

Average Teacher Salaries and Returns to Experience in Charter Schools

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Abstract

Schools need to offer competitive salaries for both new and experienced teachers to recruit and retain qualified teachers. Previous research indicates that charter schools may have less qualified teachers than traditional public schools. One explanation for this qualification disparity is that charter schools do not pay teachers competitive salaries. This paper explores teacher salaries in charter and traditional public schools using the 1999-2000 Schools and Staffing Survey. Specifically, it compares beginning teacher salaries and the return to experience in these schools. The Hierarchical Linear Modeling (HLM) technique used in this paper allows me to account for teachers being clustered within school systems and to examine factors that may strengthen or weaken the relationship between salary and years of experience. The main findings imply that while salaries for first-year teachers are similar in charter and traditional public schools, teachers in charter schools receive a lower return to experience. This results in sizeable salary differences for teachers with more than a couple years of experience in charter schools compared to their traditional public school counterparts. These findings suggest that charter schools may have difficulty retaining teachers. While charter schools may be able to compete with traditional public schools in initial teacher hiring, charter schools may lose teachers to public schools as teachers gain experience.

Introduction

The expansion of educational options for students—through increasing numbers of charter schools—creates additional options for teachers as well. In short, teachers now have a wider range of schools from which to choose when making decisions about where to teach. Recruiting and retaining high quality teachers should be an important concern of charter schools, as teachers are a school's most important resource (Hanushek, 1971). Yet, many charter schools may have difficulty attracting and retaining qualified teachers because they serve high proportions of poor, low-performing, and minority students (Lankford, Loeb, & Wyckoff, 2002). Still, charter schools are given more flexibility over several areas of school operation, including staffing (Bomotti, Ginsberg, & Cobb, 1999; Wohlstetter, Wenning, & Briggs, 1995) and they operate in a different institutional context that may impact their ability to hire teachers. Thus, understanding how charter schools use this flexibility and compete in the teacher labor market remains an important research question.

Previous research indicates that charter school teachers are less qualified than teachers in traditional public schools. (Burian-Fitzgerald, Luekens, & Strizek, 2004). Charter school teachers are less likely to be certified and have fewer years of experience (Bomotti et al., 1999; Burian-Fitzgerald et al., 2004; Podgursky & Ballou, 2001; Texas Education Agency, 2001). They are also less likely to have a major or minor in math and science in secondary schools (Burian-Fitzgerald et al., 2004) and are less likely to have a master's degree (Bomotti et al., 1999). These qualification differences are important because, in short, those students in charter schools who need well qualified teachers aren't necessarily getting them.

We currently know little about what causes this unequal distribution of qualified teachers between charter and traditional public schools. It may be that charter schools are purposely

recruiting a different population of teachers, perhaps on the belief that these traditional measures of teacher quality are not a good way of identifying the most effective teachers. Another explanation may be that a different teaching population is attracted to charter schools. Yet, it may simply be that charter schools have difficulty recruiting and retaining qualified teachers because they are less able to compete in the teacher labor market against traditional public schools.

Specifically, one aspect of a school's ability to compete in the teacher labor market is their salary. Charter school teachers often receive lower salaries than their counterparts in traditional public schools (Harris, 2003). In Texas, for example, charter school teachers earn about \$9,000 less annually than teachers in regular public schools (Texas Center for Educational Research, 2003). However, this overall salary discrepancy may be due to the different qualifications and characteristics of charter school teachers.

Understanding the teacher salaries in charter schools has implications for charter schools' ability to attract and retain teachers. If charter schools offer lower salaries to teachers with similar characteristics, then they may be at a disadvantage in recruiting teachers. Likewise, if charter schools do not reward teachers for their experience as traditional public schools do, then charter schools may have difficulty retaining teachers. Indeed, charter schools have higher teacher attrition than traditional public schools (Texas Center for Educational Research, 2003). Table 1 displays the overall teacher turnover rates for charter and traditional public schools. Turnover is higher in charter schools for both new and veteran teachers. Charter school teachers are more than twice as likely to leave the teaching profession, even when controlling for school and student characteristics (Smith & Ingersoll, 2004).

In this analysis, I examine teacher salaries in charter public and traditional public schools by asking two questions: First, do teachers with equal qualifications receive higher or lower salaries in charter schools as compared to teachers in traditional public schools? Second, does the relationship between teacher salaries and years of teaching experience vary between charter and traditional public schools?

Teacher Salaries

While teachers may consider many different aspects of schools when deciding where to teach, their potential salary in a particular school is an important ingredient. Teachers take wages into consideration when they make decisions about whether to go into teaching and in which school to teach (Beaudin, 1998; Brewer, 1996; Dolton & Makepeace, 1993; Stinebrickner, 2001). Despite claims that teaching is a calling or that they most value the intrinsic rewards, teachers react similarly to wages as workers in other occupations (Baugh & Stone, 1982a). Teachers respond both to wage differentials between teaching and non-teaching jobs, as well as to pay differences between teaching jobs (Baugh & Stone, 1982a). Thus, teacher salaries represent an important policy issue that contributes to a schools' ability to attract qualified staff. For this reason, examining differences in teacher salaries across different types of schools may shed light on why qualified teachers seem to be distributed unequally.

Teacher salaries vary by school and teacher characteristics. Salaries vary by region due to differences in alternative labor markets and costs of living. This results in important regional differences in teacher salaries. For example, within New York State, over 70 percent of the variation in teacher salaries is between regions, rather than between districts within a region (Boyd, Lankford, Loeb, & Wyckoff, 2003). Within districts, salaries in traditional public schools

are usually determined by salary schedules that outline wages by the education and years of experiences a teacher may have. Charter schools are less likely to use such a salary schedule; about 96 percent of public school districts use this type of salary schedule to determine teacher wages, compared to 62 percent of charter schools (Gruber, Wiley, Broughman, Strizek, & Burian-Fitzgerald, 2002).

