Are Public Schools Really Losing Their "Best"?

Assessing The Career Transitions Of Teachers And Their Implications For The Quality Of The Teacher Workforce

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Abstract:

Most studies that have fueled alarm over the attrition and mobility rates of high-quality teachers have relied on proxy indicators of teacher quality, which recent research finds to be only weakly correlated with value-added measures of teachers' performance. We examine attrition and mobility of teachers using teacher value-added measures for early-career teachers in North Carolina public schools from 1996 to 2002. Our findings suggest that the most-effective teachers tend to stay in teaching and in specific schools. Contrary to common expectations, we do not find that more-effective teachers are more likely to leave more-challenging schools.

JEL Classification: I20 - Education, General; J45 - Public sector labor markets; J63 - Turnover, vacancies, layoffs

Keywords: teacher quality, teacher turnover, teacher persistence

I. Introduction

Recent research on teacher attrition and sorting has fueled concerns about retaining high-quality teachers. Evidence suggests that teachers tend to move away from low-performing, high-poverty schools (Hanushek et al., 2004), and as a result, these schools have the least-qualified teachers as measured by attributes such as licensure status, the selectivity of the colleges from which they graduated, and their performance on standardized exams (Lankford et al., 2002). Equally troubling, the most academically proficient teachers are the most likely to leave the profession altogether. Specifically, teachers with higher ACT and licensure test scores, those with degrees in technical subjects such as chemistry, and those who graduate from more-selective colleges, tend to leave teaching earlier than others (Murnane and Olsen, 1989, 1990; Podgursky et al., 2004). As economist Richard Murnane rather succinctly notes: "college graduates with high test scores are less likely to take (teaching) jobs, employed teachers with high test scores are less likely to stay, and former teachers with high test scores are less likely to return" (Murnane et al., 1991). This is of particular concern given the mounting evidence that teacher quality is the key schooling factor influencing student outcomes (Goldhaber et al., 1999; Rivkin et al., 2005; Rockoff, 2004).

When these patterns of sorting and attrition are coupled with evidence of a correlation between teachers' academic proficiency and student achievement, it is temping to conclude that public schools are likely to be losing many of their most-effective teachers (Clotfelter et al., 2007; Ehrenberg and Brewer, 1994, 1995; Ferguson, 1991; Ferguson and Ladd, 1996; Strauss and Sawyer, 1986; Summers and Wolfe, 1975; Goldhaber, 2006). It is premature, however, to jump to strong conclusions about teacher quality based on easily observed and quantifiable teacher attributes (credentials, test scores, and so on) as numerous studies show that teachers'

contribution toward student academic achievement (on standardized tests), is only weakly correlated with these attributes (Aaronson et al., 2003; Clotfelter et al. 2007; Gordon et al., 2006; Greenwald et al., 1996; Hanushek, 1986; Goldhaber, 2001, 2006). Given this weak link, it's worth asking: "Are public schools really losing their 'best' teachers?"

We investigate this question by studying the career paths of new elementary teachers who began teaching in North Carolina during a 6-year period from 1996-2002. Our dataset allows us to explore teacher transfers from one teaching position to another within and between school districts, occupational changes within public schools (for example, a move from a teaching position into the district office), and exits out of the North Carolina public school workforce. And, because teachers can be matched to the students in their classrooms, we explore how career transitions are related to a more direct measure of quality: teachers' estimated contributions toward student learning.

We are aware of only three existing papers that examine teacher sorting with empirical estimates of teacher effectiveness, all of which find, contrary to expectations, that more-effective teachers were *less* likely to leave their schools or the profession. Krieg (2004) used a single year of fourth-grade test scores merged with a panel of teacher observations from Washington State to investigate the decision to leave the profession. He found that female teachers who had produced the largest average test score gains that year were less likely than females with lower average gains to leave the profession the following year, though the effect was negligible for males. Hanushek et al. (2005) examined teacher exit and transfer behavior in a large urban district in Texas and found that teachers who changed campuses within a district, changed districts, or left public education in Texas entirely had lower average gains in student test scores than those teachers who stayed at the same campus. Interestingly, evidence suggested that exiting teachers

were of lower quality only in the year immediately preceding their departure. Similarly, Boyd et al. (2007) in their analysis of teachers in New York City found that more-effective teachers tended to stay in the classroom.

We expand on these existing analyses in three key ways: by including transfers within the system, exits from the system, and moves to administration; by including school characteristics that affect transition probability; and by employing a panel dataset that allows us to explore not only several moves over time, but the movement of all teachers across an entire state. On the whole, our findings suggest that the most-effective teachers tend to have the longest stays in teaching and in specific schools. However, when we explore whether the relationship between a teacher's effectiveness and her likelihood of exiting the classroom is linked to the context in which she is working, we find a less consistent picture. In interaction models, we find that the extent to which effectiveness corresponds with a reduced change of exiting increases as the context becomes more challenged—that is, more-effective teachers are more likely to stay in challenging schools. On the whole our findings suggest that the most effective teachers tend to have the longest stays in teaching and in specific schools and, contrary to common expectations, we did not find evidence that more effective teachers were more likely to leave the most challenging contexts.

II. Data and Methodology

The data for this study includes information on the career paths of nearly all elementary-level (grades 4-6) teachers who entered the North Carolina public school system between 1996 and 2002. For every teacher in the sample, we also have (1) teacher demographic information, (2) the demographic background and academic performance of students in the schools in which

they taught, and (3) observable measures of teacher quality including teacher certification test scores, educational background, SAT scores, and estimated measures of a teacher's effectiveness in the classroom, based on her value-added contribution toward student achievement.[1] Our analysis considers the career mobility of teachers, and we examine how various measures of teacher quality influence mobility.

A. Measuring Teacher Effectiveness

Precisely which measures most accurately predict "teacher effectiveness" (we use this term interchangeably with "teacher quality") remains a continuous source of debate. There is considerable academic discussion over the value of widely used proxy measures such as teacher certification status, education level, and experience (Darling-Hammond, 2000; Goldhaber et al., 1999; Hanushek, 1986, 1997; Walsh, 2001); nevertheless, we include these variables in our analysis because they help determine employment eligibility and compensation, and are the most readily observable measures of quality available to principals making employment decisions. Likewise, many states (including North Carolina) recognize and reward teachers who obtain National Board of Professional Teaching Standards (NBPTS) certification, although evidence thus far is mixed about its value as a signal of teacher quality (Cavalluzzo, 2004; Clotfelter et al., 2007; Goldhaber and Anthony, 2007). We also measure teacher quality based on two measures of academic proficiency: a teacher's performance on licensure assessments, and the selectivity of a teacher's undergraduate degree granting institution, as indicated by the average SAT of the institution's students.

To get a more direct measure of teacher quality, we estimate teacher effectiveness based on a teacher's value-added contribution toward student achievement on standardized tests. This measure of quality is itself controversial, as these tests are clearly only able to capture a slice of

the contributions that schools and teachers make toward student learning. Furthermore, there is no universally accepted method for calculating a teacher's value-added contribution and research shows that the methodology employed for this task can, depending on context, sometimes greatly influence the measure (Ballou et al., 2004; McCaffrey et al., 2004; Rubin et al., 2004; Tekwe et al., 2004). It is beyond the scope of this paper to delve into this issue too deeply; instead we explore mobility patterns based on a three distinct measures of teacher value-added, each of which has different strengths and weaknesses.

As a first measure of teacher effectiveness, which we refer to as teacher effect 1 (TE1), we regress the student's achievement in math in the current year as a function of a cubic Y of achievement in the previous year, a vector X of time invariant and time variant student characteristics (race, gender, eligibility for subsidized lunch), and a teacher fixed effect:

$$(1) \qquad y_{ijt} = \alpha + \beta Y_{ij_{t-1}t-1} + \delta X_{ijt} + \Phi_j + \varepsilon_{ijt}$$

where y is the student *i*'s achievement in class *j* in year *t*; β is a vector of coefficients on a cubed, squared and linear prior achievement term;[2] δ is a vector of coefficients on the time variant and invariant student characteristics; and Φ is a vector of teacher-specific fixed effects for each class j. From this equation, the predicted values of the teacher-specific effects $\hat{\Phi}$ are used as measures of teacher effectiveness. The advantage of this methodology is that it attempts to control for all observable characteristics that may affect the student's performance but which are beyond the teacher's control. The downside, however, is that students and teachers are likely to be matched to one another, at least in part, based on unobservable teacher or student attributes, and this would lead to a mis-estimate of teacher effectiveness. For instance, if students who are eligible for subsidized lunch are more likely to be matched with poorer-performing teachers, then including an indicator for the student's eligibility for subsidized lunch will attribute some of the

teacher's poor performance to that variable: In this case, the teacher's measured effectiveness is attenuated towards zero. Or, if there are unobservable student characteristics that determine how students are matched to teachers and which also affect achievement, then these will be incorrectly attributed to the teacher's ability.

To remedy the two potential sources of bias in this first quality measure, we introduce two additional measures of teacher effectiveness that use the same basic structure as outlined above and predict a teacher fixed effect. Each represents a bound on the true measure of the teacher effectiveness by dealing with potential biases from including too many student variables and from not including enough. As a second measure of teacher ability, which we refer to as teacher effect 2 (TE2), we eliminate the vector X of student characteristics:

$$(2) \qquad y_{ijt} = \alpha + \beta Y_{ij_{t-1}t-1} + \Phi_j + \varepsilon_{ijt}$$

As described above, the advantage of excluding student controls is that all changes in student test scores are attributed to the teacher, eliminating the possibility that some of the teacher effect is attributed to student characteristics that determine matching. Such a methodology almost certainly biases the magnitude of teacher's true effect, however, since some of the observable student attributes likely reflect true differences that are beyond the teacher's control. The direction of the bias is theoretically unclear and depends on how students and teachers are matched. However, empirical evidence suggests that students who have difficulty learning are more likely to be matched to lower-quality teachers (Clotfelter et al., 2005; Goldhaber and Anthony, 2007; Player, 2006). In the presence of such matching, the magnitudes of the teacher effects (in absolute value) are exaggerated.

Finally, as a third measure, which we refer to as teacher effect 3 (TE3), we substitute student and teacher fixed effects for observed characteristics:

(3) $$y_{ijt} = \alpha + \theta_i + \Phi_j + \varepsilon_{ijt}$$

The advantage to this method is that the estimated teacher effect captures differences within each student and controls for all time-invariant observable and unobservable teacher and student characteristics. In a sense, this method is an extreme version of (1) which includes all observable and unobservable student attributes. Like (1), the potential downside of this is that student characteristics that determine the type of teachers to which the student is matched will be picked up in the student fixed effects, attenuating the teacher effect towards zero. However, unlike (1), unobservable time-invariant student characteristics that determine matching (and achievement) will not be inappropriately attributed to the teachers.

