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Do Staffing Reforms Help Redistribute Teacher Quality and Reduce Teacher Turnover?

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Abstract:

Education reformers routinely call on school districts to stop hiring teachers based on seniority, which they argue interferes with effective staffing, especially in disadvantaged schools. The few researchers who have empirically studied the issue, however, disagree about whether seniority-based hiring is systematically associated with staffing problems for disadvantaged schools. We approach the question by examining what happens when a single urban school district eliminates seniority-based hiring preferences. We conduct an interrupted time-series analysis of data from 1998-2005 and find that the shift from a seniority-based hiring system to a "mutual consent" hiring system leads to an initial increase in both teacher turnover and share of inexperienced teachers, especially in the district's most disadvantaged schools. For the most part, however, these initial shocks are corrected within four years leaving little change in the distribution of inexperienced teachers or levels of turnover across schools of different advantage. The results suggest that although it might be necessary for school districts to lift hiring constraints to improve school staffing, lifting seniority-based constraints alone is unlikely to be sufficient.

In recent years, policymakers and researchers have started paying more and more attention to how school district staffing practices shape the teacher workforce (Maxwell, 2008).[1] Arguably, a great deal of this recent interest in school district staffing practice stems from a the work of The New Teacher Project (TNTP), a national nonprofit that consults with states and districts on how to recruit and retain effective teachers. In a series of high-profile policy reports, TNTP shined a spotlight on how school districts can undermine their ability to get and keep good teachers when they use weak human resource management practices, especially selection practices (Levin and Quinn, 2003; Levin, Mulhern, and Schunck, 2005; Daly, Keeling, Grainger, and Grundies, 2008) and evaluation practices (Weisberg, Sexton, Mulher, and Keeling, 2009).

In the second of its policy reports, *Unintended Consequences: The Case for Reforming the Staffing Rules in Urban Teacher Union Contracts* (Levin et al., 2005), TNTP focused on the practices and rules that govern how incumbent teachers move within school districts. "As we sought to understand the effects of these rules," wrote Michelle Rhee, TNTP's CEO at the time, "we were struck by the degree to which they profoundly influence not only new teacher hiring but also the overall ability of urban schools to staff their classrooms effectively." (p. 3). In particular, TNTP found that when these rules included seniority preferences and job guarantees they interfered with effective staffing by forcing schools to hire teachers they did not want, making it easier for principals to pass poor performers around the system, delaying the hiring process, and jeopardizing new teachers by allowing them to be "bumped" by more senior

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[1] This interest in the demand-side of teacher policy is relatively new. Historically, analysts have focused on how wages and working conditions influence the teacher workforce (Jacob, 2007; Loeb & Beleille, 2009) – that is, the supply side of the equation. For instance, scholars have long debated how structural compensation reforms (Ballou, 2001; Goldhaber, 2002; Hatry, Greiner, and Ashford, 1994; Murnane and Cohen, 1986) and relative teacher salary levels (Allegreto, Corcoran, and Mishel, 2004; 2008; Podgursky, 2003; Podgursky and Tongrut, 2006; Hoxby and Leigh, 2004; Vedder, 2003) help shape of the teacher workforce. They have paid relatively less attention to school district hiring systems.

teachers (Levin et al, 2005). An urban superintendent told TNTP that these dynamics could cripple school improvement efforts: "We will never get stability and significant improvement in our schools without changing these [transfer] rules," the superintendent said (Levin et al, 2005, p. 27). Accordingly, TNTP recommends that school districts should eliminate "all transfer provisions that require or allow voluntary transfers to be forced onto schools [based on seniority], including restricted choice rules that require principals to choose from a group of voluntary transfer applicants" (2005, p. 32).[2]

Despite the intuitive appeal of eliminating forced placements based on teacher seniority, the few researchers who have empirically studied the issue reach opposite conclusions about the effects of seniority-based hiring. Studying hundreds of California school districts, Moe (2006) finds that restrictive seniority rules like the ones highlighted by TNTP exacerbate teacher quality problems for disadvantaged schools.[3] By contrast, Koski and Horng's (2007) analysis of seniority rules - also of hundreds of California schools districts – finds no effect, positive or negative. The resulting uncertainty puts policymakers in a difficult position: if seniority-based transfer rules are as dysfunctional as they seem, policymakers will want to work to revise them; but if not, they may be better off pushing reforms elsewhere (e.g., on teacher compensation or teacher evaluation).

In this paper we approach the issue by examining what happens when a single urban school district eliminated seniority-based hiring preferences and moved toward a hiring system based on

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[2] TNTP also argues that incumbent teachers should have the opportunity for a *preferential review* – i.e., a two-week window when voluntary transfers are considered before other applicants (but with no *right* to a placement). Subsequent TNTP reports suggest that eliminating seniority preferences is popular among principals and teachers, but that it also carries its own unintended consequences, namely the creation of a pool of teachers who are under contract but unable to find jobs (See Daly et al., 2008; "Idle Teachers, Wasted Money," April 30, 2008).

[3] In a later paper, Moe (2009) examines the same teacher quality outcomes using a broader measure of contract restrictiveness that includes not only transfer rules but also several other factors such as classroom assignment and teacher evaluation. He comes to very similar conclusions using this more inclusive definition of contract restrictiveness.

the mutual consent of teachers and schools. Like Moe (2006) and Koski and Horng (2007), we look at whether the distribution of teacher experience in the school district changed after the elimination of the seniority-based hiring. Unlike the two prior studies, we also look at whether teacher turnover rates changed in the school district after the policy shift. In both cases we are interested not only in general level and trends in these factors, but also in the effects on disadvantaged schools, which typically face the most challenging staffing issues (Hanushek, Kain, & Rivkin, 2004; Ingersoll, 2001; Lankford, Loeb, & Wycoff, 2002; Guin, 2004). The data come from a comprehensive longitudinal data set on the careers of teachers in the school district where the policy shift happened and cover the years 1998-2005, including four years of baseline data (i.e. pre-policy shift) and four years of follow-up data (i.e. post-policy shift). We conduct an interrupted time-series analysis of the shift from a seniority-based hiring system to a "mutual consent" hiring system and find that the policy shift was accompanied by an initial upward shift in both the turnover rates and level of inexperience in schools, but downward trends that correct for this initial upward shift by 2004. We find no evidence that the distribution of inexperienced teachers across schools and differences in the rate of turnover between advantaged and disadvantaged schools changed after the policy shift. Disadvantaged schools still displayed substantially higher rates of turnover and shares of inexperienced teachers than did more advantaged schools. The results suggest that although it might be necessary for school districts to lift hiring constraints to improve school staffing, lifting constraints alone is not sufficient to reshape the teacher workforce, especially in disadvantaged schools. In the next section we provide background on seniority preferences and prior studies, followed by a description of the data and our approach, the main findings, and some concluding thoughts.

Transfer Rules and Forced Placements

Imagine you are a principal with vacancies in the coming year. Sometime in the spring, you are required…to publicize those vacancies districtwide. At this point, however, you…cannot interview and hire the teacher you believe would be best for the job. Instead…you typically have to consider…incumbent teachers…[and] in some situations, you have no choice over which teacher transfers into your building (Levin et al, 2005, p. 8).

Critics of seniority-based hiring systems find the above scenario troubling for several reasons. They worry that if schools have no choice over the teachers they hire they cannot build a coherent staff with common norms and high levels of collaboration and trust – attributes associated with successful schools (Newmann and Wehlage, 1995; Bryk and Driscoll, 1988; Newmann, 1994; Newmann and Associates, 1996; Louis, Kruse, and Marks, 1996; Bryk & Schneider, 2002). Critics also worry that, given evidence about teachers' revealed preferences for working with advantaged students (Hanushek, Kain, and Rivkin, 2004; Guarino et al, 2006), a combination of forced matches and seniority rights will make it more likely that senior teachers will transfer to advantaged schools and leave disadvantaged schools with concentrations of novice teachers.[4] Although, to be fair, it is also possible that seniority preferences allow disadvantaged schools to retain (at least for a few years) their stronger young teachers as these teacher wait to accrue seniority in order to make a transfer.