Still, salary is the not the only factor that influences a school's ability to recruit and retain teachers. In particular, teachers may be more likely to leave a school if they do not feel successful as a teacher or if the school does not offer adequate support (Johnson & Birkland, 2003). The social organization of schools, such as the socialization of new teachers into a school and relationships between teachers and administrators affects the level of teacher turnover (Ingersoll, 2001). Indeed, financial incentives to remain in teaching may not be strong enough to entice teachers to stay in schools with undesirable working conditions (Liu, Johnson, & Peske, 2004).

Charter Schools and Teacher Salaries

While charter schools are public schools that are financed with public money, they have more autonomy from higher levels of government, such as state and district policies, than traditional public schools and often are not part of a public school district. Charter schools have this autonomy and more control over their own internal operations (Wohlstetter et al., 1995) in exchange for tighter accountability for increasing student achievement. In particular, charter schools are often released from district salary schedules and hiring policies (Gill, Timpane, Ross, & Brewer, 2001).

The growth of the charter school movement has raised questions about the quality of the instruction, and, thus, the qualifications of teachers, inside charter schools. Principals have much

more authority to recruit teachers that share their educational vision for the school and priorities for student learning, and to determine the pay of individual teachers. This flexibility may allow charter schools to pay teachers with similar personal and credential characteristics differently. For example, a charter school may decide to pay a science teacher more than a social studies teacher, because science teachers are generally harder to find. Also, as charter schools have more control over all aspects of their budget, they may decide to forgo other expenses to have higher salaries. For example, charter schools that decide the ability to recruit highly able teachers is the most important contributor to student learning may have a smaller library or fewer administration costs and use those funds for increasing teacher pay. Thus, some aspects of charter school organization might lead to higher teacher salaries.

However, other characteristics of charter schools may lead to lower salaries. In particular, most charter schools are not unionized. The presence of teacher unions may inhibit the ability of schools and districts to reward teachers financially for their performance; usually salary increases come from characteristics that are not necessarily associated with increased student performance, such as years of experience or having a master's degree. (Although it is important to note that some local union chapters are beginning to experiment with pay for performance plans and this may have an impact on all teacher salaries.) The presence of collective bargaining tends to increase teacher salaries overall, with teachers in unionized districts earning over 10 percent more than those without unions (Baugh & Stone, 1982b).

Further, charter schools may be at a disadvantage in determining wages for teachers because they often receive less per-pupil funding than traditional public schools. For example, in Texas, charter schools receive most of their funding from the state, while traditional public schools receive most of their funding from local property tax revenues; thus, depending on

location, disparities in funding can arise. Moreover, charter schools do not have the ability to levy bonds to increase their funding. As a result, charter schools in Texas have an average per-pupil expenditure that is \$1900 less than traditional public schools in Texas (Texas Center for Educational Research, 2003). Even charter schools in states that provide the full per-pupil allowance from the student's resident district (such as Michigan) may be at a financial disadvantage due to their inability to raise money for capital expenditures through bonds. Many charter schools pay for their buildings through their per-pupil allotment, while traditional public schools do not. Yet, charter schools may be more successful in obtaining private donations or may face lower costs as they target students requiring less expensive educational programs (Miron & Nelson, 2002). The extent to which charter schools experience a relative lack of funding may affect their ability to offer a competitive wage to attract and retain qualified teachers.

In addition to the overall level of salaries in schools, teachers make decisions about whether to remain in a school based, in part, on their salary increases. In particular, teachers make decisions about whether to teach another year in a particular school based, in part, on future opportunities for salary growth (Brewer, 1996). Therefore, the expected growth in wages is also an important policy issue. Public schools use established salary schedules (established through collectively bargained contracts) that guarantee a specified increase for each year of service in addition to increases based on continuing education credits. Charter schools, because they are less likely to have salary schedules, may not increase teacher salaries for years of experience alone, but may reserve higher salaries for teachers with different characteristics. For this reason, it is important to understand the relationship between years of teaching experience

and teacher salaries, to see if certain types of schools offer greater salary increases per year of teaching than others.

Some researchers may argue that schools should not base teachers' salaries so heavily on experience (Finn, 2005), as there is little evidence that additional experience after the first few years of teaching increases student achievement (Murnane & Phillips, 1981). Thus, these researchers would argue, the slope between experience and salary should be flat. For example, in a charter school, a teacher with relatively little experience and one with several years of experience may receive the same pay if they have the same effect on student achievement. Yet, this is unlikely to happen in traditional public schools that base pay on years of experience. If experience indeed has no impact on student learning, then charter schools may be using their money more efficiently if they do not reward teaching experience alone. However, in the context of a competitive teacher labor market in which schools must compete for the most qualified teachers, differences in the yearly growth in salary across schools could lead to differences in teacher attrition and inequalities in the distribution of teachers as they leave or switch schools. Large differences in the yearly increases between schools may create incentives for teachers to begin their career in one school, but transfer to a higher paying school once the teacher gains a few years of experience. In short, charters can't always offer the larger salaries that experienced teachers might expect and, in turn, these teachers will likely choose not to work in charter schools.

Conceptual Model for Comparing Teacher Salaries

Figure 1 presents the conceptual model around which this analysis is organized. As shown in this figure, teacher salaries are hypothesized to be associated with both teacher

characteristics (such as experience, qualifications, teaching assignment, and demographics) and with school characteristics (such as region and urbanicity). In addition, charter status – whether the school is a charter school or a traditional public school – may influence teacher salaries. This impact of charter schools on salaries may be a direct result of charter schools offering lower salaries, or it may be an indirect result as charter status may be associated with characteristics of schools that have lower salaries. Further, charter schools may influence the relationship between teacher characteristics (particularly experience) and salaries. For example, charter schools may choose to reward different characteristics of teachers at different rates than traditional public schools.

