

# Race and the Principal Pipeline

The Prevalence of Minority Principals in Light of a Largely White Teacher Workforce

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## ABSTRACT

This paper explores the factors that contribute to the racial/ethnic composition of the principal workforce.

## **Introduction**

There are reasons to expect an underrepresentation of racial and ethnic minorities in school leadership positions relative to student populations. Most importantly, underrepresentation of minorities in teaching logically predicts an underrepresentation in school leadership as almost all principals have teaching experience. Data from the National Center for Education Statistics (NCES) reveal a low percentage of minority teachers relative to minority students (Aud et al., 2010). Between the school years 1999-00 and 2007-08, the share of minority teachers increased from 15 to 17 percent, meanwhile the share of minority students increased from 39 to 45 percent. In short, the United States experienced an increase in the representation of minority teachers, but the representation of minority students increased by a higher rate, thus intensifying the racial mismatch between students and teachers. Since teaching is a prerequisite for principal jobs in most states, the underrepresentation of minorities in teaching implies that racial and ethnic minorities are underrepresented in the pool of potential principals and may lead to a similar mismatch between principals and students.

In addition to the limited pool of minority teachers from which to draw from, factors that reduce the number of minority teachers may also directly affect the career paths of principals. The Education Alliance at Brown University produced a comprehensive report examining the recruitment and retention of minority teachers. Their synthesis of the literature identified barriers to the recruitment and retention of minority teachers that include the attraction of other careers, unsupportive working conditions, increased standards and competency testing, financial considerations, and the high attrition of minority teachers (Torres, Santos, Peck, & Cortes, 2004). These barriers may be applicable to prospective minority principals and thus contribute to their underrepresentation relative to students, even beyond what the teaching force affects.

The racial and ethnic distribution of the principal workforce may be socially meaningful for a number of reasons. First, from the perspective of the educator, lack of access to leadership roles reduces opportunities for greater prestige and compensation. Moreover, a lack of racial and ethnic representation in the principalship affects teachers' working conditions and career decisions (Grissom & Keiser, 2011; Myung, Loeb, & Horng, 2011; Williams, 2012). Finally, in addition to its effects on teachers, principal race may affect students' opportunities, as we describe further below.

While previous empirical research has systematically studied the role of gender in career paths of principals (Joy, 1998), there are no such studies exploring race. In this paper, we use administrative and survey data from Wisconsin as well as data from NCES to address this hole in the research by answering the following questions:

- Nationally, what is the representation of racial and ethnic minorities in the principal workforce? How does it compare to the racial and ethnic composition of teachers and students? How does it vary across regions?
- To what extent do race and ethnicity predict teachers moving into the principalship and can these differences be explained by other characteristics of teachers or the schools in which they teach?
- Where in the pipeline from teaching jobs to the principals do racial or ethnic differences emerge?
- To what extent do the preferences of early career teachers explain the patterns observed in the pipeline to school leadership?

In what follows, we discuss the importance of race and provide background information about the principal pipeline and how racial differences may manifest in the principal labor market. Then, we describe the data and empirical strategy used to answer the various research questions and report the results. We find that black teachers, in fact, are *more* likely than white teachers to become principals, even when controlling for background characteristics, prior school

leadership experiences, and school characteristics. In addition, black teachers are more likely to aspire to and pursue school leadership. We conclude the paper with a discussion of the results in terms of policy implications and contributions to our understanding of principal labor markets.

## **Background**

### The Importance of Race

The education sector has played an important role in the social mobility of black people in the United States (Foster, 1997; Orfield, 1969). More specifically, Foster (1997) explores the historical experiences of black teachers and finds that the field of education provided opportunities for educated Blacks during times when employment opportunities in other segments of the labor market were limited. Using census figures from the nineteenth century, she finds that nearly half of black professionals worked in education (approximately 45 percent in the years 1890, 1900, and 1910). Moreover, she finds that the number of black teachers more than quadrupled between 1890 and 1910. In addition to their significant number, black educators were highly trained. In many southern states, the quality of black teachers, as measured by degrees and training, exceed that of white teachers (V.S. Walker, 2000; Vanessa Siddle Walker, 2001).

Despite advancements in numbers and quality, black educators struggled with the effects of racial discrimination, even after the Supreme Court ordered the end of segregation in public accommodations. Schools displaced black educators during school consolidated mandated by desegregation (Orfield, 1969; Tillman, 2004a, 2004b). In particular, some black principals were demoted and replaced by white principals (Tillman, 2004a, 2004b). Many black educators lacked legal recourse because public sector employees were exempt from federal discrimination

laws until the federal government enacted The Equal Employment Act of 1972. The law abolished language in the Civil Rights Act of 1964 exempting state and local governments from employment discrimination regulations. Consequently, minority teachers no longer had to contend with de jure discrimination in the education labor market.