In short, the teacher effectiveness measures outlined above represent a range of measures, and each has strengths and weaknesses. The correlation between the three teacher effect measures ranged from 0.496 to 0.987 with the correlation between TE1 and TE2 being the highest, and the correlation between TE2 and TE3 being the lowest.[3] Since the correlations across the three effectiveness measures are relatively high, and our model estimates are largely similar across all three measures, we choose to report findings on models that include TE3, which includes both student and teacher fixed effects, in the discussion below. However, we provide parallel tables using TE2 (which include teacher fixed effects but no student controls or student fixed effects) in the Appendix to give readers a sense of the range seen with different measurement strategies. Full results for all three measures of effectiveness are available upon request.

B. Modeling Career Paths

We employ competing risk hazard models estimated with Cox regressions to estimate the risk that individual teachers opt to leave their current teaching position given their own

characteristics and the characteristics of the school in which they teach. Hazard models are conceptually appealing for studies of teacher movement and attrition because they measure the risk of changing schools or leaving teaching given the length of time the teacher has been with a school or in the school system, which we count in one-year increments. Accounting for time is important, because we know that new teachers are substantially more vulnerable than more-established teachers to moves and exits. These models also provide some flexibility with our data by allowing us to analyze the movement of teachers without necessarily viewing the entire career for all teachers. That is, we can describe career movement with censored data.

We build all of our analyses from the basic hazard model (equation 4, below) which defines an individual's hazard or risk of leaving the position as a function of a baseline hazard function ($\lambda_0(t)$) and a series of covariates (X_{ik}) which would include measures of the teacher's quality, teacher's background characteristics, and school characteristics.[4]

$$h_i(t) = \lambda_0(t) e^{\sum_{n=1}^{k} \beta_n X_{in}} \tag{4}$$

We use Cox proportional hazard models to estimate the relative hazard of an event under different circumstances. Cox models, by focusing on the relative hazard rates, eliminate the need to know the baseline hazard as long as it is proportional over time. Because a teacher's stay could result in one of four outcomes (transferring to a new school within the district, transferring to a new school outside the district, leaving the classroom to join administration, or leaving the North Carolina system), we extend equation 4 to account for the *j* "competing risks" in equation 5:

$$\ln h_{ij}(t) = \alpha_j(t) + \sum_{n=1}^{k} \beta_{nj} X_{inj} \quad \text{where j=1, 2, 3, 4} \tag{5}$$

We report robust standard errors that help account for multiple events from the same teacher, which occurs when teachers transfer to new schools. We also stratify by event number, which allows us to account for the possibility that teachers will display a different baseline hazard if they are in their first teaching job versus their second or third.[5]

For all teachers who do not exit to administration or exit the North Carolina system, the last event is incomplete and noted as a censored observation. In total, the sample included 16,301 event observations: 3,757 events of transferring schools within the district; 3,767 events of transferring teaching position to a new district; 193 events of moving to administration; 3,058 events of exiting the system; and 6,130 censored events. The number of different teaching positions (events) ranged from one to five, with 37 percent having made at least one move (that is, displaying at least two events) and 98 percent having held three or fewer different teaching positions.

We restrict the sample to all teachers who entered the North Carolina system beginning in 1996 or later to avoid left censoring, which occurs when the start date for an observation is unknown. However, our focus on early- to mid-career teachers includes the period when attrition rates out of the occupation are highest. As is apparent in national trends, the most rapid loss of teachers in our sample also occurs in the early years (between year one and four) with 25 percent of teachers exiting the North Carolina system within the first four years of teaching. Focusing on the early- to mid-career cohorts also eliminates the complication of modeling the retirement of teachers.

An important limitation of the North Carolina data is that we do not know what happens to teachers who exit the system. It is likely that in most cases these are exits from teaching and education altogether; however, it is also possible that teachers are leaving the North Carolina

public system for a private sector teaching job or leaving North Carolina for a teaching job in another state. Evidence from the National Center for Education Statistics' *Teacher Follow-up Survey* suggests that most moves out of a state system are due to teachers leaving the profession. For example, only 12 percent of teachers who left their state's public school system after the 2000-01 school year were still teaching in either a private school or a public school in another state.

It is also worth noting that not all teacher transitions are necessarily bad for students, even though policy discussion around teacher attrition often laments attrition rates as a sign that the rewards of teaching are not enough to balance the demands of the profession. While this may be true for some teachers who choose to exit the profession, it is also the case that many unsuccessful new teachers are counseled out of the profession before they achieve the job security usually associated with tenure, which is typically earned after three years in a school. Although the North Carolina data do not permit us to determine the extent to which teacher attrition is voluntary, we also estimated our attrition models with a reduced sample of teachers who are in the system three or more years, focusing only on the moves teachers made after their first two years of teaching when teachers were most likely to have earned tenure. We generally found few differences with these reduced sample models. Therefore, we only present results from the full sample.

Our data do, however, allow us to observe the extent to which teacher transitions are associated with observable factors. **Table I** reports sample statistics for five possible outcomes for: 1) those who remain in their original schools as teachers, 2) those who move to another public school teaching position within their original school district, 3) those who move to another public school teaching position in a different district in North Carolina, 4) those who

move into an administrative position, and 5) those who leave the North Carolina public school system. These statistics are provided for the entire sample as well as the 1996 cohort of teachers.

Descriptive statistics of the early-career teachers in our sample (**Table I)** indicate that teachers who transfer schools are somewhat different than those who ultimately exit North Carolina's systems or enter administration. Looking across all events, teachers who exit the system appear to have somewhat lower teacher-effect scores but, consistent with most of the previous literature, somewhat higher certification and SAT test scores relative to teachers who transfer programs (Lankford et al., 2002). It is difficult to arrive at any conclusion by looking at all events because teachers have different opportunities to transfer and exit based on the length of time they have been in the system.

(INSERT TABLE I ABOUT HERE – TEACHER CHAR BY TYPE OF MOVE)

As a preliminary exercise to control for the opportunity to transfer or exit, we compare means for the 1996 cohort of teachers. Of the 1,093 teachers in this cohort, 189 never moved, 709 had at least one school or district transfer, 329 ultimately exited the system (177 of which left after their first teaching assignment), and 52 eventually moved to administration.

The mean scores for teacher effects and test scores for the 1996 cohort show some interesting differences across types of teachers. Within this cohort, we see that teachers who never transferred schools or left the classroom had higher teacher-effects scores than teachers who did. Teachers who stayed in their first assignment, however, had similar SAT scores to transferring teachers. They also had standardized certification test scores similar to those of teachers transferring within the district—though somewhat lower certification scores relative to teachers moving across district lines. College selectivity (as reflected by the average SAT score of the school's students) and teacher certification scores for teachers who remained in their first

assignment were slightly lower than for teachers who ultimately exited the system or went into administration. This initial view suggests that some patterns exist across teachers based on measures of teacher quality, and warrants further investigation. We explore these patterns in more detail in Section III.

III. Career Paths of North Carolina Teachers

Our examination of teacher mobility shows that—while factors typically thought to reflect competitiveness in the wider labor market do predict exits from teaching—on average, more-effective teachers tend to have longer stays in the classroom, as Hanushek et al. (2005), Krieg (2005), and Boyd et al. (2007) have all found. Even though teachers apparently gauge the context of the school they are in against other schools in their district and tend to move away from the district's most-challenged schools, we do not find evidence that more-effective teachers are more likely to leave challenging contexts.

Below, we present the results of several Cox proportional hazard models that show the within-district and across-district transfer of teachers, as well as teachers' exits to administration and exits from the North Carolina system. The primary analyses are built from the basic competing-risk model in equation (5) and estimated with a series of Cox regressions that estimate the log hazard of transferring schools within the district, transferring schools across district lines, exiting the North Carolina education system, and moving to administration. Admittedly, we use caution in interpreting the estimates of moves to administration because our sample includes only teachers in the early years of their careers with the North Carolina Public Schools. Therefore, we might reasonably expect the few teachers that do move into administration to be either unusually motivated or to have had experience prior to entering the North Carolina system. Unfortunately, we cannot directly identify those teachers who are

entering the system with out-of-state teaching experience or experience teaching in private schools. To check the possible impact of late entrants to the North Carolina system with prior experience, we estimate the basic models with a sample that excludes those teachers who entered the North Carolina three or more years after completing their bachelor's degree. Because the models with the reduced sample largely parallel what was seen with the full sample, we report the results from the full sample. We estimate models for men and women separately to account for systematic differences in their labor market behavior (Keith and McWilliams, 1997). As is typical in elementary education, the elementary teacher workforce in North Carolina is dominated by women who comprise approximately 85 percent of the teachers in our sample; not surprisingly, the estimates of effects are more robust for women.

Tables II and III (below) provide coefficient estimates (β_i), which reflect the change in the log hazard between 1996 and 2002 of a particular event given one unit change in the explanatory variable. The tables also provide the hazard ratio (h.r.)[6] from which $(h.r.-1)100$ gives the percent change in the hazard of the event with a one-unit change in the explanatory variable. These measures are often interpreted as the length of time someone stays in an event. For example, if teachers with a masters' degree are associated with a lower hazard for leaving teaching than teachers with only a bachelor's degree (i.e. $\beta_{master's}<0$ and $h.r._{masters}<1$), we would expect the teachers with the master's degree to be less likely to leave teaching and the length of time before an exit to be longer than for teachers with only a bachelor's degree. We explore several specifications of teachers' moves and exits, with each of the models controlling for the teachers' demographic background and characteristics of the school in which they taught. The discussion that follows describes the relationship between several indicators of teacher quality

and a teacher's attrition and mobility, and continues with a brief look at how the attrition and mobility of "productive" teachers varies across school contexts.