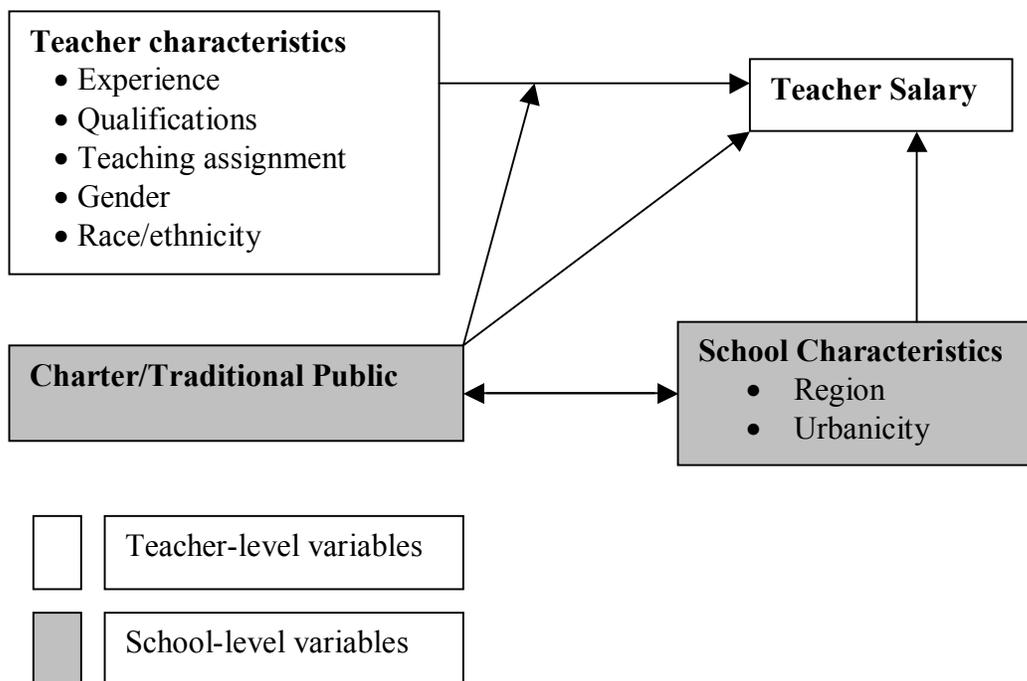


Figure 1 – Multilevel Conceptual Model for Comparing Teacher Salaries in Charter and Traditional Public Schools

Data

In this paper, I use the 1999-2000 Schools and Staffing Survey (SASS) to compare teacher salaries in charter and traditional public schools. Administered by the National Center for Education Statistics, the 1999-2000 SASS surveyed a sample of traditional public schools and their teachers, as well as all charter public schools open in 1998-99 and still operating in 1999-2000, and a small sample of teachers within these charter schools. In total, SASS includes 8432 regular public schools and 42,086 regular public school teachers as well as 870 charter public schools and 2,847 charter public school teachers. Although the charter school movement has grown substantially since 1999-2000, SASS remains the largest survey of charter schools and their teachers to date.

The U.S. Census Bureau collected the SASS data in the 1999-2000 school year. SASS employs a random sampling design, stratified by state, teacher race, new teacher status, and whether the teacher teaches Limited-English Proficient classes, with teachers clustered within schools. Schools served as the unit for first-stage sampling. Sampled schools were asked to provide a list of teachers in the school, with basic demographic information. This list of teachers was used to construct a stratified random sample of teachers that is representative at the state and national levels. The overall weighted response rates are 77% for traditional public school teachers and 72% for charter public school teachers and are weighted to reflect nonresponse on the part of both schools and teachers. Schools in the sample are weighted to reflect the sampling design and school nonresponse. I created an additional within-school teacher weight to reflect the probability of selection for teachers within schools, by dividing the teacher weight by the school weight.

The total sample of traditional public and charter public schools in SASS is over 40,000 teachers in over 9,000 schools. However, due to the low number of charter schools in some states

in 1999 (including states that had not yet passed charter school laws), charter school teachers are only compared to teachers in public schools in those states that have at least five charter schools in the sample. In 1999-2000, twenty states had at least five charter schools operating. These states include Alaska, Arizona, California, Colorado, Connecticut, Georgia, Illinois, Florida, Kansas, Louisiana, Massachusetts, Michigan, Minnesota, New Jersey, North Carolina, Ohio, Pennsylvania, Texas, Washington DC, and Wisconsin.

I also limited the sample to schools that had at least two teachers in the SASS sample, because it is not possible to disentangle the school and teacher effects if the within school sample size is 1. Finally, because I am modeling the slope of years of experience on salary, I eliminated schools in which all teachers in the sample for one school had the same amount of experience, because it is impossible to calculate a slope for those schools. I ran a missing data analysis to compare the characteristics of schools eliminated from the sample for these reasons to the final analytic sample, by comparing descriptive statistics of teachers in the final sample and those excluded. Table 2 presents the results of this analysis.

The schools eliminated from the sample differ from the remaining schools in several ways. Specifically, the eliminated schools are smaller. This is not surprising and indicates that the teachers were sampled proportionally to school size. These schools are also more likely to be in charter public schools. Again, this is not surprising because charter schools tend to be smaller than traditional public schools. There is some evidence that omitted schools are more likely to be located in central cities, and less likely to be located in the urban fringe or large towns (suburbs). There is no difference in the region of the country the omitted and included schools are found. There is evidence that the schools omitted from the sample differ by school level. Excluded schools are more likely to be schools with combined grades (i.e., K-12 schools), and less likely

to be middle or high schools. The final within-school sample size ranges from 2-19, with a mode of 4. The final sample includes 17,207 teachers in 3,876 schools.

Teacher-Level Variables

The dependent variable for this analysis is the total school-related earnings of the teacher. This measure of earnings includes the teacher's base teaching salary, wages for performing extra duties (such as coaching), summer school earnings, and any other bonuses or stipends from the school. It does not include any wages the teacher may earn in jobs not related to teaching.

