The school administration's behavior toward the staff is supportive and encouraging.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
I am satisfied with my teaching salary.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
*The level of student misbehavior (such as noise, horseplay or fighting in the halls, cafeteria or student lounge) in this school interferes with my teaching.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
I receive a great deal of support from parents for the work I do.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Necessary materials such as textbooks, supplies, copy machines are available as needed by the staff.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
*Routine duties and paperwork interfere with my job of teaching.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>

My principal enforces school rules for student conduct and backs me up when I need it.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
The principal talks with me frequently about my instructional practices.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Rules for student behavior are consistently enforced by teachers in this school, even for students who are not in their classes.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Most of my colleagues share my beliefs and values about what the central mission of the school should be.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
The principal knows what kind of school he/she wants and has communicated it to the staff.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
There is a great deal of cooperative effort among the staff members.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
In this school, staff members are recognized for a job well done.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
*I worry about the security of my job because of the performance of my students on state or local tests.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
I am given the support I need to teach students with special needs.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
I am satisfied with my class size(s).	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
I make a conscious effort to coordinate the content of my courses with that of other teachers.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
*The amount of student tardiness and class cutting in this school interferes with my teaching.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
*I sometimes feel it is a waste of time to try to do my best as a teacher.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>

I plan with the library media specialist/librarian for the integration of library media services into my teaching.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
I am generally satisfied with being a teacher at this school.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>

### Scaling Procedure and Measure Quality

Data for each instrument were scaled using a Rasch Rating Scale Model (RRSM). This model depicts the logit value of a respondent ( $\theta_n$ ) responding with a category that requires exceeding  $k$  category thresholds ( $\tau_k$ ) versus  $k-1$  to an item ( $\delta_i$ ) as a linear function of three parameters that locate the respondent, item, and category threshold onto the same underlying continuum,

$$\ln\left(\frac{\pi_{nik}}{\pi_{nik-1}}\right) = \theta_n - \delta_i - \tau_k.$$

Parameters for this model were estimated using joint maximum likelihood estimation procedures as implemented in *Winsteps* (Linacre, 2002; Wright & Masters, 1982). In the current case, the respondent measure refers to the respondent's tendency to endorse items as being descriptions of their perceptions of their own influence, their students, or their school's climate. The item calibration refers to the difficulty of endorsing a particular item, and the threshold calibration refers to the difficulty of assigning a rating of  $k$  versus  $k - 1$  on the rating scale in question. Standard errors for these estimates were also estimated (e.g.,  $SE_{\theta}$ ), and the mean of the square of these standard errors is the mean squared error of the data from the RRSM ( $MSE_{\theta}$ , for example). A more detailed description of the scales and measure quality is presented in Wolfe, et al. (2003). Suffice

it to say that evaluation of the measures focused on six characteristics of each instrument; dimensionality, internal consistency, rating category effectiveness, item quality, item hierarchy, and measure quality. Overall, the three measures exhibit acceptable quality and are appropriate for use in secondary data analysis.

For ease of interpretation, the scaled variables were linearly transformed to a Z-scale. These transformed variables were then used in the OLS estimation of the regression model parameters.