Moe (2006) and Koski and Horng (2007) explore the issue by studying how transfer rules in large samples of California school districts affect who ends up teaching in which classrooms.

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[4] Forced placements – which implicitly downplay differences between teachers – are also at odds with research that suggests teachers are not perfect substitutes. Even generalizations about academic degrees, for example, appear unwarranted, with studies showing that mathematics teachers with master's degrees are more effective than those without them but English teachers with master's degrees are not (Goldhaber and Brewer, 1997). Likewise, experience seems to matters a lot during the early stages of a person's teaching career, but less so later on (Boyd, Grossman, Lankford, Loeb and Wyckoff, 2006; Goldhaber 2006; Rockoff, 2004).

Moe (2006) looks at the relationship between the restrictiveness of transfer rules in collective bargaining agreements and the distribution of teacher quality in 115 California school districts. He judged transfer rule restrictiveness based on whether a district's collective bargaining agreement required seniority as the overriding factor in transfer decisions.[5] Moe's analysis suggests that more restrictive rules like the ones highlighted by TNTP make it harder for disadvantaged schools to hire quality teachers (which he defines as teachers with three or more years of experience and full certification).[6] He finds that disadvantaged elementary schools are relatively worse when they are located in districts with restrictive seniority-based transfer rules (versus disadvantaged schools located in districts with no seniority-based transfer rules). More concretely, Moe's (2005) results imply that if a disadvantaged school has the average number of teachers in his sample (31.61) and is located in a district with restrictive rules, it would be saddled with 2.84 more low quality teachers than if it were located in a district with no transfer restrictions.

Koski and Horng (2007) revisit Moe's analysis but fail to find a similar effect. They use an expanded and updated sample of California school districts as well as a slightly different coding scheme to measure the restrictiveness of each district's staffing rules, including two separate restrictiveness scores (one for voluntary transfer provisions only; the other for various contract provisions).[7] They use similar proxies for teacher quality, but where Moe (2006) used fixed

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[5] Moe looked at voluntary and involuntary transfers. He coded a district in which seniority was not the overriding factor in either type of transfer decision "0," a district in which seniority was the overriding factor in one of these types of transfer decisions "1," and a district in which seniority determined both types of transfers "2."

[6] Evidence on the relationship between teacher quality proxies and teachers' value-added to their students' standardized assessment suggest that a teacher's value-added scores improve through the first three years of teaching but tend to level off after three years of experience (Boyd, Grossman, Lankford, Loeb and Wyckoff, 2006; Rockoff, 2004). However, prior research has found that full certification only weakly correlates with teachers' value-added (Goldhaber and Brewer 2000).

[7] Their voluntary transfer score (what they call the teacher/leave score 1) is closer to Moe's score than the composite score they use which considers other provisions, for example, whether the district is required to

effects regression methods, Koski and Horng (2007) employ hierarchical linear modeling (HLM). In the end, Koski and Horng (2007) conclude that, "African American and Latino students, on average, are burdened with lower-quality teachers. But CBAs [collective bargaining agreements] do little to make the situation worse." (298). In other words, contrary to Moe (2006), they find that restrictive seniority rights do not make things worse. It is not entirely clear why the papers diverge. It is possible that Koski and Horng's (2007) expanded sample and different time period explain the difference, but differences in methodological approach may be important also. [8]

On the other hand, the conflicting findings may also have to do with the way the researchers coded the "restrictiveness" of the contract provisions. Elsewhere, Hess and Kelly (2006) show how contract provisions can belie clear interpretation. In an analysis of 20 collective bargaining agreements, Hess and Kelly (2006) show that while some contracts provide clear direction to use seniority as the overriding factor in transfer decisions, others are ambiguous, including seniority as one factor among many to be considered when filing a vacancy. For instance, contracts may include language that requires schools to make transfers based on "seniority when qualifications are equal" at the same time as they include language saying that schools should make transfer decisions that best serve the "the educational program of the school." In the end, when researchers compare contracts across school districts, they may necessarily lose some of this nuance.

An alternative approach to understanding the effects of seniority-based transfer policies, one that avoids the challenges of classifying CBAs or comparing non-similar districts, is to

provide a reason for denying a transfer and whether teachers are guaranteed their prior assignment when they return from long-term paid leave.
[8] In particular Moe analysis, unlike Koski and Horng's, includes school fixed effects, which account for all time invariant characteristics of schools.

investigate the effects of a defined policy shift. To date, evidence on policy shifts is mainly

qualitative and again comes mainly from TNTP. On balance, TNTP argues that eliminating

seniority preferences is popular among teachers and has benefits for schools. After New York

City moved to a 'mutual consent' system in 2005, for example, TNTP surveyed transferring

teachers and found that a vast majority (87%) agreed with the statement that "it was important to

me when interviewing that principals wanted me to move to their school" (Daly et al 2008, p.

10).[9] Elsewhere, TNTP has argued that a mutual consent system in Milwaukee reduced "the

churn of teachers from school to school and leads to satisfying assignments that teachers are not

inclined to leave." (2008, p. 13). As with earlier TNTP reports, these results raise important

issues that call for additional research. With that in mind, we turned to a policy change in a

single urban district to investigate the effects of seniority-based transfer rules.

The Policy Shift: Reducing Seniority Rights

The policy shift we studied occurred in the early 2000s in a mid-sized urban district located

in the Midwest. Historically, the district had given veteran teachers first pick of all teaching

vacancies under just the type of seniority preference and job guarantee system discussed by

TNTP. But after a series of prolonged negotiations with its teachers union in the late 1990s, the

district started phasing out the seniority preference system in 2000. In the beginning, the

agreement with the union allowed individual schools, by faculty vote, to drop the seniority-based

transfer system in favor of a school-based hiring system that emphasized mutual consent. The

school-based hiring system eliminated within-district seniority preferences, seriously curtailed

forced placements (they only happened if schools were unable to fill a vacancy during the

school-based interview season that happened in the spring), and provided incumbents a period of

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[9] This argument about the benefits of a system of 'mutual consent' was overshadowed by TNTP's findings about 'excessed' teachers who remained on the payroll even when they couldn't find a placement ("Idle Teachers, Wasted Money." April 30, 2008).

preferential review for filling vacancies in advance of external candidates, but no guaranteed

placement. According to our conversations with union and district officials, all of the district's

schools had voted to join the new system by the Spring 2001 hiring cycle, which runs from April

through June. We describe the revised hiring process in more detail elsewhere (DeArmond,

Gross, Goldhaber, 2008). For now, the key point is that the policy shift reduced (but did not

eliminate) seniority preferences and forced placements in the district.[10]

The policy shift did nothing to directly temper teacher preferences for working in more

advantaged, higher performing schools (Hanushek, Kain, and Rivkin, 2004; Guarino et al, 2006),

it nevertheless might have affected staffing across the district. Because a match of mutual

consent should be more simpatico than a forced one, the policy might help reduce teacher

turnover (i.e., both schools and teachers should find a better "fit" through the hiring process).

This potential settling effect is important, given that high turnover rates can create a host of

problems for schools, including fragmented instructional programs and the loss of teaching

expertise (Guin, 2004); ongoing hiring and training costs (Milanowski and Odden, 2007);

workplace stress and low morale (Guin, 2004; Roseman, 1981; Shields et al., 2001).