A. Teacher Quality and Exits from the Classroom: Are We Losing the 'Best' Teachers?

Understanding the extent to which the best teachers actually stay in teaching is central to the effort to ensure that there are high-quality teachers in all classrooms. . In this section we explore the relationship between teacher quality and teachers' movement out of the classroom—whether it be an exit from the North Carolina system or a move into administration. As stated earlier, debate continues over the extent to which various indicators really represent teacher quality. In order to identify high-quality teachers and teacher candidates, the educational community has relied on easily observable indicators that are readily accessible to employers—including college selectivity, Praxis scores, advanced degrees, and National Board of Professional Teaching Standards (NBPTS) certification. More recently, however, researchers have estimated the achievement gains made by students while in a given teacher's classroom, and argue that these measures are potentially more accurate reflections of teachers' effectiveness and therefore their quality of teaching. While we explore the relationship between these traditional quality indicators and mobility, we focus much of our discussion on the relationship between these value-added measures of teacher quality and teacher mobility. Although our analysis shows that the most-effective teachers tend to stay in teaching longer than less-effective teachers, when we control for effectiveness we still find that teachers from more-selective colleges and women with higher Praxis scores are more likely to leave teaching than are their counterparts with lower Praxis scores or from less selective colleges.

INSERT TABLE II ABOUT HERE – WOMEN EXITING CLASSROOM FX3

INSERT TABLE III ABOUT HERE – MEN EXITING THE CLASSROOM

To illustrate how the story of attrition changes depending on how we measure teacher quality, we begin by comparing models of attrition as predicted by traditional quality indicators and by our teacher effectiveness measures in separate specifications. Looking first at the more conventional indicators of teacher quality in Specification 1 (columns (1) and (2) in Tables II and III), our results, much in line with previous research, show that teachers with stronger general academic credentials are more likely to leave teaching. Specifically, an additional 100 points in the average SAT score of the teacher's undergraduate institution is associated with a 29 percent greater chance that a woman will exit the system and an 18 percent greater chance that a man will exit the system.

Critics, however, could argue that college selectivity is not a good indicator of a teacher's aptitude or educational training and, given the relatively modest economic returns to teaching, future teachers may purposely choose not to attend the most-selective colleges, as they often have higher associated costs. But, we also find that, controlling for all other quality indicators, women scoring better on the Praxis teaching exam (an exam intended to capture teacher's knowledge of pedagogy and relevant content) are also more likely to exit the North Carolina system, while Praxis scores for men are not associated with greater risk of exiting (in fact, stronger scorers appear less likely to exit). When we account for the fact that women scoring higher on the Praxis are also more likely (80 percent more likely) to move to administration, these results suggest that the best scoring pre-service teachers may be leaving North Carolina's classrooms.

Quality indicators that reflect teachers' investment in their educational credentials, predictably, reveal that teachers making these investments tend to stay in teaching. Teachers with advanced degrees, which are typically specific to the educational field and required to maintain

teacher certification, show significantly lower risk of exiting the North Carolina system. For women, a master's degree is associated with a 16 percent lower risk of exiting the NC system and for men we see a 32 percent lower chance of exiting. Similarly, women with NBPTS certification show a 90 percent lower risk of exiting the system (few men in our sample obtained the NBPTS certification, making these estimates uninformative in the models of men's mobility and attrition).

Although teachers with strong education-specific credentials are less likely to exit the system, teachers in this early-career sample who obtain advanced degrees appear motivated to pursue administrative positions. Typically, a master's degree or higher is required for administrative certifications, and teachers in this early cohort who obtain advanced degrees are nearly twice as likely for women, and nearly four times as likely for men, to move to administration within their first 6 years in the system.

From the above descriptions, it is not entirely clear if North Carolina is losing its best teachers or not. Teachers with strong education credentials and advanced degrees tend to stay in the field, while those with stronger academic credentials and pre-service exam scores are more likely to leave. Although the relatively early exit by teachers from more-selective undergraduate institutions and with higher pre-service Praxis scores likely raises alarm for those concerned about the quality of teachers remaining in teaching over time, neither of these indicators of teacher quality is directly associated with the performance of students in the teachers' classrooms. In our second set of specifications, we explore whether the measures of teacher quality we directly derive from the performance of their students –measures of a teacher's effectiveness that theoretically capture the aspects of experience, pre-service and in-service

training, and that matter for student performance – are associated with the attrition of teachers. Thus, we can ask more directly, "Is North Carolina losing its most-effective teachers?"

For our second set of specifications in Tables II and III, columns (3) and (4) replace the easily observable indicators of teacher quality with a linear and quadratic term of the value-added effectiveness measure, TE3.[7] These models show that the most-effective teachers, on average, do in fact tend to have a longer tenure in teaching, but that the effect of TE3 on reducing the chance of exit grows weaker as teachers become more and more effective. For example, in the models for women, the difference in the log hazard on exit from the system for a teacher one standard deviation above the average TE3 score relative to the average TE3 is -0.433 (-0.637+0.204), giving a risk ratio of 0.649; whereas the difference in the log hazard for a teacher two standard deviations above the mean relative to the average teacher is -0.458 (-0.637*2+0.204*2^2), giving a risk ratio of 0.633.[8] While it appears that more-effective women are less likely to move to administration, effectiveness does not have a significant relationship to men's exits from the classroom.

Interestingly, when we include both traditional quality indicators and TE3, as we did in our third specification, we find that the risk ratio for all quality indicators is relatively unchanged from the previous specifications. This means that the attrition of teachers who attend more-selective colleges and who have stronger Praxis scores out of teaching is not necessarily mitigated by positive results in the classroom.

The decision to leave teaching, of course, is likely a complex decision that plays out over time. Hanushek et. al (2005), in fact, found that the effectiveness of teachers exiting the field dropped in their very last year, perhaps due to teachers giving the job less effort knowing that they would be leaving the field. We tested whether those exiting the system showed a similar

drop in effectiveness just before exiting the system, as well as testing if the patterns of exit were sensitive to which year of effectiveness was considered for analysis. Several methodological notes need to be mentioned here. First, because TE3 is not time varying we can only explore this time sensitive issue with TE2 and TE1. We have chosen to use TE2 here because it is the measure we use to provide comparison with TE3 throughout the rest of the paper. In addition, the sample for this analysis varies rather substantially from the sample used for the estimates given above. Due to a variety of reasons,[9] we can not obtain effectiveness scores for every year teachers are in the sample. To allow for a comparison across the one-year lagged effectiveness model and the average effectiveness model, we estimate both models with the reduced sample available for the one-year lagged model.

First, we find that, on average, effectiveness scores rose between the next-to-last and last year of teaching, with an average increase for women of 0.038, or almost 4 percent of a standard deviation. We also find very similar exit patterns with the two different years of teacher effectiveness data. Specifically, when TE2 is measured two years before the end of a teaching job compared to during the last year of a teaching job, the effect of TE2 on exit likelihood for women is only slightly stronger in the linear term (-0.532 versus -0.385) and slightly weaker in the quadratic term (0.177 versus 0.297).[10] For men, effectiveness measured two years prior to exit is a stronger predictor of exiting than the TE2 measure in the last year before exiting (-0.949 and significant at 95 percent confidence versus -0.377 and not significant). For women we do not find strong evidence that the exit pattern is sensitive to the year in which the teacher effectiveness was measured but the opposite may be true for men.

B. Teacher Quality and Mobility in the System

In this section, we turn our attention to the movement of teachers within the North Carolina system. As above, we first estimate the hazard of transfers (within districts and across districts) as a function of the traditional teacher quality indicators. We follow this specification with models that replace traditional indicators with TE3. Finally, we estimate the models with both the traditional indicators and the effectiveness scores. These specifications are provided in Tables IV and V.[11] Again, models for women and men are estimated separately. In the first specification using only traditional quality indicators, few indicators seem to be associated with the transfer of teachers within districts for men or women. Only NBPTS certification shows a statistically significant effect, with women holding NBPTS certification at a somewhat lower risk of transferring schools and staying in their positions somewhat longer. However, in the models for women, all of the quality indicators except advanced academic degrees show statistically significant effects on the transfer of teachers across districts. NBPTS certification reduces the likelihood of transferring by 18 percent, and a one standard deviation higher Praxis scores reduces the likelihood of transferring out of the district by more than 80 percent per standard deviation. College selectivity slightly increases the likelihood of exiting, but the increased risk of district transfers is relatively small: an increase of 100 points in the undergraduate institution's SAT scores increases the risk of transferring districts by only 8 percent.

While many of these findings concur with previous findings by Lankford et al.'s (2002) analysis of New York State teachers, our finding that National Board Certified Teachers (NBCTs) show longer stays in their schools and districts seems to counter previous research. Goldhaber and Hansen (2007) report that teachers often use their certification to leverage a new position once they receive NBPTS certification, suggesting that these teachers should reveal

shorter stays and an increased risk of transfer. However, when you consider that these models estimate the average stay for individuals with various background and professional characteristics, and that teachers who secure a new position just after receiving their NBPTS certifications would be less likely to leave these new, more-favorable positions, it would follow that teachers with NBPTS certification would, on average, ultimately show longer stays and lower risk of transferring.

(INSERT TABLE IV ABOUT HERE: WOMEN AND SCHOOL MOBILITY)

(INSERT TABLE V ABOUT HERE: MEN AND SCHOOL MOBILITY)

While school principals might be encouraged that the most-*credentialed* teachers tend to stay in their buildings, we are really interested in the mobility of the system's most-*effective* teachers. Competing hypotheses surround the implications that success in the classroom could have on the transfer of teachers. On the one hand, we might expect successful teachers to stay in the school in which they are experiencing success. On the other hand, we might expect these teachers to be more likely to move schools, as they would be very attractive teacher candidates and could use their success to find more-desirable teaching positions.

Our second specification, which includes only our effectiveness score and individual and school controls and which is presented in columns (3) and (4) of Tables IV and V, shows that more-effective women do stay in their schools and districts longer. Unlike the models of teacher exits from the system, this effect does not change with the effectiveness of teachers. The likelihood of a female teacher moving schools within the district decreases by 14 percent with each additional standard deviation in TE3 and the likelihood of moving districts decreases 16 percent with each additional standard deviation in teacher effect. While the effect on moving schools is not statistically significant for men, we find that each additional standard deviation in

effectiveness is associated with just over a 34 percent lower risk of moving districts for men. Moreover, our third specification shows that these effects remain when we include all of the teacher quality indicators. Notably when we compare the model with traditional indicators to the full model for women (comparing column (2) to column (6) in Table IV), the effect from the Praxis score becomes non-significant and the effect from NBPTS certification becomes more negative (a stronger reduction in the risk of transferring districts). These changes suggest a positive relationship between effectiveness and Praxis scores, and a negative relationship between effectiveness and NBPTS among district movers

C. Do the Best Teachers Leave the Schools that Need Them the Most?

While the transfer patterns across all schools reveal that, on average, more-effective teachers are less likely to move schools, previous research on school mobility has found that teacher mobility patterns differ across schools with different contexts (Greenberg and McCall, 1974; Hanushek et al., 2004; Imazeki, 2002; Lankford et al., 2002; Murnane, 1981). In particular, researchers have argued that struggling schools and schools serving the most-disadvantaged populations suffer most from teacher attrition (Ingersoll and Smith, 2003). It is, therefore, critical to examine whether the effective teachers are more likely to exit from schools with the most-challenging circumstances. While we find that attrition does vary rather substantially across some context factors, with indicators of challenging contexts predicting greater mobility and exit, we do not find that more-effective teachers are more apt to leave those challenging contexts.