Almost five decades after the Civil Rights Act, racial disparities in leadership representation persist, and the elementary and secondary education sector continues to be important for black college-educated workers seeking employment and leadership opportunities. Employment statistics from the Equal Employment Opportunity Commission (2010) show the rate of black labor participation in education surpassing other employment sectors. Overall, black workers comprise approximately 14 percent of the labor force; however, they make up a substantially higher percent of elementary and secondary education employees at 22 percent. Employment in education is much higher than in health care (18 percent), finance/insurance (12 percent), management (12 percent), and science/technology (nine percent). With respect to racial representation in leadership positions, the education sector has not achieved racial parity, but it fares much better than other employment sectors. Specifically, blacks constitute of nine percent of senior managers and 16 percent of midlevel managers in education, which compare favorably to the national average (three and seven percent respectively) and representations in health care (six and 10 percent), finance (three and seven percent), management (three and six percent), and science/technology (two and five percent).

The importance of minority access to school leadership stems from its potential to serve as an indicator of the nation's progress in eliminating racial discrimination in the workplace. The plight of black principals is deeply rooted in history - in times where black educators lacked legal protection from discrimination. Thus, history, to an extent, provides a baseline from which one

can examine how subsequent changes in jurisprudence and social attitudes influence labor market outcomes.

Diversity among the ranks of school leaders has implications beyond symbolic representations of fairness and equality because the presence of minority principals may affect student learning, particularly for minority students. Although there is currently no direct evidence establishing a relationship between principal's race and student achievement, evidence about teachers suggests race is important factor in improving student performance. Two empirical studies examine how a teacher's race influences academic achievement and the perception of students. The first study (Dee, 2004) uses data from the Tennessee Project STAR class-size experiment, which randomly matched students and teachers within schools, and finds that an assignment to a same-race teacher significantly increased the math and reading achievement of both black and white students by approximately three to four percentile points. His second study (2005) uses data from the National Education Longitudinal Study to examine how teacher's perceptions of students differ when the teacher and student match on race. He finds that teachers are more likely to classify a student as disruptive if the student and teacher do not share the same race/ethnic designation. These studies suggest that the racial composition of education employees may have implications for minority student achievement during a time when racial achievement gaps pose a challenge to the nation.

While there is no research relating principal demographics to student achievement, a number of studies either establish correlations between principal race and other student outcomes or identify an effect of principal race on teachers. Meier and Stewart (1992) use aggregated school personnel data from 67 school districts in Florida in 1987 to investigate the relationship between minority representation of principals and student outcomes (i.e., ability grouping,

discipline, and student performance). In their study, the proportion of black principals in a district is negatively associated with black students' special education placement rates and positively correlated with higher promotion rates and lower dropout rates for black students. These findings suggest the presence of black principals may influence school policies and practices that have implications for student outcomes.

The race of a principal has potential implications for students from other minority groups as well. Meier (1993) assesses the relationship between Latino principal representation and Latino student outcomes using data from 670 school districts in Texas spanning the period from 1994 to 1997. He finds the presence of Latino principals is associated with lower rates of special education placements, higher placement rates in gifted programs and lower levels of disciplinary action for Latino students. In addition, the study shows that these positive outcomes are more likely to occur in districts with a critical mass of Latino principals. His estimates of such a critical mass range from 16 percent to 24 percent for ability grouping and disciplinary outcomes. The findings for Latino principals mirror the findings for black principals.

The initial studies of racial representation of principals and student outcomes have focused on a single racial/ethnic group, but later work in this area (Pitts, 2005, 2007) explores principal representation beyond any single ethnic group. These studies use the Blau index to measure how closely administrators match each racial group of students. The 2005 study finds principal racial representation positively correlates with lower dropout rates and higher performance on the Texas Assessment of Academic Skills and the SAT. The 2007 follow-up study does not find an overall statistically significant relationship for principal representation, but principal representation is associated with improved academic performance for black

students. Thus principal representation is associated with academic achievements all students, but especially black students.

Scholarship on the relationship between same-race principals and teachers has emerged in recent years. Grissom and Keiser (2011), using data from the 2003-04 Schools and Staffing Survey and the 2004-05 Teacher Follow-Up survey, find teachers are more likely to stay in schools where they are supervised by a same-race principal. In addition, they find higher levels of job satisfaction and supplemental compensation when teachers share the race of the principal. In another study, Myung, Loeb, & Horng (2011) use a combination of survey and administrative data to investigate how school leaders identify and encourage teachers to pursue school administration. They find principals are more likely to “tap” teachers who share their ethnicity. In the final study, Williams (2012) uses administrative data from Wisconsin to explore the same-race principal effects on the initial placement, retention, and promotion of teachers. He finds that principals are more likely to attract teachers of the same race, white teachers are less mobile when they work under white principals, and black teachers are more likely to pursue careers in school leadership when they work with black principals.

Although relatively large-scale empirical studies of principal representation find improvements for same-race teachers and students, especially black students, these studies have not isolated specific mechanisms or explanations for these associations. Qualitative studies of black principals provide possible explanations for why the presence of black principals may influence student outcomes. Researchers observe black principals using their shared cultural experiences to inform their practice and enhance relationships with school stakeholders. In particular, principals can serve as role models for students and employ models of leadership that address the racial and cultural composition of the school (Brown, 2005; Tillman, 2004a, 2004b).