Our main concern in this paper how the policy shift affected disadvantaged schools. On

the one hand, we might expect disadvantaged schools to benefit from the better matches we

expect across the district, leading to reduced turnover and subsequently fewer inexperienced

teachers. On the other hand, we might expect that disadvantaged schools will have a harder time

retaining young talented teachers under the new policy, as young teachers no longer have to bide

their time in first assignments to gain seniority. Under this second scenario, disadvantaged

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[10] Although forced placements only accounted for about 142 of the 532 incumbent teacher transfers or placements for the 2006 hiring season, interviews with principals suggests that schools strongly prefer to hire teachers through the interview process rather than have them assigned by the district human resources department.

schools might see an increase in turnover and subsequently more inexperienced teachers. The analysis that follows focuses on both outcomes and asks; how did the policy shift affect the rate of turnover across the district and how did it affect the distribution of inexperienced teachers in the district?

Data

The data are from state administrative records on public school teachers from a large urban school district from 1997 through 2006 (We also use similar data from other regional school districts to explore possible validity threats). The data include information on teachers' races, ages, experience levels, qualifications, and salaries. We merged these staff data with school level information on enrollments, percentages of students who are minorities, and percentages of students receiving free/reduced price lunch.

Column 1 in Table 1 shows summary statistics for the urban district between 1998 (the 1997-98 school year) and 2005 (the 2004-05 school year); as a point of comparison, Table 1 also includes information on school districts located in the four counties surrounding the urban district (column 2 – hereafter referred to as "suburban" districts). In this analysis we use the nearby suburban districts for comparison as they are likely operating within the same localized teacher labor market as the urban district (Boyd et al. 2005).

[INSERT TABLE 1 HERE]

Table 1 indicates that schools in the urban district serve relatively high proportions of poor (75%) and minority students (79%) compared to the suburban districts. Teachers working in the urban district also tend to have less experience, fewer qualifications, and lower salaries than their counterparts in other districts. As for our outcomes of interest, the percentage of inexperienced

teachers (defined here as those with fewer than 3 years of experience) and teacher turnover rates

(defined as the percent of teachers leaving for another school in the district) are also highest in

the urban district.

Since the policy shift was fully implemented beginning in the spring of 2001, the first year

we expect to see a policy effect on the distribution of inexperienced teachers in the urban district

would be the 2001-02 school year (identified here as the share of inexperienced teachers in

2002). The first effects of the policy shift on teacher turnover would occur between the 2000-01

and 2001-02 school years (identified here as the 2001 turnover rate). Figures 1A and 1B provide

an initial look at these outcomes before and after the policy shift, broken out by low minority

(raking in the lowest quartile of schools by minority concentration) and high minority (ranking in

the highest quartile in minority concentration) schools in the urban district.[11]

[INSERT FIGURE 1A, B]

Unsurprisingly, Figures 1A and 1B show that high minority schools are worse off than low

minority schools in both time periods on both measures; they have a larger proportion of

inexperienced teachers and higher turnover rates in both time periods, averaged over the four

years prior to the shift and the four years after the shift. In addition, Figure 1A suggests that the

teacher experience gap between low and high minority schools doubled after the policy shift:

high minority schools went from having 1.30 times the proportion of inexperienced teachers

found in low minority schools to 1.75 times the proportion;[12] Figure 1B shows the gap in

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[11] While it is common to consider the concentration of free and reduced lunch (FRL) students as a proxy for schools serving disadvantaged students and working with challenging student populations, the variation in FRL in this district's schools is very small. We found that concentration of minority students, which was highly correlated with FRL concentration, provides more variation across schools. In addition, previous research by Clotflelter, Ladd, and Vigdor (2005) found a significant relationship between the racial composition of schools and concentration of inexperienced teachers. Given the racial and ethnic segregation of this city, examining minority concentration also corresponded with the local perceptions of school contexts.
[12] To ensure that our analysis was not dependent on the specific definition of an "inexperienced" teacher we tested all models with experience defined as teachers with two or fewer years of experience. With these

turnover rates grew after the policy shift as well (from a 3.2 percentage point gap to a 5.1 percentage point gap).

On balance, Figures 1a and 1b suggests that the policy shift did little to improve the standing of high minority schools in the district with regards to staffing. There are several reasons, however, to be cautious about this interpretation. First, we might worry that something other than the policy shift explains the changes we see across the two time periods, masking the policy's net effect. It is likely, for example, that the number of inexperienced teachers and the rate of teacher turnover in schools are both sensitive to enrollment changes. If disadvantaged schools saw a surge in enrollment between the two time periods, for example, all else equal we might expect them to hire more new (less experienced) teachers. On the other hand, we might worry that what we see in Figure 1 could be a function of broader regional trends (e.g., state-level budget cuts) that mask the policy's effects. In the analysis that follows we try to address these concerns by using longitudinal data on students and teachers to account for preexisting trends and compositional changes and by considering staffing patterns in surrounding districts during the same time period. Although we cannot rule out all threats to validity, these more controlled comparisons try to account for at least some of these extraneous influences.

Analytical Approach

We conduct two parallel analyses. First, we look at the policy shift's effect on the distribution of teacher experience, measured as the percentage of experienced teachers in a school (EXP%, teachers with three years experience or less). Second, we look at the policy shift's effect on teacher turnover rates, measured as the percentage of a school's teachers who

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experiments we found no instances in which changing the definition of experienced teachers to include third year teachers substantially changed the coefficient's magnitude.

transfer to another school in the same district (EXIT%).[13] We begin with simple trend models,

$$Transfer\% = \beta_0 + \beta_1 t + \beta_2 P + \beta_3 T + \gamma X_{it} + \varepsilon_{it} \tag{1}$$

$$In\exp erience\% = \beta_0 + \beta_1 t + \beta_2 P + \beta_3 T + \gamma X_{it} + \varepsilon_{it} \tag{2}$$

which we then expand to distinguish disadvantaged schools, using minority enrollment as a

proxy for disadvantage:

$$\begin{aligned}Transfer\% = \beta_0 + \beta_1 t + \beta_2 P + \beta_3 T + \\ \beta_q MIN_{it} + \beta_n t\left(MIN_{it}\right) + \beta_s P\left(MIN_{it}\right) + \beta_r T\left(MIN_{it}\right) + \gamma X_{it} + \varepsilon_{it}\end{aligned} \tag{3}$$

$$\begin{aligned}In\exp erience\% = \beta_0 + \beta_1 t + \beta_2 P + \beta_3 T + \\ \beta_q MIN_{it} + \beta_n t\left(MIN_{it}\right) + \beta_s P\left(MIN_{it}\right) + \beta_r T\left(MIN_{it}\right) + \gamma X_{it} + \varepsilon_{it}\end{aligned} \tag{4}$$

In equations 1 through 4 t is a time trend (1997=0 to 2005=8). P is variable indicating the post-

policy period. T is second time trend term that reflects the post-policy period, MIN_{it} is a vector

of dummy variables that separates the sample into quartiles based on the school's concentration

of minority students, and X_{it} controls for the school's enrollment at the start of the time series

and the school's change in enrollment from the prior year. We include controls for enrollment

because, as Moe (2006) points out, teachers may prefer to be in smaller schools and so

enrollment growth/decline may affect staffing patterns regardless of the particulars of the staffing

rules.

The first three regression coefficients should be interpreted as the intercept (level at the

start of the time series), the pre-policy linear trend, and the post policy linear trend for the

reference category of schools (which are schools in the lowest minority quartile in our analysis).