Years of experience and qualifications are the two major determinants of public school salaries. Qualifications may include degrees earned, certification, or other indicators of quality. The measures of qualifications explored in this study include having a master's degree and full certification status.¹ In addition to experience and qualifications, schools may decide to give higher wages to teachers in fields that are particularly hard to staff, such as special education.² Teacher gender and minority status may capture elements of discrimination in wages, which is found in many occupations, and may be possible in teaching as schools and districts have some flexibility in the initial placement of teachers on the salary schedule. Finally, many teachers may take on additional responsibilities, such as coaching or after-school tutoring, and be paid for such activities.

The independent variables in the Level 1 model are the following:

MALE: A dummy variable coded 1 if the teacher is male.

TOTEXPER: Total years of teaching experience, including teaching in both public and private schools, not including the current year.

¹ The selectivity of the teacher's undergraduate college, often used as a proxy for teacher verbal ability which is related to student achievement, was included in initial models, but found to be nonsignificant.

² Initial models included controls for other subject fields, but were found to be nonsignificant and dropped from the final analysis.

MINORITY: A dummy variable coded 1 if the teacher is Black, Hispanic, Asian, or American Indian.

FULLCERT: A dummy variable coded 1 if the teacher is fully certified. Less than fully certified includes teachers with a temporary, provisional, or emergency certification, as well as those with no certification.

MASTERS: A dummy variable coded 1 if the teacher has a master's degree or higher.

EXTRADUT: A dummy variable coded 1 if the teacher reports receiving extra pay for additional responsibilities, such as coaching.

SPECED: A dummy variable coded 1 if the teacher reports any special education field as his/her main teaching assignment field. (Other assignment fields were included in initial models, but were nonsignificant.)

PARTTIME: A dummy variable coded 1 if the teacher is less than full-time.

EXPERSQ: Years of teaching experience squared, this quadratic term is included to capture any nonlinear effects of experience.

School-Level Variables

As noted above, charter schools may be expected to have lower salaries due to their relative lack of funding compared to traditional public schools. However, charter schools have more flexibility to devote more of their budget to teacher salaries. There are noted salary differences by geographical region, partly due to differences in cost of living and the relative wages of other occupations. Further, school location may be associated with teacher salaries, as rural areas may have fewer resources to devote to salaries. Several controls for school context were included in initial models, such as the percent of students in a school eligible for free or

reduced-price lunch and the average years of experience of teachers in the schools, but were found to be nonsignificant and therefore dropped. Also, school size and grade level variables (using dummies for middle and secondary schools as well as individual grade levels) were initially included, but dropped from the final analysis because they were nonsignificant.

CHARTER: A dummy variable coded 1 if the school is a charter public school.

CENTCITY: A dummy variable coded 1 if the school is located in a central city.

RURSMLTN: A dummy variable coded 1 if the school is located in a small town or rural area (the omitted category is schools in the urban fringe or large towns).

NORTHEAST: A dummy variable coded 1 if the school is located in the Northeast (the omitted category is schools in the West).

MIDWEST: A dummy variable coded 1 if the school is located in the Midwest (the omitted category is schools in the West).

SOUTH: A dummy variable coded 1 if the school is located in the South (the omitted category is schools in the West).

Teacher school-related salaries and years of experience appear to be roughly normally distributed. All missing data is imputed at both the school and teacher level by NCES. Thus, there is no missing data at either the teacher or school level. Table 3 present the means and standard deviations for the variables used.

As shown in Table 3, charter schools and their teachers differ from their public school counterparts in several ways. Overall, teachers in charter schools report wages of about \$9,000 less than teachers in traditional public schools, although part of this difference is likely due to the lesser qualifications of charter school teachers. Whereas there do not appear to be gender

differences, there are more minority teachers in charter schools, possibly because charter schools are more likely to be in urban areas and minority teachers are most often found in urban schools. Further, charter school teachers have fewer years of experience and are less likely to have a master's degree or full certification, be paid for additional duties and have a main assignment in special education. Charter schools also differ from traditional public schools in many ways. They are smaller and much more likely to be located in urban areas, whereas traditional public schools are more likely to be located in the suburbs or rural areas. Charter schools appear to be concentrated in the West (especially California and Arizona) and are less common in the other regions. They also appear to be less likely to be elementary or middle schools and more likely to have combined grades (such as K-12 schools) than traditional public schools.

Methods

I used Hierarchical Linear Modeling (HLM) to estimate the relationship between charter schools and teacher salaries. Standard econometric techniques may not be appropriate because teachers are grouped within schools. In a standard regression, the error terms are assumed to be uncorrelated with each other. This may not be true when individuals are clustered within groups as there may be some feature of the group that influences the individual. In the case of teacher salaries, there may be something about the school that influences the individual teacher's salary independently of the teacher's characteristics. For example, one school may have higher salaries in general than another school and this may affect the individual's salary in a nonrandom way. Therefore, it is necessary to use a model that can estimate the nonrandom variance in the error term due to the clustering of teachers within schools. While random-effects models also control for this clustering effect, HLM can go a step farther. Not only can the school intercept vary, but

slopes as well. This allows the analyst to model slopes as outcomes and estimate what characteristics of schools affect relationships between two teacher-level variables, such as experience and salary.

HLM partitions the variance in teacher salaries into variation between individual teachers within a school and variation between schools (Raudenbush & Bryk, 2002). HLM can be understood through a two-level modeling process. At the first level, the within-school model, the dependent variable is regressed on variables measured at the teacher level. It estimates coefficients for these individual level variables to explain the variation in salary between teachers within a school. It also estimates an intercept and slope (for the relationship between salary and experience) for each school; it is conceptually similar to running individual regressions for each school to get an intercept and slope. At the second level, the between-school model, HLM uses the school-level intercepts and slopes as dependent variables to estimate coefficients for school-level variables that may affect the school's average salary or relationship between salary and experience within a school.