(INSERT TABLES VI AND VII ABOUT HERE – BASIC CONTEXT)

We begin exploring the relationship between school context and teacher mobility with basic models that demonstrate the patterns of exit and transfer as a function only of teacher

demographic background and school context indicators, such as the percent of students on free or reduced-price lunch, percent of African American students, school enrollment, school-wide math score, and district salary supplement rates. These models, presented in Tables VI and VII, show that a school's math performance appears to have the most substantial effect on mobility. Each additional standard deviation in school-wide math scores reduces the likelihood that a woman will exit from the school by 44 percent, which lends support to earlier studies suggesting that low-performing schools suffer greater teacher attrition (Lankford et al., 2002).

Although it is reasonable to think that district salary supplements will keep teachers in the field and in the district, we find only modest evidence that such supplements reduce the risk of exiting the classroom. We do, however, find that each additional $100 of salary supplement corresponded with a 3 percent decrease in the risk of transferring out of the district for both women and men. Between 97 and 98 percent of teachers statewide (in districts providing salary supplements) received a salary supplement during the years of this study, with the average supplement ranging from just over $1,600 in 1997 to $2,500 in 2002.

The demographic and economic background of students is also found to have statistically significant effects on women's transfers within and across districts and out of the classroom, and on men's transfers across districts and out of the system. However, in each case the effect is very small, with risk ratios very close to one. Given the relatively consistent expectation that teachers tend to leave schools with the nation's most-challenged students (Greenberg and McCall, 1974; Hanushek et al., 2004; Stinebrickner et al., 2005; Lankford et al., 2002), we probe this issue further. Because teachers may judge their context relative to the contexts of schools around them, it is plausible that the total percent of free and reduced-price lunch (FRL) students might matter less than how concentrated the number of low-income students feels relative to other regional

schools. We find that the relative levels of FRL students had a significant effect for the women's models only. Here we see that women in schools one standard deviation above their district's mean FRL level were 17 percent more likely to transfer schools than were similar teachers in schools at the district mean FRL. While the overall percent of FRL students is not strongly associated with transfers or exits, the relative position of a school's FRL levels within a district has significant effects on the transfer of teachers within their district, suggesting that teachers do sort themselves away from the most-challenging student populations.[12]

In models with only teacher background and context factors, we find that school contexts do relate to the mobility of teachers within and out of the system. When we look at context factors when we control for teacher effectiveness (columns (4) through (6) in Tables VI and VII)[13], we see that context factors still predict mobility and attrition. The questions we are raising in this section are: Does the effect of a teacher's effectiveness measure on mobility or attrition depend on the type of context the teacher is working in? Does being in a high-poverty school or low-performing school correspond with a greater or lower likelihood of transferring or exiting? We test the differential effect of teacher effectiveness in several ways. First, we estimate additional hazard models with an interaction term reflecting the interaction between teacher effectiveness and the percent of FRL students, between teacher effectiveness and within-district standardized FRL, and between teacher effectiveness and math performance, separately.

(INSERT TABLE VIII ABOUT HERE – TWO INTERACTION MODELS)

These models explore the interaction between TE3 and within-district standardized FRL,[14] and separately between TE3 and school-wide math scores. Because we do not find statistically significant interaction effects in the models of men's mobility or interaction effects for school-to-school transfers, we only present the models of women's exits in Table VIII, which

displays the main and interaction effects for two different interaction specifications. Our first specification, which examines the interaction between effectiveness and school-wide math scores is presented in columns (1) through (4). This model suggests that teacher effectiveness more strongly predicts staying in the system when teachers are in lower-performing schools. Specifically, the hazard ratio of teachers one standard deviation above the average TE3 relative to the average teacher, controlling for all other teacher background and school factors, is $e^{(-0.665+0.197+0.473(math))}$, which is an increasing function of the school-wide math scores. So, in this case, the hazard ratio is 0.626 for teachers in schools with average scores (standardized math=0) but 0.390 for teachers in schools scoring one standard deviation below the mean. We find the interaction between effectiveness and math scores to run in the opposite direction for moves to administration. Again, we caution against making global judgments about the moves to administration with this sample of early-career teachers, as few have pursued administrative positions at this point in their careers.

Columns (5) through (8) in Table VIII provide the main effects and the interaction between teacher effects and within-district standardized FRL (district zFRL). Here, we find that the hazard ratio for exit is lower for teachers in the theoretically more-challenging context (higher within-district standardized FRL). In this case, the hazard ratio for teachers one standard deviation above the mean TE3 relative to average teachers is $e^{(-0.607-0.238(zFRL))}$ (because the quadratic term for TE3 is not significant, we have not included it in the hazard ratio). In this case, the hazard ratio for teachers in a school with the district average percent FRL students is 0.545, and the hazard ratio for teachers in schools one standard deviation above the district average percent FRL is 0.430. We found a similar pattern in the main effect and interaction terms for mobility within districts where the coefficient for TE3 is -0.153 and the coefficient for the

interaction is -0.104. Again, teachers' effectiveness is a stronger predictor of staying in the system in the more-challenging context.

It is possible that the above interaction models, while revealing differences across contexts, may be masking interesting differences that occur at the extremes of the context distributions. Perhaps the bulk of the distribution effectiveness more strongly predicts staying in challenging contexts, but in the *most-challenged* schools we do find teachers leveraging their effectiveness to move to more-advantaged contexts, implying that effectiveness predicts mobility or exit; and in the *most-advantaged* schools we find teachers leveraging their effectiveness to stay in these schools, implying that effectiveness predicts staying put. We further explore how the relationship between teacher effectiveness and mobility vary across contexts by exploring the differences in the extreme contexts (most-challenged and most-advantaged) in separate models. In these models, presented in Table IX, we find that the effectiveness of a teacher still *does not* increase the likelihood of transfer or exit from the classroom in the lowest-performing or highest-FRL schools. In fact, we find that in these the highest-FRL schools, effectiveness more likely predicts staying, with an additional standard deviation of effectiveness reducing the hazard of transferring schools by 26 percent and reducing the hazard of transferring districts by 15 percent. Increasing effectiveness also decreases the likelihood of exiting the North Carolina system, but this effect does diminish in more-effective teachers. The hazard ratio for exit of a teacher one standard deviation above the mean relative to an average teacher measures 0.49, and the hazard ratio for a teacher two standard deviations above the mean relative to the average teacher measures 0.40. By contrast, the effectiveness of a teacher has little predictive value in the risk of transferring within districts, across districts, or to administration among the lowest-FRL schools

but, as we have consistently seen across all analyses in this paper, more-effective teachers in these schools are at a lower risk of exiting the system.

(INSERT TABLE IX ABOUT HERE - MOBILITY BY QUARTILE)

While promising, these results alone cannot dispel the notion that effective teachers stay where they are regardless of the circumstances. It is still possible that effective teachers leverage their effectiveness to move into more "desirable" schools with higher test performance and fewer high-needs students very early in their careers and stay in those positions, which would make it appear that effective teachers have longer stays in schools and districts. To test whether more-effective teachers were more likely to make these early moves and then stay in their new positions, we first examine whether more-effective teachers start their careers in schools with fewer FRL students or in schools with higher math scores. We find that teachers with effectiveness scores in the highest quarter of the distribution are not systematically placed in schools with fewer FRL students. The average percent FRL at the initial placements for teachers with the highest TE3 scores is 50.2, relative to 49.8 percent for teachers with the lowest quartile of TE3 scores, which is not found to be a statistically significant difference. It does seem that the lowest quartile of teachers do start in slightly lower-scoring schools. The average standardized math score at the initial placement school for teachers in the top TE3 quartile is -0.013, while for the lowest quartile of TE3 teachers it is -0.038, which is a statistically significant difference.[15]

Of course, new teachers who have had little opportunity to prove their skills have relatively limited control over their placement. As such, we might expect the first move that teachers make to be a telling indicator of their preferences in schools. Therefore, we also look at the set of teachers who make at least one move to a new school and test whether the effectiveness of the teacher predicts the difference in math scores or difference in the percent of

FRL students between the teacher's first and second school. The results of regression models that control for the district in which teachers work, presented in Table X, show that effectiveness in the classroom is *not* necessarily associated with increases in school math test performance or with decreases in the percent of FRL students between the new and old school. In fact, we find modest evidence that more-effective female teachers tend to see less improvement in school math scores after their transfer. Of the teacher quality indicators examined, only having an advanced degree predicts the degree to which the teacher improved her context, suggesting that advanced degrees might be the most-persuasive quality signal to hiring principals or that teachers seeking to improve their school context use additional education as a means to move around the school system.

(INSERT TABLE X ABOUT HERE – FIRST MOVES)

On the whole, these results do not support the hypothesis that the most-effective teachers leave challenging schools. While this important question deserves more investigation, it does seem that to some extent, the greatest challenges to schools with difficult contexts might be finding effective teachers and creating contexts in which teachers can be developed and become effective.

IV. CONCLUSION

Educational policy advocates and researchers have raised concerns that the conditions and rewards of teaching have failed to keep the nation's best teachers in the classroom or schools that need them the most, which bodes badly on our ability to reform education, especially in the weakest schools. While we find that measures of teacher quality do, in fact, predict the tenure of teachers in classrooms, we also find that, contrary to the concerns just identified, the most-effective teachers tend to stay in the classroom and to stay in the schools in which they find

success with students, no matter what the context. Certainly, we agree that reforming compensation systems could go a long way toward attracting high-quality applicants into the field and, with the right incentives, could help to more-equitably distribute teachers across schools. Our results, however, suggest that for teachers to stay in the field, it is also important that they find success in the classroom. Policies and programs that provide teachers with more thorough preparation, more consistent and effective mentorship, and more relevant development should also be considered valuable strategies for retaining teachers and reducing teacher mobility.