In equations 3 and 4, differences in β_n show the difference in the dependent variable across

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[13] We focused on the shuffle of teachers within the district instead of the total turnover from schools (i.e. including teachers that exited the system) because the policy affects the rules by which teachers transfer around the district. Although new transfer rules may have some impact on teachers' decision to stay in the district, attrition from the district is relatively small compared with the number of transfers within the district.

schools in different minority concentration quartiles at time zero. β_r reflects a level shift in the outcome in the post policy period. β_s is the difference in the pre-policy period across minority quartiles, while β_n reflects the difference in the post-policy trend shifts in the post-policy period. A negative coefficient for β_2 would, for example, indicate that the trend in teacher inexperience (or, in the second analysis, turnover) for the lowest minority schools shifted downward after the policy shift; the elements of β_n show how this shift varies across schools with different concentrations of minority students.

Although not reflected in the above equations, we also estimate the difference in effects across schools in different locales. Specifically, we compare schools in the urban district to schools in the surrounding suburban districts. These comparisons are made with several vectors of dummy variables interacting with the level and linear trend terms.

Findings

On balance, we cannot rule out the possibility that the policy shift created an initial increase in transfer rates or share of inexperienced teachers in the district but, despite this initial shock, we find little evidence that these high levels persist over time. However, when we examine the differential effects on the rate of transfer and share of inexperienced teachers across schools with different shares of minority students, we find that high minority schools saw much higher initial shocks in both of these factors than do relatively low minority schools. But again, these more substantial shocks in high minority schools are eliminated by the 2004.

Teacher Transfers

The policy shift caused substantial changes in the way teachers move around the system and as such could have significant effects on the rate of transfer within the district. Overall, we see that the policy shift seems to correspond with a substantial level increase in the rate of

turnover, which is most deeply felt by the high minority schools. However, these high minority

schools return to their pre-policy transfer rates by 2004. In this case, however, the low minority

schools, which experienced a much smaller shift in transfer rates and less of a shock to recover

from, end up with substantially lower transfer rates in 2004 than they had prior to the policy

shift. Consequently, the gap in transfer rates between these low minority schools and other

higher minority schools widens.

We begin our analysis of transfer rates with a simple model based on equation 2. The

results for this preliminary model are shown in Table 2 and illustrated in Figure 2.

[INSERT TABLE 2 HERE – MODEL OF TRANSFERS]

[INSERT FIGURE 2– TURNOVER BY SECTOR]

Looking at the raw numbers on transfers from the district, it appears that something

significant happened in 2001. The percent of teachers who switched schools in the district

jumped from 6.4 to 10.5. This jump is picked up in the basic trend models. Examining Figure 2

we see that the slight upward trend in transfer that paralleled the turnover trends in the suburban

districts, jumped dramatically in the urban district in 2001 - the first year the policy shift could

be reflected in school transfer rates. The suburban district schools, on average, saw a slight

decrease in this year. Again, after this initial jump, the district's internal mobility began to

stabilize with transfer rates returning to pre-policy levels by 2004.

The picture changes somewhat when you consider how these effects differed across

schools in different minority quartiles, as reflected in equation 3. There are reasons to believe

that the policy might have had differential effects on disadvantaged schools. Qualitative

evidence suggests, for example, that some principals in high minority schools in the urban

districts reported more difficulties attracting and retaining teachers under the mutual consent

system (DeArmond, Gross, and Goldhaber, 2008). If younger teachers act on preferences for low-minority schools (Jackson 2009) sooner because they do not have to wait for tenure, the transfer gap between high-minority and low-minority schools may be exacerbated.   On the other hand, mutual consent hiring might allow schools to find especially committed teachers and build a more stable teaching staff. Figures 3a and 3b show just how different rates changed for high and low minority schools. (Coefficient estimates from the full models are provided in Appendix Table A1.)

Prior to the policy shift, the urban district's highest minority schools averaged much high rates of transfer than did schools in minority quartiles 1, 2 and 3. However, in 2001, schools in the two highest minority quartiles saw large level increases in their transfer rates. Our models estimated a much smaller level increase for the low minority quartiles but these shifts are not statistically significant.   Even though the rate of transfer in the high minority quartile schools returns to similar or lower levels of transfer than they had prior to the policy shift, schools in the third minority quartile appear worse off in their relative position to the lower minority schools. Prior to the policy shift, schools in this third minority quartile, on average, had very similar rates of transfer as their lower minority peers. However, after the policy shift, the third quartile schools, on average, appear closer to the highest minority schools in their rate of transfer.

[INSERT FIGURES 3A AND 3B: TRANSFER BY MINORITY]

Transfer trends in the suburban districts were substantially different from what was seen in the urban district. It does not appear that the level changes and trends that correspond with the policy shift in the urban district are present in the wider labor market.

To see if lifting seniority preferences actually made it easier for young teachers to leave high minority schools as we hypothesized, we took a closer look at the mobility behavior of

teachers in their initial placements within the district. To do this, we examine the survival

function for first placements in high and low minority schools for each cohort of new teachers

separately. Since splitting our sample into both cohorts and quartiles reduced the number of

teachers in each sub-analysis dramatically, the number of new teachers in the lowest minority

quartile of schools was not enough to estimate the survival function. For this discussion we

compare the survival function of teachers in the second to lowest minority quartile (quartile 2)

and the highest minority quartile (quartile 4).

Figure 4a provides four survival functions for first placements: teachers from the 1998

cohort placed in high minority schools; teachers from the 1998 cohort placed in low minority

schools, teachers from the 2002 cohort placed in high minority schools and teachers from the

2002 cohort placed in low minority schools. At issue is whether teachers in high minority

schools showed improvements in their survival rate from 1998 to 2002, and if these

improvements exceed any improvements made by teachers in low minority schools.

[INSERT FIGURES 4A AND 4B]

As it turns out, the survival of teachers in high minority schools *fell* substantially from the

1998 to the 2002 cohort while the survival of teachers in the low minority schools increased

between these two cohorts. High minority schools seem to be worse off in terms of keeping their

teachers after the reform than before the reform, while the opposite is true for low minority

schools. However, when we consider what is happening in the years leading up to the reform, as

illustrated in figure 4b, we find that the changes seen between the 1998 cohort and the 2002

cohort reflect a gradual shift over time beginning before the new hiring policy took effect in the

district. It is not entirely clear the policy change was behind the changes in teacher turnover for

high minority schools.

Teacher Experience

On the surface, there is little reason to expect a district wide shift in the share of inexperienced teachers from this policy. But it is certainly possible if this policy prompted an exodus of experienced teachers who are replaced with less experienced teachers. Looking at the raw numbers from the district, it does appear that the district saw a slight increase in the number of teachers leaving the district for positions outside the district between 2001 and 2002. In addition, the district had an increase in the number of new teachers into the district in 2002.

Table 3, which provides the coefficient estimates from a model based on equation 2, and Figure 5, which graphically represents these estimates, showed that the urban and suburban districts had statistically significant differences in their inexperienced teacher trends. Before the policy shift the urban district schools, on average, were trending downward, while the schools in suburban districts in increasing in their share of inexperienced teachers. In 2002, the first year in which teachers hired under the new policy would be on school staff rosters, we estimate a significant upward shift in the average share of inexperienced teachers (controlling for enrollment levels and changes) in the urban district but much smaller shift in the suburban districts. This upward shift, however, seems to be quickly mended as the average share of inexperienced teachers in the district returns to pre-policy levels by 2004.

 [INSERT TABLE 3]

[INSERT FIGURE 5]

To explore the policy's effects on the distribution of inexperienced teachers within the district, we estimate the pre- and post- policy trends of teacher experienced by minority quartile in the urban district and, for comparison, the surrounding suburban districts and the outlying

districts in the state. Because the models included several series of interaction terms that complicate their interpretation, we represent the estimates graphically in Figures 6a and 6b. (Full model estimates are available in Appendix Table A2). These figures illustrate the predicted school level concentration of inexperienced teachers by minority quartile for schools in the urban districts (6a) and the surrounding suburban districts (6b).