I used the teacher file as the level 1 data and the school file as the level 2 data. I used my created teacher within-school weight for the level 1 weight and the school final weight for the level 2 weight. I then normalized both weights and generalized the weights at level 2. I ran a Fully Unconditional Model to partition the variance between the teacher and school levels. My level 1 model consisted of only an intercept for the school mean teacher salary plus error associated with the teacher:

$$Y_{ij} = \beta_0 + r_{ij}$$

My level 2 model consisted of only an intercept for the grand mean of teacher salary, or the average of school average teacher salary plus error associated with the school:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

I also calculated the intraclass correlation (ICC), to determine the percent of variance in teacher salaries that is between schools. I calculated the ICC as follows:

$$ICC = \tau_{00} / (\sigma^2 + \tau_{00})$$

Next, I ran a within-school model, using the teacher-level independent variables. This model is conditional at level 1, but unconditional at level 2. The slopes were fixed for all independent variables, except for years of experience, which was free and left uncentered (so the intercept represents beginning salaries). The other independent variables were centered around their grand mean:

$$Y_{ij} = \beta_0 + \beta_1 TOTEXPER + \beta_2 MALE + \beta_3 MINORITY + \beta_4 FULLCERT + \beta_5 SPECED + \beta_6 PARTTIME + \beta_7 MASTERS + \beta_8 EXTRADUT + \beta_9 EXPERSQ + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{20} + u_{2j}$$

I also calculated the percent of the level 1 variance explained by the within-school model:

$$\% \text{ Variance explained at level 1} = (\sigma^2_{FUM} - \sigma^2_{within}) / \sigma^2_{FUM}$$

I then included a between-school model that included models for the intercept and coefficient for the slope of years of experience and teacher salary:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} CHARTER + \gamma_{02} RURSMLTN + \gamma_{03} NRTHEAST + \gamma_{04} MIDWEST + \gamma_{05} SOUTH + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} CHARTER + \gamma_{12} CENTCITY + \gamma_{13} RURSMLTN + \gamma_{14} NRTHEAST + \gamma_{15} SOUTH + u_{1j}$$

Finally, I calculated the percent of the level 2 variance explained by the final between-school model:

$$\% \text{ Variance explained at level 2} = (\tau_{00\text{within}} - \tau_{00\text{between}}) / \tau_{00\text{within}}$$

Results

There is a relatively low reliability of the school average teacher salary estimate ($\lambda = .502$). This reliability estimate is an average across schools of the parameter variance over the total variance in teacher salaries within each school. In other words, it is an estimate of the average reliability of the observed average school teacher salary to the true school average, pooled across schools. This low reliability may be due to the low within-school sample size, although it is moderated by a large number of schools. The robust and non-robust fixed effects tables produce similar results, suggesting that the standard errors are robust. Table 4 presents the results of the Fully Unconditional Model.

The intraclass correlation, 31.2%, is a measure of the proportion of the total variation in the outcome variable that is explained by the level 2 grouping. In other words, it is the proportion of variance in teacher salaries that lies systematically between schools. These results indicate that slightly less than one-third of the variance of teacher salaries is between schools. Further, the random effects table (second part of table 4) indicates that the school level variance is significantly different from zero, lending further support to the idea that teacher salaries are influenced by a school effect, and are appropriately modeled using HLM.

Table 5 presents the results from the within-school model. The average salary for a beginning female, non-minority teacher with a bachelor's degree and lacking full certification is just under \$30,000. One additional year of teaching results in an average increase of about

\$1200, controlling for the other variables. This return to experience may represent the expected increase in salary a teacher can expect if she decides to teach in the school for another year. Thus, this important consideration may influence retention decisions. However, the return to experience appears to be nonlinear, as the quadratic term is also significant. There appears to be a slight deceleration in the return to experience over time. However, the deceleration does not vary between schools.³

The largest effect on teacher salaries is part-time status. This is not surprising, as teachers working fewer hours per week would be expected to earn a lower salary. Having a master's degree is associated with about a \$3700 more than a beginning teacher's salary. Teachers who take on extra responsibilities also receive a large pay increase. Some teacher demographics influence salaries as well. Specifically, male teachers earn about \$2000 more than female teachers, and minority teachers earn about \$770 more than White teachers.

Teaching assignment also influences teacher salaries. English/language arts, math, science, and physical education were found to be unrelated to salary in exploratory models and were dropped. Special education teachers, however, have substantially higher salaries levels of than other teachers. They are paid about \$1000 per year more than other teachers. Overall, the within-school model explains about 53% of the within-school variance in teacher salaries, indicating that a substantial amount of the variance in teacher salaries within a school can be explained by the variables included in the model presented here.

The random effects table in the bottom of Table 5 indicates that there is still unexplained variance between schools in the average teacher salary after controlling for the level 1 variables. This is indicated by the statistically significant effect of schools on mean salary. Further, the

³ I initially left the quadratic term slope to vary, but it was nonsignificant.

variance of the experience/salary slope parameter also differs between schools, after controlling for the level 1 variables.

To answer the first major research question about whether charter school teachers earn higher or lower salaries than teachers in traditional public schools with comparable characteristics, Table 6 presents the between-school model and provides evidence about average salaries for first-year teachers. We see that first-year teachers in charter schools make about the same salary as teachers in traditional public schools, once other teacher and school characteristics are controlled. The average salary for beginning teachers in the West, controlling for both teacher and school characteristics, is \$31,900. Teachers in the South and Midwest earn about \$2800 and \$2300 less, respectively, than teachers in the West. Teachers in the Northeast appear to have the highest salaries. Teachers in rural areas also earn less (about \$2800) than teachers in central cities and suburbs.