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Endnotes

[1] These data are collected by the North Carolina Department of Public Instruction (NCDPI) and maintained by the North Carolina Education Research Data Center (NCERDC) at Duke University.

[2] The cubic term is to control for nonlinearities in test-score growth based on different points in the initial distribution of test scores.

[3] All correlations had a p-value of less than 0.0001 with Corr (TE1, TE2)=0.987, Corr (TE1, TE3)=0.509 and Corr (TE2, TE3)=0.496.

[4] For computation, equation 4 is often rewritten as the log hazard:

$$\ln h_i(t) = \alpha(t) + \sum_{n=1}^{k} \beta_n X_{in}, \text{ where } \alpha(t) = \ln \lambda_0(t)$$

[5] The Cox proportional hazard models we estimate assume that the events (transferring or exiting) occur at discrete intervals of time (yearly in the case of these models). However, because teachers could transfer or exit mid-year, we also test the basic models for this paper using log-log models for continuous time. Results from these models largely parallel the results provided in this paper's discussion. Due to the lengthy computational time of the continuous-time models with our data set, we choose to explore and report the discrete-time models.

[6] This interpretation of coefficients and risk ratios is true for all linear terms in the model. Marginal change in log hazard and risk ratios is somewhat more complex for non-linear and interaction terms as they are not constant.

[7] Appendix tables AI and AII provide estimates for specification 2, described here, and specification 3, described below using TE2 as the measure of teacher effectiveness.

[8] The difference in the hazard rates with a *c* unit change in TE3 is:

$$h(t \mid TE3 = TE3 + c) - h(t \mid TE3 = TE3) = \alpha_t + \beta_1(TE3 + c) + \beta_2(TE3 + c)^2 + \sum_3^n \beta_n \bar{X}_n - \left[\alpha_t + \beta_1(TE3) + \beta_2(TE3)^2 + \sum_3^n \beta_n \bar{X}_n\right]$$

$$= \beta_1(c) + \beta_2(TE3 + c)^2 - \beta_2(TE3)^2$$

[9] The North Carolina data do not necessarily facilitate the annual measures of effectiveness for students for a variety of reasons. First, teachers in elementary schools can often change grade assignments whereby they temporarily assume classrooms in non-tested grades (K-2). Second, the state provides a number of designations for classroom teachers, and the designation reported for teachers changes unpredictably; therefore, teachers may not be consistently reported as leading "self-contained" classrooms, the designation we used to ensure that the attribution of students to teachers was accurate.

[10] The table of estimates is provided in appendix Table AIII.

[11] Appendix tables AIV and AV provide estimates for specifications 2 and 3 using TE2.

[12] We also tested similar models that examined the relationship between relative concentrations of minority students and teacher mobility, but did not find a statistically significant association.

[13] Similar models using TE2 are available in appendix tables AVI and AVII

[14] We also estimated interactions between effectiveness and FRL, which were not found to be significant for any type of move and are therefore not presented here.

[15] The mean percent FRL for the lowest quartile falls well within the 95 percent confidence interval for the mean percent FRL for the highest quartile of teachers (49.3805, 51.0730). However, the mean school-wide math score for teachers in the lowest quartile falls outside the 95 percent confidence interval for the mean school-wide math score for the highest quartile of teachers (-0.0196, -0.0064).

Table AI: Women Exiting the Classroom Using Teacher Effect Two

	Specification2		Specification 3	
	3	4	5	6
Variable	Exit NC System	Move to Admin.	Exit NC System	Move to Admin.
TE2	-0.626	-0.186	-0.622	-0.097
s.e.	*0.08164*	*0.300*	*0.081*	*0.313*
Risk ratio	0.535**	0.831	0.537**	0.908
$(TE2)^2$	-0.011	0.248	0.027	0.357
	0.097	*0.337*	*0.096*	*0.357*
	0.98	1.277	1.027	1.429
Undergrad SAT/100			0.287	-0.128
			0.022	*0.106*
			1.333**	0.879
Standardized Praxis			0.114	0.588
			0.033	*0.160*
			1.121**	1.801**
NBPTS certification			-2.236	-14.298
			0.436	*0.211*
			0.107**	0.000**
Masters Degree Plus			-0.228	0.637
			0.059	*0.230*
			0.796**	1.890**
African American	-0.411	0.949**	-0.035	1.126
	0.064	*0.252*	*0.071*	*0.279*
	0.663**	2.582	0.966	3.084**
Other Non-white	-0.169	1.276**	-0.132	1.384
	0.179	*0.519*	*0.170*	*0.510*
	0.845	3.584	0.876	3.990**
% FRL	-0.006	-0.008	-0.005	-0.009
	0.002	*0.008*	*0.002*	*0.008*
	0.994**	0.992	0.995**	0.991
% African American	0.009	0.003	0.009	0.004
	0.001	*0.006*	*0.001*	*0.006*
	1.009**	1.003	1.009**	1.004
Enrollment/10 students	0.0017	0.004	0.002	0.004
	0.00082	*0.004*	*0.00083*	*0.004*
	1.002**	1.005	1.002*	1.004
School wide Math	-0.061	0.273	-0.0826	0.224
	0.112	*0.484*	*0.114*	*0.502*
	0.941	1.313	0.921	1.252
Salary supplement/$100	-0.002	-0.008	-0.005	-0.011
	0.001	*0.008*	*0.002*	*0.008*
	0.998	0.992	0.995**	0.989

Table AII: Men Exiting the Classroom Using Teacher Effect Two

	Specification2		Specification 3	
	3	4	5	6
Variable	Exit NC System	Move to Admin.	Exit NC System	Move to Admin.
Teacher Effect Two	-0.709	0.770**	-0.75416	0.76623
s.e.	*0.178*	*0.349*	*0.18243*	*0.36284*
Risk ratio	0.492**	2.159	0.470**	2.152**
(Teacher Effect Two)^2	-0.113	0.012	-0.12489	-0.02590
	0.235	*0.410*	*0.23159*	*0.48132*
	0.894	1.012	0.883	0.974
Undergrad SAT/100			0.23938	0.06737
			0.03908	*0.10128*
			1.270**	1.070
Standardized Praxis			-0.22133	0.05033
			0.06804	*0.22968*
			0.801**	1.052
NBPTS certification			-0.09242	-13.75526
			0.76348	*0.62375*
			0.912	0.000**
Masters Degree Plus			-0.41824	1.47529
			0.12074	*0.23422*
			0.658**	4.372**
African American	-0.07803	0.791**	0.03405	0.91768
	0.10884	*0.312*	*0.12496*	*0.33179*
	0.925	2.206	1.035	2.503**
Other Non-white	0.24233	1.043*	0.16506	1.02822
	0.28928	*0.640*	*0.27771*	*0.83317*
	1.274	2.838	1.179	2.796
% FRL	0.00275	-0.002	0.00333	-0.00746
	0.00310	*0.007*	*0.00316*	*0.00764*
	1.003	0.998	1.003	0.993
% African American	0.00521	-0.002	0.00443	0.00206
	0.00239	*0.007*	*0.00240*	*0.00676*
	1.005**	0.998	1.004*	1.002
Enrollment/10 students	0.0007829	0.002	0.0008503	0.00285
	0.00138	*0.005*	*0.00140*	*0.00518*
	1.001	1.002	1.001	1.003
School wide Math	-0.28718	0.583	-0.35894	0.60418
	0.23646	*0.534*	*0.24691*	*0.54006*
	0.750	1.793	0.698	1.830
Salary supplement/$100	-0.00871	-0.025	-0.00774	-0.02672
	0.00321	*0.011*	*0.00318*	*0.01116*
	0.991	0.976*	0.992**	0.974**

Table AIII: Time Sensitivity of the Effect of Teacher Effect Two on Exits

	Women's exits from the NC System		Men's exits from the NC System	
	TE2 two years before the end of the event	*TE2 in last year before the end of the event*	*TE2 two years before the end of the event*	*TE2 in last year before the end of the event*
TE2	-0.542**	-0.385**	-0.949**	-0.391
Standard error	*0.084*	*0.121*	*0.268*	*0.362*
$(TE2)^2$	0.177**	0.297**	-0.377	0.351
Standard error	*0.095*	*0.163*	*0.355*	*0.541*

Table AIV: Women Moving Schools Using Teacher Effect Two

	Specification 2		Specification 3	
	3	4	5	6
Variable	Transfer Schools	Transfer Districts	Transfer Schools	Transfer Districts
TE2	-0.25354	-0.19374	-0.23825	-0.18165
s.e.	*0.06659*	*0.07024*	*0.06655*	*0.07020*
Risk ratio	0.776**	0.824**	0.788**	0.834**
$(TE2)^2$	0.11621	-0.22433	0.13166	-0.20165
	0.08115	*0.10368*	*0.08175*	*0.10401*
	1.123	0.799**	1.141	0.817*
Undergrad SAT/100			-0.00774	0.07714
			0.01958	*0.02103*
			0.992	1.080**
Standardized Praxis			-0.01583	0.00707
			0.03077	*0.03316*
			0.984	1.007
NBPTS certification			-0.60640	-1.70353
			0.16587	*0.37363*
			0.545**	0.182**
Masters Degree Plus			-0.00559	-0.19768
			0.05227	*0.06400*
			0.994	0.821**
African American	0.00531	0.00274	-0.00519	0.10167
	0.05265	*0.06255*	*0.06000*	*0.06954*
	1.005	1.003	0.995	1.107
Other Non-white	0.17301	-0.01939	0.18101	0.01117
	0.14323	*0.19231*	*0.14296*	*0.19078*
	1.189	0.981	1.198	1.011
% FRL	-0.00426	-0.00415	-0.00425	-0.00403
	0.00143	*0.00164*	*0.00144*	*0.00165*
	0.996**	0.996**	0.996	0.996**
% African American	0.00513	0.00896	0.00519	0.00900
	0.00109	*0.00122*	*0.00110*	*0.00123*
	1.005**	1.009**	1.005**	1.009**
Enrollment/10 students	0.00411	0.00203	0.00410	0.00203
	0.0007715	*0.0008429*	*0.0007725*	*0.0008456*
	1.004**	1.002**	1.004**	1.002**
School wide Math	-0.58870	0.14315	-0.57858	0.13886
	0.10135	*0.12215*	*0.10272*	*0.12386*
	0.555**	1.154	0.561**	1.149
Salary supplement/$100	-0.00632	-0.03208	-0.00617	-0.03251
	0.00140	*0.00172*	*0.00142*	*0.00176*
	0.994**	0.968**	0.994**	0.968**