[INSERT FIGURES 6A, 6B]

Trends in the percent of inexperienced teachers varied slightly prior to the policy shift and as depicted in Figure 3a, only the highest minority schools (minority quartiles 3 and 4) showed a statistically significant level shift in the share of inexperienced teachers. (According to Figure 6a it appears that minority 2 quartile schools also saw a substantial level shift but this shift is not statistically different from that of the lowest (quartile 1) schools.) The trends in these high minority schools, however, turn sharply downward after the initial shock and are estimated to be at or below pre-policy shift levels by 2004. The gap between high and low minority schools persist through the length of our panel of data.

Importantly, the post policy shift trends in the suburban districts (Figure 6b), while estimated to be somewhat less steep than what is seen in the urban district, are not statistically different from what we see in the urban district. On balance, we come away from this analysis with the impression that the elimination of seniority preferences did little to change the overall level of experience in the urban district's schools and, moreover, did nothing to change the distribution of experience in disadvantaged schools.

Conclusion

As policymakers and researchers pay more attention to the demand-side of teacher quality, a host of school district practices are coming under increased scrutiny. Among those, seniority

preferences and job guarantees have come under particular criticism for making it harder for principals and schools to build a coherent faculty with common professional commitments. Despite the intuitive appeal of this argument, prior research on the issue has produced mixed results (Moe, 2005; Koski & Horng, 2007).

This paper offers evidence on the issue based on examining what happened when an urban school district effectively eliminated seniority preferences and job guarantees in favor of a hiring system based on mutual consent between teachers and schools. One advantage of looking at a single district is that we avoid the difficulty of interpreting the sometimes-ambiguous language governing transfer rules in school district collective bargaining agreements. Another is that longitudinal data on teacher careers allow us to examine not only how the policy shift affected the distribution of inexperienced teachers (as prior studies do) but also how it affected teacher turnover rates within the district.

Moe (2009) found that disadvantaged schools are relatively better off and Koski and Horng (2007) saw no real difference with less restrictive hiring rules. We, however, we find that at least initially, the implementation of the policy change increases inexperienced teachers and rates of turnover, especially in disadvantaged schools. However, over time these initial effects are corrected. In fact, in the case of teacher turnover, post-policy shift rates buck the upward pre-policy trends so substantially that within four years of the policy shift the rate of transfer for schools across all minority subgroups is lower than it was prior to the policy shift. But on balance, the district saw little long-term improvement in the distribution of inexperienced teachers system wide or in the gap between high and low minority schools in the teacher transfer rate.

Because we only have four years of post-policy shift data, it is impossible to know if more

significant changes started to occur after teachers and principals become more comfortable with the hiring practices. It is also possible that we have missed some factor that mitigated the policy shift's effect, despite our efforts to assess the role that concurrent policies in the district may have played in affecting these outcomes. Finally, although analyses of the demand-side of the teacher quality equation may benefit from looking at single policies or practices, important questions remain about the interaction of various human capital policies and practices, not just seniority preferences, but seniority preferences and compensation, seniority preferences and tenure policies. These interactions and their effects are important areas for future research.

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Tables and Figures

Table 1. Summary Statistics

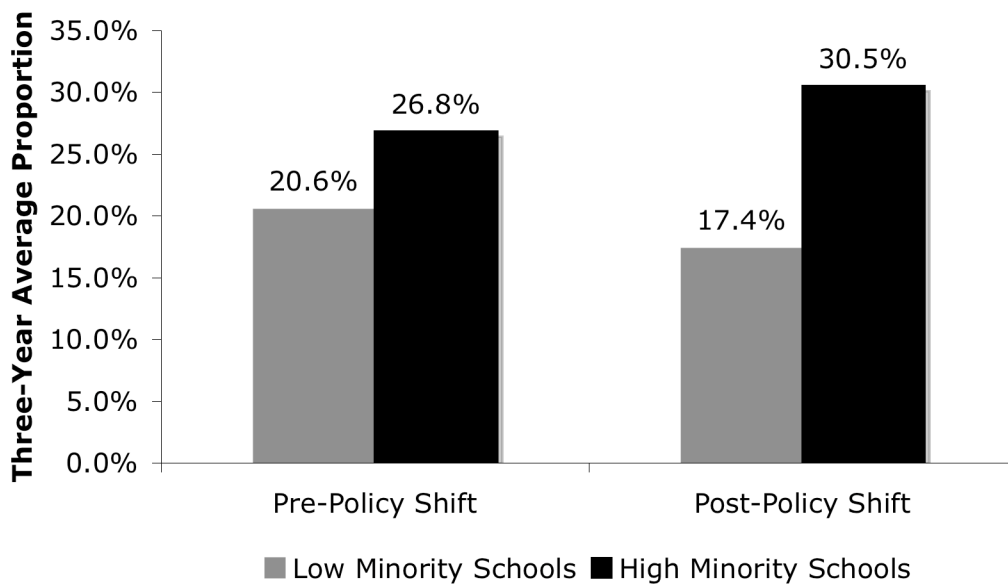|	Urban District Schools	Suburban District Schools
% of Inexperienced Teachers (3 yrs or less)	25.7%	13.3%
Avg. Years of Experience	11.4	14.8
% of Teachers with Masters Degree	27.0%	44.2%
Avg. Teacher Salary	$40,377.00	$40,650.00
Avg. Annual Within-District Teacher Transfer	7.2%	5.1%
% of Students with FRL status	78.6%	17.0%
% of Minority Students	75.0%	11.7%
% of Students with Proficient Reading Scores	55.3%	85.0%
% of Students with Proficient Math Scores	41.1%	76.6%
Avg. School Level Student Enrollment	459	392
Number of Schools	126	156

Table 2. Time Trend Model for Teacher Transfer Rates

	Teacher Transfer 1998-2004 Post Policy=1 for >= 2001
Suburb	-1.597
	(1.023)
Overall Time Trend	0.391
	(0.400)
Suburb Time Trend	0.132
	(0.727)
Post Policy Level Change	5.152
	(1.062)***
Post Policy Suburb Level Change	-5.91
	(1.805)***
Post Policy Trend Change	-2.566
	(0.514)***
Post Policy Suburb Trend Change	1.684
	(0.901)*
Log Enrollment	-1.957
	(0.968)**
Enrollment Change	-0.01
	(0.004)**
Constant	6.142
	(0.583)***
Observations	1657
R-squared	0.04

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3. Time Trend Model of the Share of Inexperienced Teachers

	Teacher Inexperience 1998-2005 Post Policy=1 for >= 2002
Suburb	-10.975
	(1.194)***
Overall Time Trend	-0.748
	(0.418)*
Suburb Time Trend	1.479
	(0.523)***
Post Policy Level Change	9.658
	(1.764)***
Post Policy Suburb Level Change	-8.042
	(2.048)***
Post Policy Trend Change	-3.173
	(0.749)***
Post Policy Suburb Trend Change	2.008
	(0.902)**
Log Enrollment	-0.894
	(1.298)
Enrollment Change	-0.008
	(0.003)***
Constant	16.894
	(0.942)***
Observations	1880
R-squared	0.17
Robust standard errors in parentheses	
* significant at 10%; ** significant at 5%; *** significant at 1%	