Evidence for the second major research question about whether the return to experience is similar for charter and traditional public school teachers is found in the second half of Table 6, which presents school effects on the relationship between years of experience and teacher salaries. On average, teachers receive an additional \$1300 for each year of experience, controlling for school characteristics. We see that teachers in charter schools receive significantly less for each year of experience than their counterparts in traditional public school teachers. Teachers in charters schools can expect to see their salary increase by just \$1000 per year. This weaker effect of experience on salary may indicate that charter schools are less likely to make salary decisions based on one's total teaching experience.

There also appears to be geographical influences on the relationship between teacher salary and years of experience. Schools in the South offer smaller increases for each year of

experience than teachers in the Midwest or West, while schools in the Northeast offer larger increases. Schools in both urban and rural areas have lower returns to experience than schools in the suburbs.

Discussion

A substantial amount of variation in teachers' salaries is due to school-by-school differences. This is not surprising considering that schools (and districts) determine salaries. The finding that the intercept varies significantly by school suggests that a standard regression model would not appropriately account for the grouping and an HLM model should be used. Thus, it is reasonable that teachers in the same school would respond more similarly to each other than those outside the school.

Within schools, salaries are determined by years of experience, teacher qualifications, and teaching assignment. Special education teachers receive higher salaries, which may be due to the special training required and, consequently, the relatively high demand for these teachers. Special education teachers require special preparation, and relatively few teachers are prepared for or want to teach special education classes. Teachers with these credentials may be offered wage premiums because they are in short supply. The salary increase associated with having a master's degree is expected as most salary schedules offer raises for additional educational credits. Teachers that take on additional responsibilities and may be involved in coaching, coordinating extracurricular activities, and after-school tutoring also earn larger salaries.

One unexpected finding is the salary increase associated with being a minority teacher. This is surprising as it suggests bias in favor of minority teachers. However, this difference may be due to unobserved characteristics of schools in which minority teachers are likely to be found.

Yet, the fully conditional model shows that minority teachers still receive higher wages, after controlling for school urbanicity and region. These demographic differences in teacher salaries may be due to the flexibility that schools have in teachers' initial placement on the salary schedule. These salary differences may represent a form of affirmative action, particularly as most teachers are White females; schools may find it necessary to offer higher salaries to attract minority or male teachers and have diversity in its teaching staff. This may be possible in districts with a single salary schedule as districts have some flexibility over the initial placement of teachers on the schedule.

The most important factors determining average teacher salary are associated with where the school is located. Teachers in rural schools and in the South and Midwest receive lower salaries, compared to those in the Northeast, who are paid more. These geographic differences are not surprising and consistent with previous research, which suggests that much of the variation in salaries is between labor markets (Boyd et al., 2003). The importance of the regional and location variables on teacher salaries between schools may reflect differences in costs of living and lower wages in alternative labor markets. This may also explain why initial models did not find any difference associated with school instructional level. The structure of teacher salaries may not make distinctions based on grade levels. While these differences may be due to differences in relative wages and costs of living between geographic areas, they may also lead to an inequitable distribution of qualified teachers, as some areas may be less able to offer competitive wages. In particular, rural schools may have difficulty attracting and retaining qualified teachers away from the cities and suburbs.

The relationship between teacher salaries and years of experience represents the amount that schools pay teachers for each additional year of teaching experience. Although it may be

determined by the relative value different schools place on experience, for the individual teacher this relationship indicates the return to experience she can expect to earn if she continues teaching. The results presented here show that charter school teachers can expect to receive salary increases that are at least \$300 less per year than their counterparts in traditional public schools.

The weaker relationship between experience and salary is not necessarily cause for concern. Indeed, there are many policy proposals to decrease this relationship and reward teachers for characteristics other than years on the job (Finn, 2005). If there is little relationship between experience and teacher performance, it may be reasonable for charter schools to reward other characteristics than years of experience. For example, they may choose to reserve higher salaries for teachers that demonstrate their performance through peer reviews, evaluations, or student achievement.

However, the relationship between experience and salary can still have important implications for teacher career decisions. Figure 2 graphs the relationship between experience and teacher salary for both traditional public and charter school teachers. Salaries for new teachers are similar in both types of schools, although the growth trajectories are quite different. After a few years of experience, the major differences between teacher salaries are evident. In addition, teachers in charter schools reach their maximum salary much earlier than teachers in traditional public schools. Charter school teachers reach a maximum salary of about \$45,000 after 26 years of experience. Public school teacher salaries, however, continue to grow until about 35 years of experience (nearing retirement age) and reach a maximum of \$55,000.