Table AV: Men Moving Schools Using Teacher Effect Two

	Specification 2		Specification 3	
	3	4	5	6
Variable	Transfer Schools	Transfer Districts	Transfer Schools	Transfer Districts
Teacher Effect Two	-0.27215	-0.29556	-0.26655	-0.27618
s.e.	*0.15705*	*0.19010*	0.15913	0.19106
Risk ratio	0.762*	0.744	0.766*	0.759
(Teacher Effect Two)^2	-0.06107	-0.08320	-0.05379	-0.06701
	0.20612	*0.27316*	0.20599	0.27860
	0.941	0.920	0.948	0.935
Undergrad SAT/100			0.01505	-0.01831
			0.04164	0.04650
			1.015	0.982
Standardized Praxis			-0.07574	0.05296
			0.07234	0.07531
			0.927	1.054
NBPTS certification			-0.82645	-11.52542
			1.03649	0.40448
			0.438	0.000**
Masters Degree Plus			-0.12793	-0.03124
			0.11003	0.12364
			0.880	0.969
African American	0.26894	0.01732	0.22869	0.03164
	0.10559	*0.12021*	0.11740	0.14204
	1.309**	1.017	1.257**	1.032
Other Non-white	0.43735	0.11625	0.41361	0.14574
	0.23660	*0.29660*	0.23901	0.30064
	1.549*	1.123	1.512*	1.157
% FRL	0.0001700	-0.00996	0.0002386	-0.01057
	0.00343	*0.00367*	0.00347	0.00367
	1.000	0.990*	1.000	0.989**
% African American	0.0009203	0.01042	0.00101	0.01101
	0.00259	*0.00254*	0.00262	0.00256
	1.001	1.010**	1.001	1.011**
Enrollment/10 students	0.00281	0.00430	0.00282	0.00435
	0.00172	*0.00167*	0.00174	0.00167
	1.003	1.004**	1.003	1.004**
School wide Math	0.48063	-0.35100	0.49105	-0.34280
	0.27085	*0.27535*	0.27308	0.27661
	1.617	0.704	1.634*	0.710
Salary supplement/$100	-0.00650	-0.02919	-0.00632	-0.02954
	0.00328	*0.00369*	0.00332	0.00372
	0.994**	0.971**	0.994*	0.971**

Table AVI: Women Context and Mobility with Teacher Effect Two

	Move within District	Move out of District	Exit NC System
TE2	-0.26718	-0.19859	-0.63079
s.e.	*0.06754*	*0.07037*	*0.08205*
h.r.	0.766**	0.820**	0.532**
$(TE2)^2$	0.10851	-0.22576	-0.01477
s.e.	*0.08220*	*0.10384*	*0.09747*
h.r.	1.115	0.798**	0.985
African American	0.02992	0.01184	-0.40285
s.e.	*0.05306*	*0.06309*	*0.06439*
h.r.	1.030	1.012	0.668**
Other non-white	0.24022	0.00412	-0.14878
s.e.	*0.14430*	*0.19206*	*0.17980*
h.r.	1.272*	1.004	0.862
% FRL	-0.01132	-0.00642	-0.00788
s.e.	*0.00202*	*0.00230*	*0.00235*
h.r.	0.989**	0.994**	0.992**
District ZFRL	0.15913	0.04970	0.04853
s.e.	*0.03162*	*0.03510*	*0.03825*
h.r.	1.172**	1.051	1.050
% African American	0.00676	0.00951	0.00915
s.e.	*0.00115*	*0.00127*	*0.00130*
h.r.	1.007**	1.010**	1.009**
Enrollment/10	0.00446	0.00210	0.00181
s.e.	*0.0007774*	*0.0008449*	*0.0008289*
h.r.	1.004**	1.002**	1.002**
Math	-0.55830	0.15559	-0.05084
s.e.	*0.10220*	*0.12299*	*0.11226*
h.r.	0.572**	1.168	0.950
Salary Supplement/$100	-0.00805	-0.03267	-0.00283
s.e.	*0.00144*	*0.00178*	*0.00155*
h.r.	0.992**	0.968**	0.997*

Table AVII: Men Context and Mobility with Teacher Effect Two

	Move within District	Move out of District	Exit NC System
TE2	-0.27239	-0.29981	-0.70446
s.e.	*0.15688*	*0.19036*	*0.17848*
h.r.	0.762*	0.741	0.494**
$(TE2)^2$	-0.06140	-0.08786	-0.10542
s.e.	*0.20667*	*0.27307*	*0.23561*
h.r.	0.940	0.916	0.900
African American	0.26921	0.02101	-0.08327
s.e.	*0.10576*	*0.12096*	*0.10897*
h.r.	1.309	1.021	0.920
Other non-white	0.43854	0.12908	0.21935
s.e.	*0.23824*	*0.29669*	*0.29281*
h.r.	1.550*	1.138	1.245
% FRL	0.0000218	-0.01225	0.00555
s.e.	*0.00452*	*0.00516*	*0.00443*
h.r.	1.000	0.988**	1.006
District ZFRL	0.00353	0.05245	-0.06748
s.e.	*0.07816*	*0.08229*	*0.07809*
h.r.	1.004	1.054	0.935
% African American	0.0009569	0.01105	0.00450
s.e.	*0.00271*	*0.00268*	*0.00252*
h.r.	1.001	1.011**	1.005*
Enrollment/10	0.00282	0.00445	0.0005458
s.e.	*0.00175*	*0.00169*	*0.00141*
h.r.	1.003	1.004**	1.001
Math	0.48155	-0.33762	-0.30058
s.e.	*0.27314*	*0.27579*	*0.23672*
h.r.	1.619*	0.713	0.740
Salary Supplement/$100	-0.00655	-0.02990	-0.00780
s.e.	*0.00355*	*0.00382*	*0.00338*
h.r.	0.993*	0.971**	0.992**

TABLES

Table I: Characteristic of Teachers and School by Type of Move

	Individuals that Never Exit the Classroom		Occurrences of Transferring Schools		Occurrences of Transferring Out of Districts		Exits from the North Carolina System		Individuals that Exit to Administration	
	Full Sample N=6130	1996 cohort N=606	Full Sample N=3767	1996 cohort N=687	Full Sample N=3153	1996 cohort N=496	Full Sample N=3058	1996 cohort N=329	Full Sample N=193	1996 cohort N=52
Characteristics of teachers in events										
Percent Female	0.843	0.873	0.845	0.875	0.839	0.852	0.8078	0.895	0.5893	0.596
Percent African American	0.016	0.139	0.164	0.144	0.163	0.1293	0.1386	0.0985	0.2684	0.1538
Percent Other Non-white	0.015	0.017	0.016	0.007	0.013	0.0101	0.0134	0.0152	0.0363	0.0385
Quality indicators for teachers in events										
Teacher effect	0.135	0.153	0.087	0.099	0.071	0.043	0.0369	0.088	0.0640	0.056
	0.398	0.449	*0.407*	0.367	*0.398*	0.378	*0.3999*	0.412	*0.4485*	0.377
Years in the NC system	3.735	7.000	2.569	3.592	2.294	3.242	2.551	4.043	4.1347	5.711
	1.452		*1.642*	2.068	*1.452*	1.903	*1.414*	1.689	*1.774*	1.401
Avg. SAT of undergraduate institution/100	8.917	8.826	8.910	8.861	8.935	8.965	9.2020	9.371	8.829	9.207
	1.073	0.997	*1.124*	1.163	*1.073*	1.012	*1.137*	1.168	*1.248*	1.022
Standardized Praxis Score	0.110	0.028	0.057	0.006	0.070	0.069	0.1414	0.278	0.117	0.212
	0.677	0.705	0.723	0.756	*0.677*	0.747	*0.6694*	0.760	*0.710*	0.643
Percent of teachers with MA or more	0.137	0.205	0.141	0.190	0.115	0.212	0.1220	0.176	0.3938	0.481
School characteristics at end of events										
Percent FRL Students	47.334	46.022	46.6453	43.279	48.283	44.197	48.059	43.0593	46.1795	43.1200
	21.859	22.689	*22.346*	21.853	*21.859*	20.370	*21.868*	21.1274	*22.0930*	19.6625
Percent African American Students	33.957	31.5902	37.7625	36.7726	38.7059	35.4734	39.2008	35.7970	35.2021	26.7539
	24.594	23.3951	*24.9731*	24.0208	*24.5943*	23.5038	*24.0217*	22.4813	*23.7600*	19.7561
Standardized School Wide math score	-0.008	-0.012	-0.027	-0.015	-0.026	-0.021	-0.022	0.0034	-0.001	-0.026
	0.156	0.169	*0.207*	0.198	*0.156*	0.131	*0.182*	0.186	*0.158*	0.148

Table II: Women Exiting the Classroom

	Specification 1		Specification 2		Specification 3	
	1	2	3	4	5	6
	Exit NC system	To admin	Exit NC System	Move to admin	Exit NC System	Move to admin.
TE3			-0.637**	-0.602*	-0.699**	-0.654
s.e.			*0.062*	*0.310*	*0.060*	*0.291*
h.r.			0.529	0.548	0.497	0.520
$(TE3)^2$			0.204**	0.187	0.268**	0.337
s.e.			*0.049*	*0.143*	*0.047*	*0.221*
h.r.			1.226	1.206	1.308	1.401
College Selectivity	0.253**	-0.149			0.289**	-0.124**
s.e.	*0.021*	*0.109*			*0.022*	*0.106*
h.r.	1.287	0.861			1.335	0.883
Praxis	0.118**	0.592**			0.112**	0.596
s.e.	*0.036*	*0.172*			*0.033*	*0.162*
h.r.	1.126	1.807			1.119	1.816
NBPTS	-2.182**	-13.514**			-2.233**	-14.228
s.e.	*0.436*	*0.186*			*0.435*	*0.589*
h.r.	0.113	0.000			0.107	0.000
Master's plus	-0.175**	0.670**			-0.224**	0.634**
s.e.	*0.059*	*0.229*			*0.059*	*0.230*
h.r.	0.839	1.955			0.799	1.885
African American	-0.031	1.068**	-0.410**	0.921**	-0.021	1.124**
s.e.	*0.067*	*0.275*	*0.063*	*0.253*	*0.071*	*0.276*
h.r.	0.969	2.909	0.664	2.512	0.979	3.078
Other non-white	-0.107	1.364**	-0.166	1.290**	-0.126	1.417**
s.e.	*0.167*	*0.507*	*0.175*	*0.517*	*0.171*	*0.508*
h.r.	0.899	3.911	0.847	3.631	0.881	4.127
Percent FRL	-0.005**	-0.009	-0.004**	-0.007	-0.005**	-0.009**
s.e.	*0.002*	*0.008*	*0.002*	*0.009*	*0.002*	*0.008*
h.r.	0.995	0.991	0.996	0.993	0.995	0.992
Percent African American	0.009**	0.003	0.008**	0.001	0.009**	0.004**
s.e.	*0.001*	*0.006*	*0.001*	*0.006*	*0.001*	*0.006*
h.r.	1.009	1.003	1.008	1.001	1.009	1.004
Enrollment/10	0.002*	0.003	0.002**	0.004	0.002**	0.004
s.e.	*0.001*	*0.004*	*0.001*	*0.004*	*0.001*	*0.004*
h.r.	1.002	1.003	1.002	1.004	1.002	1.004
Math	-0.120	0.259	-0.075	0.274	-0.113	0.243
s.e.	*0.002*	*0.516*	*0.112*	*0.008*	*0.114*	*0.495*
h.r.	0.994	1.296	0.928	0.993	0.893	1.276
Salary Supplement	-0.006**	-0.010	-0.002	-0.007	-0.005**	-0.010
s.e.	*0.002*	*0.008*	*0.002*	*0.008*	*0.002*	*0.008*
h.r.	0.994	0.990	0.998	0.993	0.995	0.990

*Significant at a 90% confidence level based on a Wald Chi-Squared statistic; ** Significant at a 95% confidence level based on a Wald Chi-Squared statistic.