Figure 1A. Teacher Inexperience in Urban District Before and After Policy Shift

Figure 1B. Teacher Turnover Rate in Urban District Before and After Policy Shift

Low Minority Schools ■ High Minority Schools
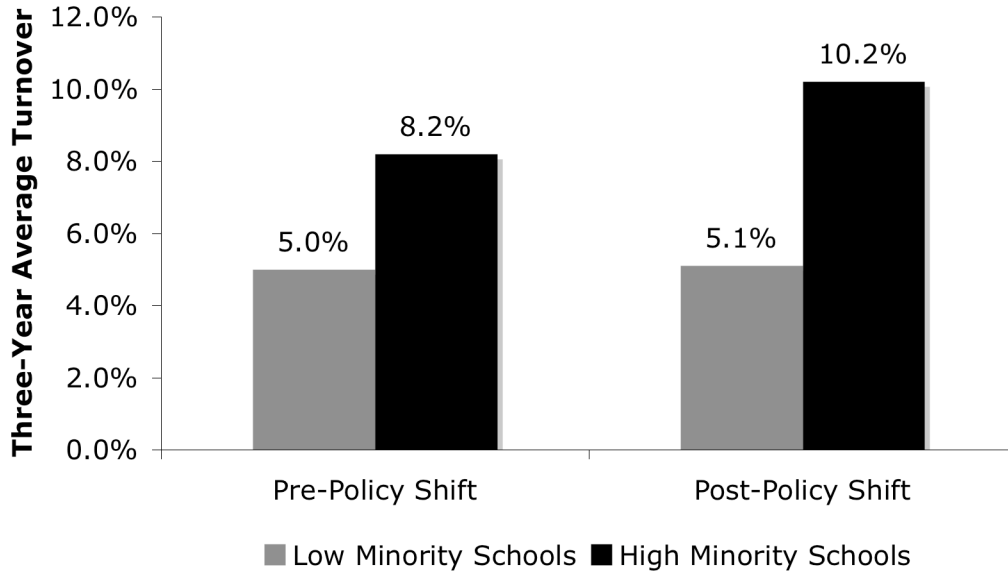
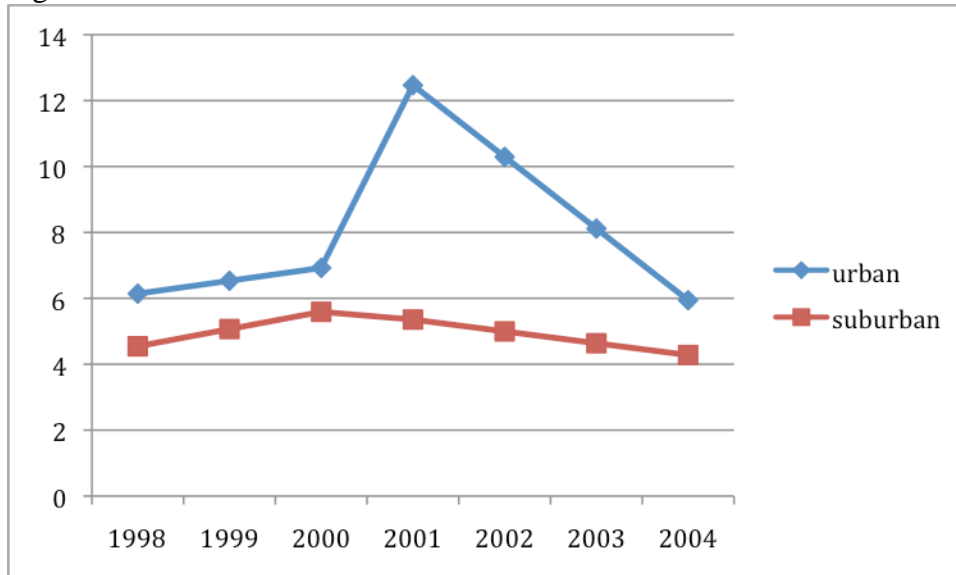Figure 2: Estimated Transfer Rates in Urban and Suburban Districts

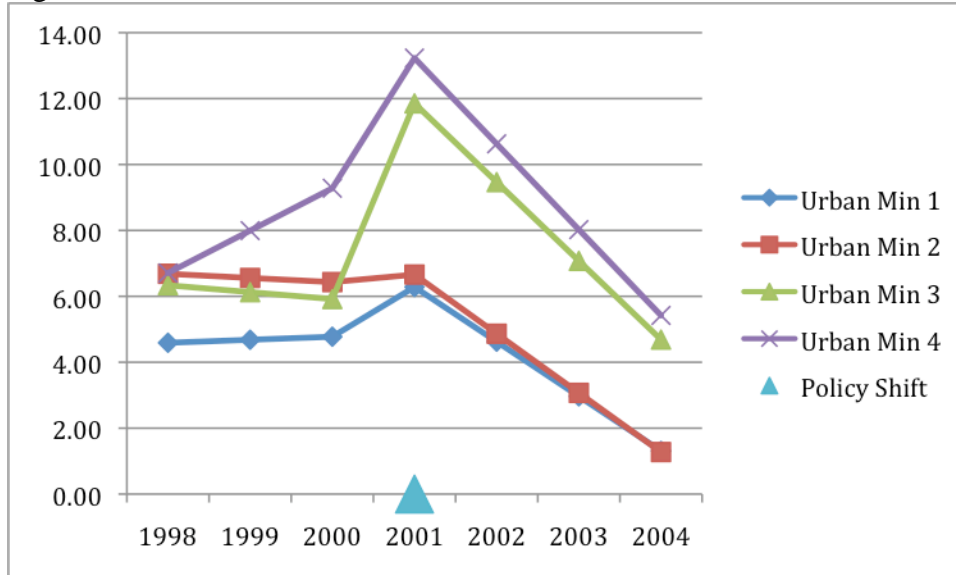Figure 3a: Estimated Transfer Rates for Schools in the Urban District

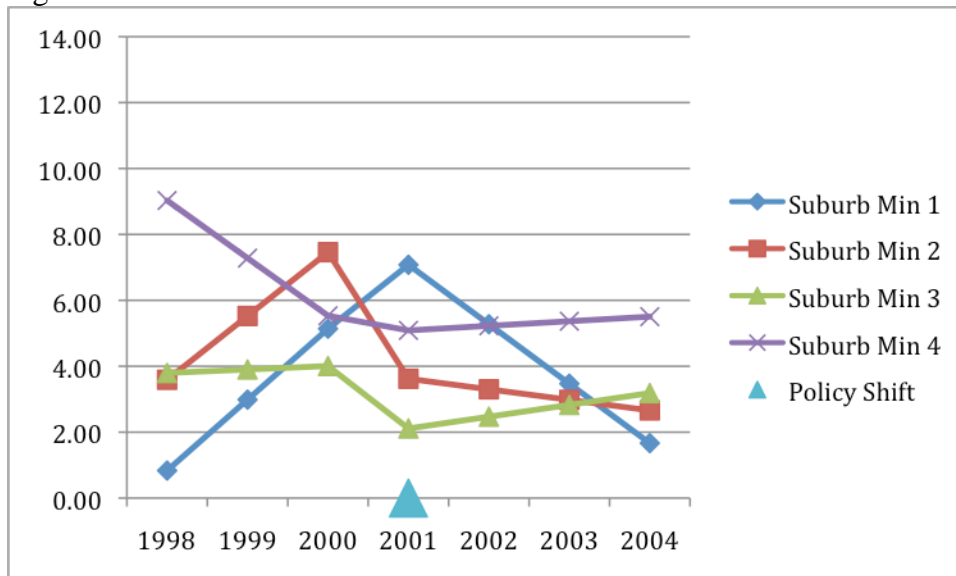Figure 3b: Estimated Transfer Rates for Schools in the Suburban District