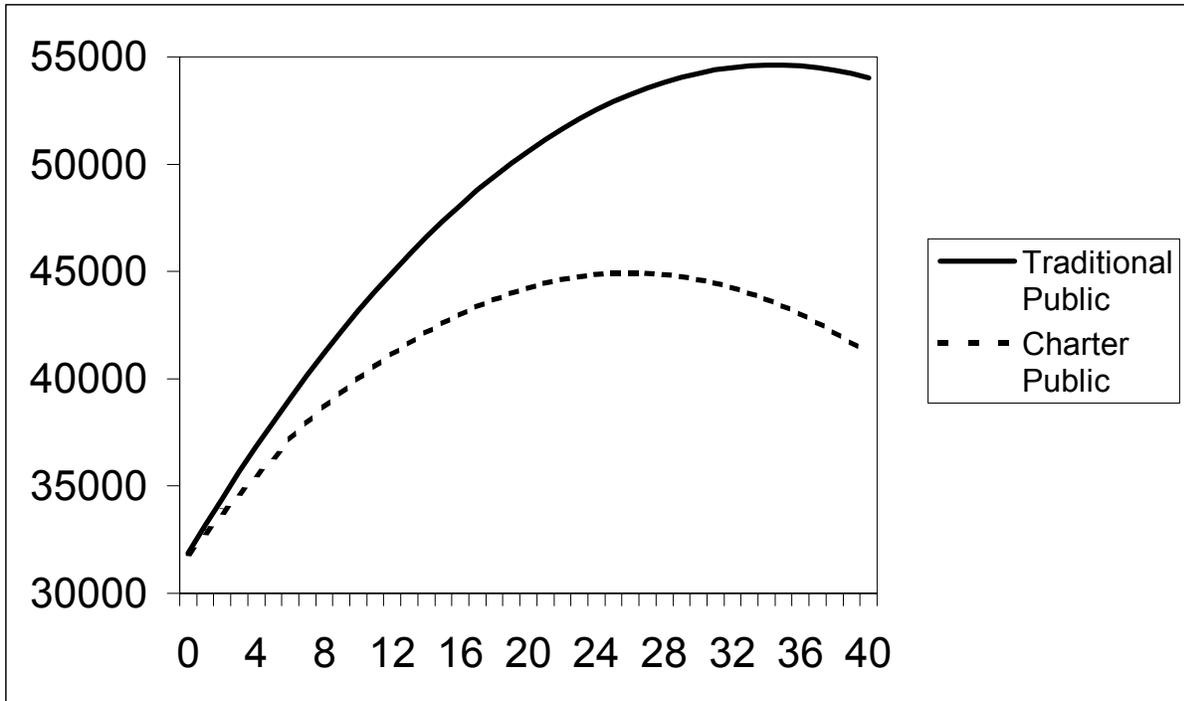


Figure 2 – Growth trajectories of teacher salaries in charter and traditional public schools

The quadratic relationship between experience and salary suggests that the salary increases for each year of experience become smaller, and eventually become negative. For teachers in traditional public schools, the maximum salary is reached near the end of the teacher’s career, thus it is unlikely that many teachers actually see their salary decrease. However, charter public school teachers with 25 years of experience do appear to experience salary decreases, as shown in Figure 2. Yet, since no charter schools had been open for more than 10 years at the time of data collection, very experienced teachers in the charter sample must have gained their experience in traditional public or private schools before moving to a charter school. This sample of very experience charter school teacher is small and probably highly selective. It is likely that these experienced teachers took a substantial pay cut to work in a

charter school. Thus, additional research should examine why teachers are attracted to charter schools and why some teachers are willing to forgo higher earnings to work in these schools.

Conclusion

Given the results in Figure 2, it should not be surprising to find that charter schools have higher attrition (Bomotti et al., 1999). While charter schools are able to compete with traditional public schools in initial teacher hiring, charter schools may lose teachers to public schools as teachers gain experience and can earn higher salaries in traditional public schools. Before we can reach any conclusions about the implications of this study, we need to explore where charter school teachers go when they leave their school. Additional research should examine whether teachers who leave charter schools are more likely to find higher paying jobs in traditional public schools, whether they switch to another charter (or private) school, or whether they leave teaching altogether. This study has identified an important phenomenon, that charter schools appear to offer competitive salaries for beginning teachers but lower salaries as teachers gain experience. We need more research to explore the factors behind this finding.

Given these findings, it is not surprising that charter schools employ three times the number of new teachers as traditional public schools. While some charter schools may have high numbers of new teachers because they are newly-created, evidence from Texas indicates that the average experience level of charter school teachers remain the same as the charter school ages due to attrition (Texas Center for Educational Research, 2003). If charter schools do not offer competitive wages to teachers with more than a couple years of experience, it is unlikely that they will be able to retain many highly experienced teachers. While there may be little evidence that experience is an indicator of teacher quality on an individual level, having high

concentrations of new teachers in one school may impact the school's ability to improve student learning. While these new teachers may bring fresh, innovative ideas to the school and are less tied to traditional teacher behavior, they are also quite inexperienced and still learning to teach. Further, continual high levels of turnover may inhibit a sense of professional community within the school and lead to instability and a lack of effective teachers to mentor those entering the school.

Of course, charter schools have more control over their budget, and, hence, teacher salaries. It may be that charter schools are consciously concentrating on recruiting new teachers. Perhaps charter schools are trading smaller class sizes for less experienced teachers. However, it may also be that, to the extent that charter schools face a resource disadvantage compared to traditional public schools, charter schools are forced to offer lower salaries to more experienced teachers because they cannot afford salaries competitive with public schools. Additional research should examine the relative per-pupil and capital expenditures and resources of traditional public and charter schools, and the portion of their budget allocated to teacher salaries.

Finally, this study points to potential difficulties in altering the traditional teacher salary schedule and changing the return to experience that teachers expect. While experience may not an important indicator of teacher quality, it has been the driving force in salaries for decades. Thus, any change to this model of salary schedules may be disruptive to the nature of teacher recruitment and retention. Charter schools appear to be changing the dynamics of teacher salaries, which may be a positive finding. Yet, in doing so, they may also face the problem of increased turnover due to teacher preferences for higher salaries. School systems that want to eliminate the single salary schedule must still compete in a competitive labor market for teachers. If that labor market rewards experienced teachers with higher salaries, then these

school systems face a dilemma. They may want to reward other characteristics than experience, but find that teachers expect and value yearly salary increases. Attempts to change the dynamics of teacher salaries, either by charter schools or traditional public school districts, must confront this dilemma.