Table III: Men Exiting the Classroom

	Specification 1		Specification 2		Specification 3	
	1	2	3	4	5	6
	Exit NC system	Move to Admin	Exit NC system	Move to Admin	Exit NC System	Move to Admin
TE3			-0.386**	0.229	-0.530**	0.139
s.e.			*0.140*	*0.369*	*0.134*	*0.371*
h.r.			0.680	1.258	0.589	1.149
$(TE3)^2$			0.170**	0.031	0.219**	0.004
s.e.			*0.075*	*0.138*	*0.071*	*0.144*
h.r.			1.185	1.032	1.245	1.004
College Selectivity	0.167**	0.070			0.237**	0.070
s.e.	*0.040*	*0.106*			*0.039*	*0.101*
h.r.	1.182	1.072			1.268	1.072
Praxis	-0.263**	0.036			-0.220**	0.043
s.e.	*0.078*	*0.215*			*0.068*	*0.223*
h.r.	0.768	1.037			0.802	1.044
NBPTS	-0.164	-13.641**			-0.111	-13.811**
s.e.	*0.838*	*0.619*			*0.883*	*0.615*
h.r.	0.848	0.000			0.895	0.000
Master's plus	-0.392**	1.478**			-0.427**	1.468**
s.e.	*0.130*	*0.234*			*0.123*	*0.235*
h.r.	0.676	4.384			0.653	4.341
African American	-0.008	0.865**	-0.107	0.742**	0.057	0.871**
s.e.	*0.118*	*0.326*	*0.106*	*0.309*	*0.126*	*0.329*
h.r.	0.992	2.375	0.899	2.100	1.058	2.390
Other non-white	-0.035	1.292**	0.034	0.949	0.143	1.158
s.e.	*0.247*	*0.599*	*0.246*	*0.729*	*0.286*	*0.789*
h.r.	0.966	3.638	1.035	2.582	1.154	3.184
% FRL	0.004	-0.006	0.003	-0.001	0.003	-0.007
s.e.	*0.003*	*0.007*	*0.003*	*0.008*	*0.003*	*0.008*
h.r.	1.004	0.994	1.003	0.999	1.003	0.993
% African American	0.004	0.000	0.005**	-0.004	0.006**	0.000
s.e.	*0.002*	*0.007*	*0.002*	*0.007*	*0.002*	*0.007*
h.r.	1.004	1.000	1.005	0.996	1.006	1.000
Enrollment/10	0.002	0.003	0.001	0.002	0.001	0.002
s.e.	*0.001*	*0.005*	*0.001*	*0.005*	*0.001*	*0.005*
h.r.	1.002	1.003	1.001	1.002	1.001	1.002
Math	-0.259	0.582	-0.196	0.601	-0.410*	0.578
s.e.	*0.265*	*0.531*	*0.260*	*0.532*	*0.249*	*0.530*
h.r.	0.772	1.790	0.822	1.824	0.664	1.783
Salary Supplement/100	-0.007**	-0.025**	-0.007**	-0.023**	-0.009**	-0.025**
s.e.	*0.003*	*0.011*	*0.003*	*0.011*	*0.003*	*0.011*
h.r.	0.993	0.975	0.993	0.977	0.991	0.975

*Significant at a 90% confidence level based on a Wald Chi-Squared statistic; ** Significant at a 95% confidence level based on a Wald Chi-Squared statistic.

Table IV: Women Moving Schools

	Specification 1		Specification 2		Specification 3	
	1	2	3	4	5	6
	Move Within District	Move out of District	Move Within District	Move out of District	Move Within District	Move out of District
TE3			-0.18 **	-0.149 **	-0.17 **	-0.158 **
s.e.			0.057	0.066	0.057	0.067
h.r.			0.835	0.861	0.844	0.854
$(TE3)^2$			0.034	-0.02	0.035	-0.005
s.e.			0.045	0.054	0.046	0.056
h.r.			1.035	0.98	1.036	0.995
College Selectivity	-0.006 *	0.074 **			-0.009	0.076 **
s.e.	0.02	0.021			0.02	0.021
h.r.	0.994	1.077			0.991	1.079
Praxis	-0.024	0.009			-0.021	0.008
s.e.	0.031	0.033			0.031	0.033
h.r.	0.976	1.01			0.979	1.008
NBPTS	-0.634 **	-1.723 **			-0.607 **	-1.699 **
s.e.	0.168	0.373			0.167	0.375
h.r.	0.531	0.179			0.545	0.183
Master's plus	0.004	-0.199 **			0.003	-0.201 **
s.e.	0.052	0.064			0.052	0.064
h.r.	1.004	0.819			1.003	0.818
African American	0.021	0.1	0.027	-0.007	0.007	0.1
s.e.	0.06	0.069	0.053	0.063	0.06	0.07
h.r.	1.021	1.105	1.028	0.993	1.007	1.106
Other non-white	0.179	0.004	0.174	-0.031	0.177	0.009
s.e.	0.144	0.189	0.144	0.192	0.144	0.191
h.r.	1.196	1.004	1.19	0.969	1.193	1.009
% FRL	-0.004 **	-0.004 **	-0.004 **	-0.004 **	-0.004 **	-0.004 **
s.e.	0.001	0.002	0.001	0.002	0.001	0.002
h.r.	0.996	0.996	0.996	0.996	0.996	0.996
% African American	0.006 **	0.009 **	0.006 **	0.009 **	0.005 **	0.009 **
s.e.	0.001	0.001	0.001	0.001	0.001	0.001
h.r.	1.006	1.009	1.006	1.009	1.006	1.009
Enrollment/10	0.004 **	0.002 **	0.004 **	0.002 **	0.004 **	0.002 **
s.e.	0.001	0.001	0.001	0.001	0.001	0.001
h.r.	1.004	1.002	1.004	1.002	1.004	1.002
Math	-0.616 **	0.115	-0.609 **	0.133	-0.596 **	0.133
s.e.	0.103	0.123	0.102	0.122	0.103	0.123
h.r.	0.54	1.122	0.544	1.142	0.551	1.142
Salary Supplement/100	-0.007 **	-0.032 **	-0.006 **	-0.032 **	-0.006 **	-0.032 **
s.e.	0.001	0.002	0.001	0.002	0.001	0.002
h.r.	0.993	0.968	0.994	0.969	0.994	0.968

*Significant at a 90% confidence level based on a Wald Chi-Squared statistic; ** Significant at a 95% confidence level based on a Wald Chi-Squared statistic.

Table V: Men Moving Schools

	Specification 1		Specification 2		Specification 3	
	1	2	3	4	5	6
	Move Within District	Move Outside District	Move Within District	Move Outside District	Move Within District	Move Outside District
TE3			-0.030	-0.419 **	-0.051	-0.357 **
s.e.			0.973	0.171	0.150	0.177
h.r.			0.970	0.658	0.951	0.700
$(TE3)^2$			-0.066	-0.253	-0.051	-0.275
s.e.			1.078	0.231	0.122	0.244
h.r.			0.936	0.776	0.951	0.759
College Selectivity	0.014	-0.012			0.012	-0.018
s.e.	0.042	0.046			0.042	0.046
h.r.	1.014	0.988			1.012	0.983
Praxis	-0.077	0.065			-0.076	0.054
s.e.	0.073	0.075			0.073	0.075
h.r.	0.926	1.067			0.927	1.055
NBPTS	-0.851	-11.599 **			-0.847	-11.469 **
s.e.	1.031	0.403			1.029	0.412
h.r.	0.427	0.000			0.429	0.000
Master's plus	-0.134	-0.034			-0.121	-0.018
s.e.	0.110	0.125			0.110	0.123
h.r.	0.874	0.966			0.886	0.982
African American	0.254 **	0.080	0.297 **	0.031	0.246 **	0.042
s.e.	0.117	0.146	0.956	0.121	0.117	0.142
h.r.	1.289	1.084	1.346	1.031	1.279	1.043
Other non-white	0.415 *	0.238	0.465 **	0.212	0.438 *	0.170
s.e.	0.232	0.304	0.780	0.300	0.236	0.298
h.r.	1.514	1.268	1.592	1.237	1.550	1.185
% FRL	0.000	-0.011 **	0.000	-0.010 **	0.000	-0.010 **
s.e.	0.003	0.004	0.991	0.004	0.003	0.004
h.r.	1.000	0.989	1.000	0.990	1.000	0.990
% African American	0.001	0.012 **	0.001	0.011 **	0.001	0.011 **
s.e.	0.003	0.003	0.967	0.003	0.003	0.003
h.r.	1.001	1.012	1.001	1.011	1.001	1.011
Enrollment/10	0.003 *	0.005 **	0.003 *	0.004 **	0.003 *	0.004 **
s.e.	0.002	0.002	1.065	0.002	0.002	0.002
h.r.	1.003	1.005	1.003	1.004	1.003	1.004
Math	0.463 *	-0.379	0.459 *	-0.356	0.476 *	-0.339
s.e.	0.272	0.274	1.041	0.271	0.272	0.274
h.r.	1.589	0.684	1.582	0.700	1.609	0.713
Salary Supplement/100	-0.007	-0.031 **	-0.007 **	-0.030 **	-0.007 **	-0.030 **
s.e.	0.003	0.004	0.942	0.004	0.003	0.004
h.r.	0.993	0.970	0.993	0.971	0.993	0.971

*Significant at a 90% confidence level based on a Wald Chi-Squared statistic; ** Significant at a 95% confidence level based on a Wald Chi-Squared statistic.