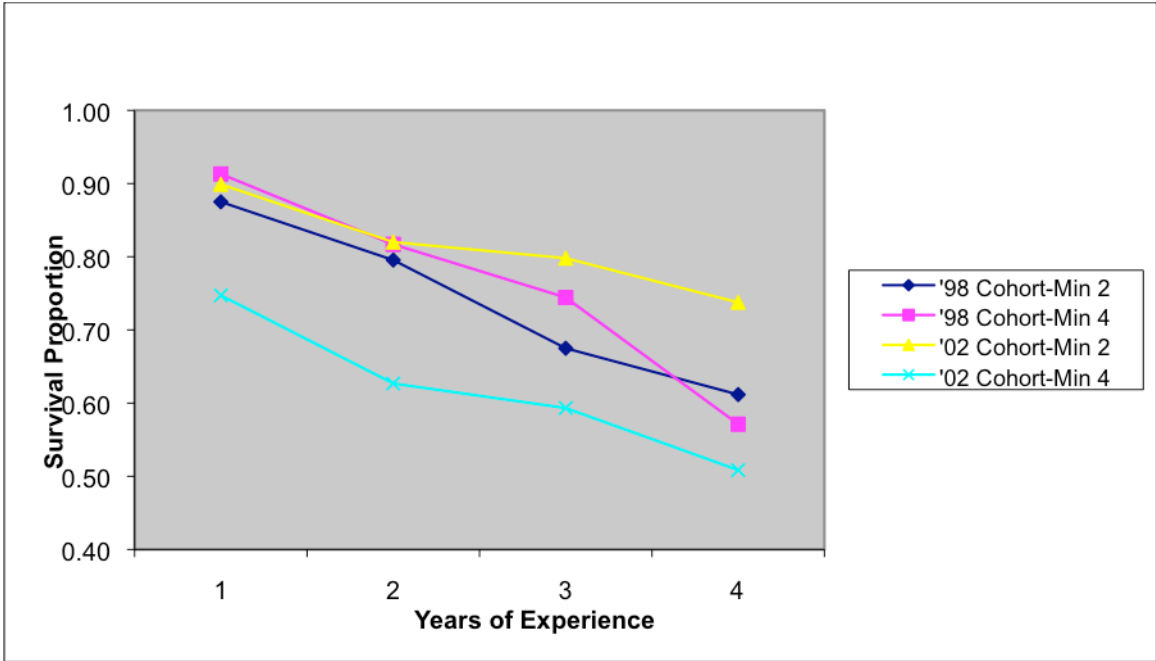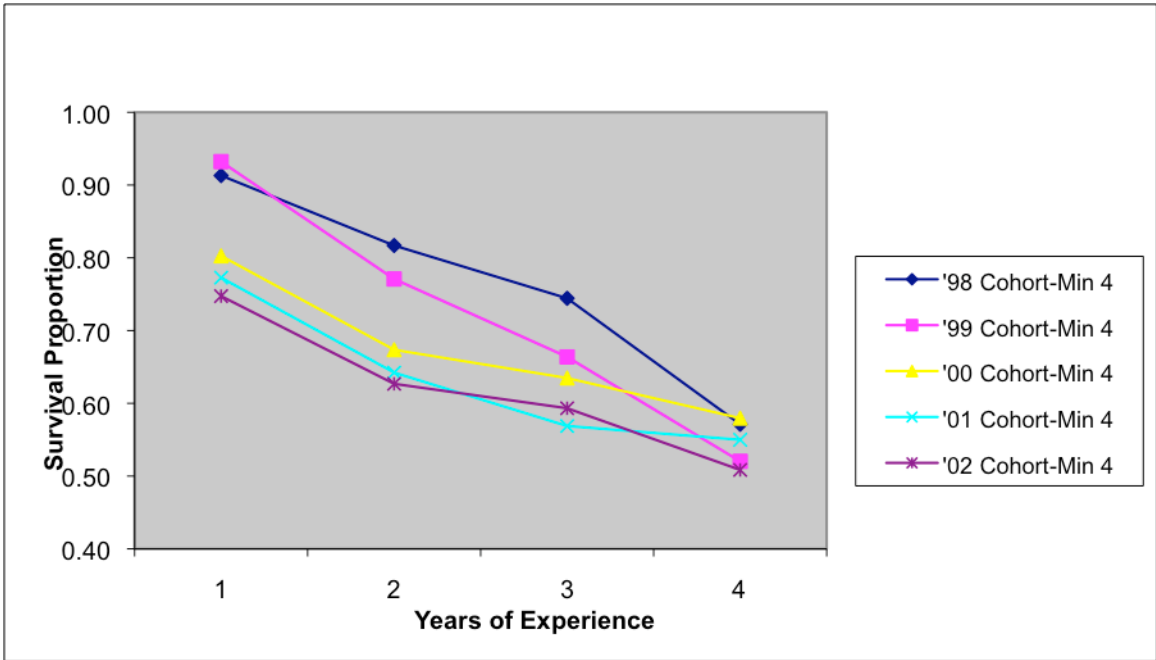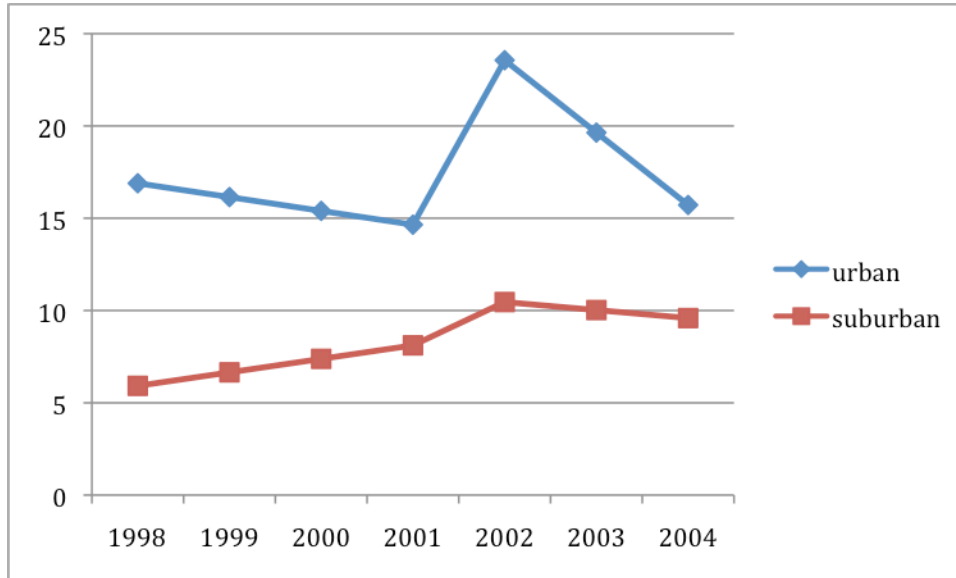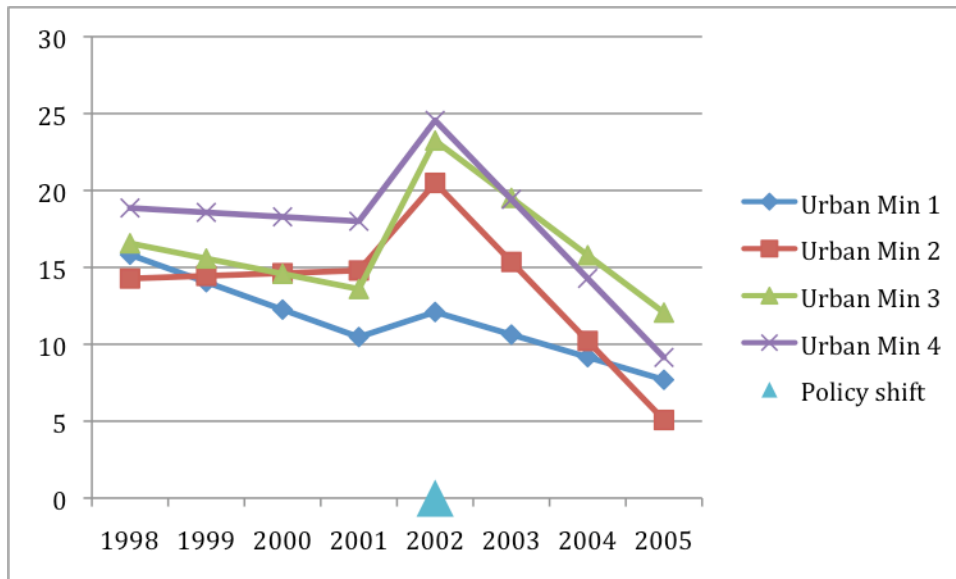Figure 4a: Survival Function of Teachers Before and After the Policy Shift