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| | All teachers | Teachers with less than 3 years of experience | Teachers with at least 3 years of experience |
|--------------------|--------------|---|--|
| Traditional public | 14.2 | 22.1 | 12.7 |
| Charter public | 28.6 | 33.5 | 24.6 |

Note: The attrition rates include teachers who moved schools and teachers who left the profession.
Source: Schools and Staffing Survey, 1999-2000

Table 2 - Descriptive statistics for schools omitted and included in analysis

| <i>School characteristics</i> | <i>Included</i> | <i>Omitted</i> |
|-------------------------------------|-----------------|----------------|
| N | 3876 | 642 |
| Charter school | 1.81% | 2.78% *** |
| School size | 603.15 | 374.65 *** |
| Percent free/reduced lunch students | 39.04 | 46.04 ** |
| Percent minority students | 35.97 | 41.61 * |
| <i>Urbanicity</i> | | |
| Central city | 25.26% | 31.93% * |
| Urban fringe/Large town | 51.92% | 45.47% § |
| Rural/Small town | 22.82% | 22.60% |
| <i>Region</i> | | |
| Northeast | 15.94% | 17.02% |
| Midwest | 32.44% | 30.22% |
| South | 29.50% | 27.53% |
| West | 22.12% | 25.23% |
| <i>School level</i> | | |
| Elementary | 58.67% | 64.60% § |
| Middle | 16.07% | 11.09% * |
| Secondary | 21.39% | 16.48% * |
| Combined | 3.87% | 7.83% *** |

§ Difference is significantly different at the p<.10 level.

* Difference is significantly different at the p<.05 level.

** Difference is significantly different at the p<.01 level.

*** Difference is significantly different at the p<.001 level.

Table 3 - Descriptive statistics for teacher and school variables, by charter status

| <i>Teacher variables</i> | <i>Traditional Public</i> | <i>Charter Public</i> |
|---------------------------|---------------------------|----------------------------|
| N | 14997 | 2210 |
| Salary | \$42,018.20 (18,629) | \$33,885.14 (35,174)*** |
| Years of experience | 13.66 (14.91) | 6.62 (25.89)*** |
| Male | 25.43% | 25.29% |
| Minority | 16.05% | 21.34%*** |
| Full certification | 89.84% | 66.28%*** |
| Master's degree | 49.27% | 40.28%*** |
| Paid for extra duties | 41.74% | 25.29%*** |
| Special education teacher | 11.04% | 7.13%*** |
| Part-time teacher | 7.81% | 12.33%*** |

| <i>School variables</i> | <i>Traditional Public</i> | <i>Charter Public</i> |
|-------------------------|---------------------------|-----------------------|
| N | 3202 | 674 |
| <i>Urbanicity</i> | | |
| Central city | 24.79% | 51.01%*** |
| Urban fringe/Large town | 52.23% | 34.64%*** |
| Rural/Small town | 22.98% | 14.35%*** |
| <i>Region</i> | | |
| Northeast | 16.02% | 11.53%** |
| Midwest | 32.58% | 24.72%*** |
| South | 29.61% | 23.56%** |
| West | 21.79% | 40.18%*** |
| <i>School level</i> | | |
| Elementary | 58.81% | 50.95%*** |
| Middle | 16.20% | 9.22%*** |
| Secondary | 21.38% | 22.27% |
| Combined | 3.61% | 17.56%*** |

* Difference is significantly different at the $p < .05$ level.

** Difference is significantly different at the $p < .01$ level.

*** Difference is significantly different at the $p < .001$ level.

Table 4 - Fully Unconditional Model: Teacher Salary

| | Value |
|--|----------|
| Within-school variance (sigma-squared) | 1.10E+08 |
| Between-school variance (tau) | 4.98E+07 |
| Reliability (lambda) | 0.502 |
| Intraclass correlation | 0.312 |

Table 5 - Within-School Model: Teacher Salaries

| <i>Fixed effects</i> | <i>Teacher salaries</i> |
|--|-------------------------|
| Intercept, γ_{00} | 29758.25 *** |
| Years of experience, γ_{10}^a | 1232.46 *** |
| Male, γ_{20} | 2048.33 *** |
| Minority, γ_{30} | 769.41 * |
| Full certification, γ_{40} | 1003.03 *** |
| Special education teacher, γ_{50} | 996.17 ** |
| Part-time teacher, γ_{60} | -7336.48 *** |
| Master's degree, γ_{70} | 3684.24 *** |
| Paid for extra duties, γ_{80} | 2776.78 *** |
| Experience squared, γ_{90}^a | -19.21 *** |
| Percent of level 1 variance explained | 59.30% |

| <i>Random effects</i> | <i>Parameter variance</i> |
|---------------------------|---------------------------|
| Intercept | 2.82E+07 *** |
| Years of experience slope | 1.09E+05 *** |

| <i>Reliability estimates</i> | <i>Reliability</i> |
|------------------------------|--------------------|
| Intercept | 0.330 |
| Years of experience slope | 0.305 |

* Difference is significantly different at the $p < .05$ level.

** Difference is significantly different at the $p < .01$ level.

*** Difference is significantly different at the $p < .001$ level.

^a This variable is uncentered. All other variables are grand-mean centered.

Table 6 - Between-School Model: Average Teacher Salaries for beginning teachers

| <i>Intercept as outcome</i> | <i>Teacher salaries</i> |
|---------------------------------|-------------------------|
| Intercept, γ_{00} | 31856.68 *** |
| Charter, γ_{01} | -29.33 |
| Rural/Small town, γ_{02} | -2872.32 *** |
| Northeast, γ_{03} | 1376.10 * |
| Midwest, γ_{04} | -2262.57 *** |
| South, γ_{05} | -2838.93 *** |
| Percent of variance explained | 18.33% |

| <i>Years of experience slope</i> | <i>Teacher salaries</i> |
|----------------------------------|-------------------------|
| Intercept, γ_{10} | 1322.58 *** |
| Charter, γ_{11} | -320.35 *** |
| Central city, γ_{12} | -28.43 § |
| Rural/Small town, γ_{13} | -166.71 *** |
| Northeast, γ_{14} | 159.69 *** |
| South, γ_{15} | -150.18 *** |
| Percent of variance explained | 20.47% |

Note: All continuous variables are grand-mean centered and all dummy variables are uncentered.

§ Difference is significantly different at the $p < .10$ level.

* Difference is significantly different at the $p < .05$ level.

*** Difference is significantly different at the $p < .001$ level.