Table VI: Context and Mobility for Women

	1	2	3	4	5	6
	Move within District	Move out of District	Exit NC System	Move within District	Move out of District	Exit NC System
TE3				-0.188 **	-0.160 **	-0.681 **
s.e.				*0.057*	*0.066*	*0.060*
h.r.				0.828	0.852	0.506
$(TE3)^2$				0.037	-0.016	0.226 **
s.e.				*0.045*	*0.054*	*0.045*
h.r.				1.038	0.984	1.254
African American	0.055	0.019	-0.353 **	0.048	0.012	-0.387 **
s.e.	*0.053*	*0.063*	*0.064*	*0.053*	*0.063*	*0.064*
h.r.	1.056	1.020	0.703	1.049	1.012	0.679
Other non-white	0.228	-0.004	-0.173	0.236	0.001	-0.150
s.e.	*0.145*	*0.192*	*0.181*	*0.145*	*0.192*	*0.18*
h.r.	1.256	0.996	0.841	1.267	1.001	0.861
% FRL	-0.011 **	-0.006 **	-0.007 **	-0.011 **	-0.006 **	-0.007 **
s.e.	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*
h.r.	0.989	0.994	0.993	0.989	0.994	0.993
District ZFRL	0.153 **	0.045	0.034	0.159 **	0.052	0.058
s.e.	*0.032*	*0.035*	*0.038*	*0.032*	*0.035*	*0.038*
h.r.	1.165	1.046	1.035	1.173	1.053	1.059
% African American	0.007 **	0.010 **	0.010 **	0.007 **	0.010 **	0.010 **
s.e.	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*
h.r.	1.007	1.010	1.010	1.007	1.010	1.010
Enrollment/10	0.005 **	0.002 **	0.002 **	0.005 **	0.002 **	0.002 **
s.e.	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*
h.r.	1.005	1.002	1.002	1.005	1.002	1.002
Math	-0.596 **	0.134	-0.124	-0.577 **	0.150	-0.079
s.e.	*0.103*	*0.122*	*0.114*	*0.103*	*0.122*	*0.112*
h.r.	0.551	1.143	0.884	0.562	1.162	0.924
Salary Supplement/$100	-0.008 **	-0.033 **	-0.003 **	-0.008 **	-0.032 **	-0.002
s.e.	*0.001*	*0.002*	*0.002*	*0.001*	*0.002*	*0.002*
h.r.	0.992	0.968	0.997	0.992	0.968	0.998

*Significant at a 90% confidence level based on a Wald Chi-Squared statistic; ** Significant at a 95% confidence level based on a Wald Chi-Squared statistic.

Table VII: Context and Mobility for Men

	1	2	3	4	5	6
	Move within District	Move out of District	Exit NC System	Move within District	Move out of District	Exit NC System
TE3				-0.036	-0.368 **	-0.518 **
s.e.				*0.151*	*0.173*	*0.139*
h.r.				0.965	0.692	0.596
$(TE3)^2$				-0.066	-0.278	0.184 **
s.e.				*0.130*	*0.240*	*0.074*
h.r.				0.936	0.758	1.202
African American	0.294 **	0.050	-0.011	0.292 **	0.030	-0.055
s.e.	0.105	0.122	0.108	*0.106*	*0.121*	*0.109*
h.r.	1.342	1.052	0.989	1.339	1.030	0.946
Other non-white	0.435 *	0.136	0.253	0.465 **	0.148	0.197
s.e.	0.233	0.295	0.284	*0.235*	*0.294*	*0.302*
h.r.	1.545	1.145	1.287	1.592	1.159	1.218
% FRL	0.000	-0.012 **	0.006	0.000	-0.012 **	0.005
s.e.	0.005	0.005	0.004	*0.005*	*0.005*	*0.005*
h.r.	1.000	0.988	1.006	1.000	0.988	1.005
District ZFRL	0.000	0.048	-0.075	-0.002	0.048	-0.067
s.e.	0.078	0.082	0.077	*0.078*	*0.082*	*0.078*
h.r.	1.000	1.049	0.927	0.998	1.049	0.935
% African American	0.001	0.012 **	0.006 **	0.001	0.011 **	0.006 **
s.e.	0.003	0.003	0.003	*0.003*	*0.003*	*0.003*
h.r.	1.001	1.012	1.006	1.001	1.011	1.006
Enrollment/10	0.003 *	0.005 **	0.001	0.003 *	0.004 **	0.001
s.e.	0.002	0.002	0.001	*0.002*	*0.002*	*0.001*
h.r.	1.003	1.005	1.001	1.003	1.004	1.001
Math	0.459 *	-0.361	-0.366	0.465 *	-0.335	-0.333
s.e.	0.273	0.275	0.239	*0.272*	*0.274*	*0.239*
h.r.	1.582	0.697	0.694	1.592	0.715	0.717
Salary Supplement/$100	-0.007	-0.031 **	-0.009 **	-0.007 **	-0.030 **	-0.009 **
s.e.	0.004	0.004	0.003	*0.004*	*0.004*	*0.003*
h.r.	0.993	0.970	0.991	0.993	0.971	0.992

*Significant at a 90% confidence level based on a Wald Chi-Squared statistic; ** Significant at a 95% confidence level based on a Wald Chi-Squared statistic.

Table VIII: Selected Variables from Context and Effectiveness Interaction Models for Women

	Specification 1				Specification 2			
	1 Move Within Districts	2 Move Out of District	3 Exit NC System	4 Move to Admin.	5 Move Within Districts	6 Move Out of District	7 Exit NC System	8 Move to Admin.
TE3	-0.185**	-0.164**	-0.665**	-0.631**	-0.153**	-0.160**	-0.607**	-0.609*
Se	*0.002*	0.066	0.061	0.297	*0.059*	*0.068*	*0.061*	0.327
h.r.	*0.831*	*0.849*	*0.515*	*0.532*	0.858	0.852	0.545	0.544
$(TE3)^2$	0.035	*-0.015*	*0.197***	0.238	0.040	-0.016	0.208	0.170
Se	*0.442*	*0.055*	*0.047*	0.229	*0.044*	*0.767*	*0.045*	0.134
h.r.	*1.035*	*0.986*	*1.218*	*1.269*	1.041	0.984	1.232	1.185
% FRL	0.011**	-0.006**	-0.007**	-0.015	-0.011**	-0.006**	-0.007**	-0.147
Se	*0.002*	*0.002*	*0.002*	0.013	*0.002*	*0.002*	*0.002*	0.013
h.r.	*0.989*	*0.994*	*0.993*	*0.985*	0.989	0.994	0.993	0.985
Math	0.578**	0.162	-0.073	0.425	-0.576**	0.150	-0.091	0.305
Se	*0.102*	*0.125*	*0.511*	0.487	*0.102*	*0.219*	*0.112*	0.493
h.r.	*0.561*	*1.175*	*0.929*	*1.529*	0.562	1.162	0.913	1.356
District ZFRL	0.159**	0.052	0.058	0.177	0.169**	0.052	0.065 *	0.182
Se	*0.032*	*0.035*	*0.126*	0.234	*0.032*	*0.035*	*0.038*	0.236
h.r.	*1.173*	*1.053*	*1.060*	*1.193*	1.185	1.053	1.067	1.199
TE3 & District ZFRL interaction					-0.104**	-0.100	-0.238**	-0.185
Se					*0.043*	*-0.049*	*0.055*	0.261
h.r.					0.091	0.999	0.788	0.831
TE3 and Math Interaction	0.061	*-0.037*	0.437**	-1.265**				
s.e.	*0.725*	*0.287*	*0.209*	0.583				
h.r.	*1.063*	*0.827*	*1.549*	*0.282*				

*Significant at a 90% confidence level based on a Wald Chi-Squared statistic; ** Significant at a 95% confidence level based on a Wald Chi-Squared statistic.

Table IX: Teacher Effectiveness and Teacher Mobility by School Math Scores and FRL

	Move within District		Move out of District		Exit the NC System		Move to Admin.	
	Lowest Quartile In Math	Highest Quartile in Math	Lowest Quartile In Math	Highest Quartile in Math	Lowest Quartile In Math	Highest Quartile in Math	Lowest Quartile In Math	Highest Quartile in Math
Teacher effect 3	1.142	0.828**	0.786	1.025	1.438	0.544**	0.056	0.894
(Teacher effect 3)^2	0.527	1.137*	1.014	0.793*	0.779	1.079	0.0	0.654
	Quartile with most FRL	Quartile with fewest FRL	Quartile with most FRL	Quartile with fewest FRL	Quartile with most FRL	Quartile with fewest FRL	Quartile with most FRL	Quartile with fewest FRL
Teacher effect 3	0.742**	0.897	0.852*	0.849	0.399**	1.016	0.839	0.103
(Teacher effect 3)^2	0.916	1.048	1009	0.827	1.262**	0.865	0.834	0.000*

*Significant at a 90% confidence level based on a Wald Chi-Squared statistic; ** Significant at a 95% confidence level based on a Wald Chi-Squared statistic.

Table X: Effectiveness and Changing Context with Transfers

	Women Dependent Variable: Difference in School Math Scores	Dependent Variable: Difference in Percent of FRL students	Men Dependent Variable: Difference in School Math Scores	Dependent Variable: Difference in Percent of FRL students
Teacher Effect	-0.0205*	-0.704	-0.016	-6.039
s.e.	*0.0108*	*1.114*	0.033	3.611
NBPTS certification	0.1423	-6.014	N/A	N/A
s.e.	*0.0927*	*9.558*		
Master's Degree Plus	0.0410**	-1.476	-0.003	3.733
s.e.	*0.0144*	*1.489*	0.029	3.188
African American	-.03606**	5.968**	-0.026	9.191
s.e.	*0.0139*	*1.432*	0.028	3.073
Other Non-white	0.0071	3.999	-0.051	15.106
s.e.	*0.0402*	*4.147*	0.078	8.541

*Significant at a 90% confidence level; ** Significant at a 95% confidence level.