Figure 4b: Survival Function of High Minority Teachers from 1998 to 2002
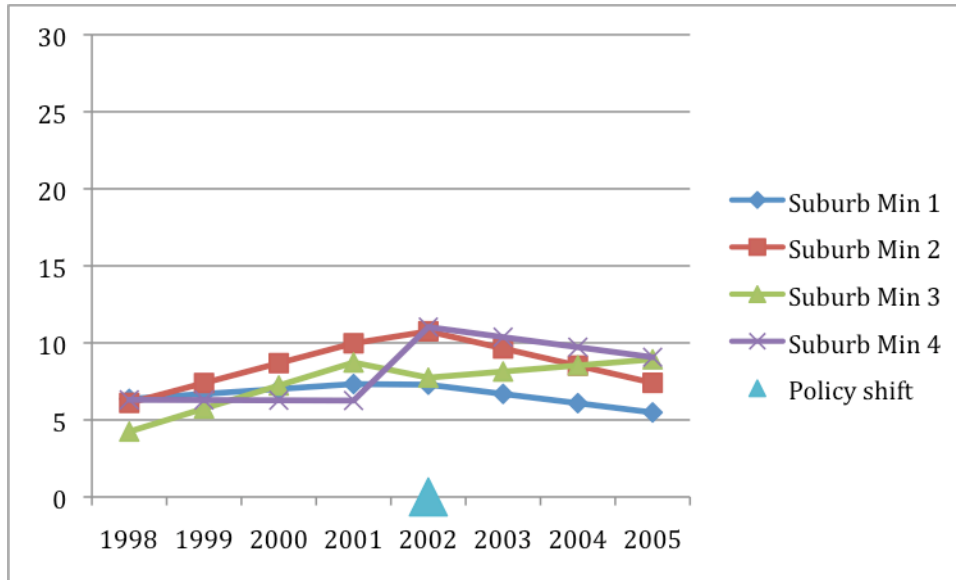
Figure 5: Estimated Percent of Inexperienced Teachers in the Urban and Suburban Districts

Figure 6a: The Estimated Percent of Inexperienced Teachers in the Urban District

Figure 6b: The Estimated Percent of Inexperienced Teachers in the Suburban District

Table A1. Teacher Transfer Rates Model with Minority Student Quartiles

	Teacher Inexperience 1998-2005 Post Policy=1 for >= 2002
Min Quartile 2	-1.548
	(2.374)
Min Quartile 3	0.742
	(2.700)
Min Quartile 4	3.039
	(2.586)
Suburb	-9.457
	(2.089)***
Suburb Min Quartile 2	1.286
	(2.756)
Suburb Min Quartile 3	-2.865
	(3.041)
Suburb Min Quartile 4	-3.1
	(3.377)
Overall Time Trend	-1.784
	(0.675)***
Min Quartile 2 Time Trend	1.958
	(1.058)*
Min Quartile 3 Time Trend	0.793
	(0.877)
Min Quartile 4 Time Trend	1.496
	(1.112)
Suburb Time Trend	2.105
	(0.824)**
Suburb Min Quartile 2 Time Trend	-0.989
	(1.251)
Suburb Min Quartile 3 Time Trend	0.381

	(1.113)
Suburb Min Quartile 4 Time Trend	-1.833
	(1.506)
Level Shift	3.097
	(2.825)
Level Shift Min 2	7.737
	(5.367)
Level Shift Min 3	10.283
	(5.686)*
Level Shift Min 4	8.599
	(3.804)**
Level Shift Suburb	-2.537
	(3.176)
Level Shift Suburb Min 2	-6.404
	(6.140)
Level Shift Suburb Min 3	-12.224
	(6.152)**
Level Shift Suburb Min 4	-3.736
	(4.602)
Post Policy Trend Change	0.315
	(0.898)
Min Quartile 2 Trend Change	-5.627
	(1.788)***
Min Quartile 3 Trend Change	-3.052
	(2.191)
Min Quartile 4 Trend Change	-5.164
	(1.607)***
Suburb Trend Change	-1.237
	(1.224)
Suburb Min Quartile 2 Trend Change	4.144
	(2.166)*
Suburb Min Quartile 3 Trend Change	2.875
	(2.487)
Suburb Min Quartile 4 Trend Change	5.449
	(2.247)**
Log Enrollment	-1.406
	(1.355)
Enrollment Change	-0.009
	(0.003)***
Constant	15.823
	(1.806)***
Observations	1875
R-squared	0.21

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A2. Percent of Inexperienced Teachers Model with Minority Student Quartiles

	Teacher Attrition 1998-2004 Post Policy=1 for >= 2001
Min Quartile 2	2.093
	(1.683)
Min Quartile 3	1.746
	(1.689)
Min Quartile 4	2.117
	(1.489)
Suburb	-3.756
	(1.187)***
Suburb Min Quartile 2	0.661
	(2.252)
Suburb Min Quartile 3	1.216
	(2.262)
Suburb Min Quartile 4	6.077
	(3.007)**
Overall Time Trend	0.092
	(0.703)
Min Quartile 2 Time Trend	-0.218
	(1.130)
Min Quartile 3 Time Trend	-0.302
	(1.049)
Min Quartile 4 Time Trend	1.194
	(1.041)
Suburb Time Trend	2.06
	(1.481)
Suburb Min Quartile 2 Time Trend	0.002
	(1.917)
Suburb Min Quartile 3 Time Trend	-1.745
	(1.836)
Suburb Min Quartile 4 Time Trend	-5.094
	(2.284)**
Level Shift	3.166
	(1.446)**
Level Shift Min 2	-1.142
	(2.163)
Level Shift Min 3	5.16
	(2.620)**
Level Shift Min 4	3.387
	(2.705)
Level Shift Suburb	0.578
	(5.416)
Level Shift Suburb Min 2	-6.122
	(6.254)
Level Shift Suburb Min 3	-11.157
	(5.954)*
Level Shift Suburb Min 4	-7.715
	(6.106)
Post Policy Trend Change	-1.75
	(0.852)**
Min Quartile 2 Trend Change	0.081
	(1.263)

Min Quartile 3 Trend Change	-0.429
	(1.398)
Min Quartile 4 Trend Change	-2.139
	(1.319)
Suburb Trend Change	-2.206
	(2.193)
Suburb Min Quartile 2 Trend Change	1.619
	(2.574)
Suburb Min Quartile 3 Trend Change	4.638
	(2.568)*
Suburb Min Quartile 4 Trend Change	7.982
	(2.905)***
Log Enrollment	-2.362
	(0.962)**
Enrollment Change	-0.011
	(0.004)**
Constant	4.591
	(1.011)***
Observations	1651
R-squared	0.08

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%