Furthermore, black principals in predominantly black schools are able to demonstrate to parents and students a “commitment to the education of African-American children, a compassion for, and understanding of, their students and the communities in which they work, and a confidence in the ability of all African-American children to learn,” (Lomotey, 1989, p.131). Finally, the black community tends to perceive black principals as prominent leadership figures (Tillman, 2004a). These observations suggest that black principals may be able to facilitate school operations by harnessing their cultural ties with students and parents.

In summary, there is reason to believe that a principal's race is important because the presence of minorities in school leadership serves both symbolic and practical purposes. The representation of minority principals may reflect progress in establishing an equitable labor market for principals. Moreover, minority principals have the potential to influence school policies and practices that benefit students, particularly same-race students.

### Pathways to School Leadership

This study is the first, that we know of, to explore racial differences in the pathways to school leadership. However, researchers have studied other aspects of the principal pipeline, which provide useful insights for our inquiry. The most evident characteristic of school leadership is that it starts with teachers. Forty-one states require prospective principals to have some experience in primary or secondary education (Gates, Ringel, & Santibanez, 2003). Gates and her colleagues (2003) confirm teaching as the primary starting point on the path to becoming a school principal by showing that 99 percent of public school principals have some teaching experience and these principals have an average of 14 years of teaching experience. The

findings reinforce the supposition that in order to understand the principal labor market, it is important to understand the path from teacher to principal.

Although nearly all principals are former teachers, they do not follow the same path to the principalship. The Schools and Staffing Survey (SASS) asks principals about school positions held prior to becoming a principal (NCES, 2008). Prior experience as an assistant principal is the most common response with 68 percent of principals in public schools reporting that they were assistant principals but a substantial 32 percent were not. More than half (53 percent) of principals report having experience as a club sponsor, and 36 percent report having prior experience as a department head. In short, teachers can move into the role of principals through a variety of pathways.

#### Factors Influencing the Racial Composition of the Principal Workforce

Both supply-side and demand-side factors affect the transition from teaching to school leadership. The supply side of the market involves processes that facilitate an individual's decision to pursue a career as a principal. The demand-side involves processes that influence hiring decisions (e.g., the number of positions, qualifications, preferences of hiring authorities for certain candidate characteristics). Variation in these factors can contribute to racial differences in the likelihood of a teacher becoming a principal.

Teachers' preferences are an important supply-side factor to consider when understanding the role of race in the principal labor market. A teacher's decision to pursue a career in school administration depends on his/her inclination for the job. Racial differences in teachers' preferences for school leadership may account for the observed racial distribution of principals.

In other words, teachers' explicit choices rather than employers' preferences may induce racial differences in the racial composition of the principal workforce.

Teachers can signal a preference for school leadership by acquiring a school administrative credential. Nearly all states (49 out of 50) require prospective principals to obtain some type of credential (Tryneski, 2000). Credentials acquisition may play an important role in the transition from teacher to principal by signaling interest in school leadership and immediately making teachers eligible to apply for principal positions. Racial differences in credential attainment, which could arise from different access to or affinity to the necessary coursework, could shape the racial composition of the principal workforce. Evidence from the state of New York shows growing diversity among those obtaining administrative credentials (Papa, Lankford, & Wyckoff, 2002). The proportion of Blacks and Hispanics obtaining administrative credentials more than doubled between 1984 and 2002 from 12 to 25 percent. Although their study does not link acquisition of credentials with movement into school leadership, data from SASS reveals minority principal representation in New York increased from 10 to 26 percent between the 2003-04 and 2007-08 school years.

Teachers with adequate credentials may be eligible to become principals, but differences in qualifications beyond the minimum requirements, may make some principal candidates more attractive than others. For example, superintendents and human resource professionals value leadership experience when examining principal applicants (Roza, 2003). Therefore, the representation of minorities in leadership positions such as grade level team leader or department head may affect minority representation in the principal labor force. Again, differences in preferences for or access to those first-level leadership positions may affect later opportunities for principal jobs.

On the demand side, school districts may influence the racial composition of principals through the attitudes and beliefs of individuals in charge of the hiring process. Hiring authorities may simply discriminate based on race. Such preferences are discriminatory because they are unrelated to the prospective principal's ability and productivity. Sometimes those responsible for principal selection may not have racial preferences for principal candidates, but make decisions based on the preferences of parents, students and/or teachers, who in turn discriminate by race even in the absence of productivity differences. These types of discrimination can be costly because more effective candidates are overlooked and they are likely to increase racial tensions.

Irrationality and prejudice are not the only reasons for harboring racial preferences. Hiring committees, given imperfect information, may use race to make judgments about the abilities of certain groups from previous experiences or gross measures of performance (Arrow, 1971, 1973; Phelps, 1972). Thus, if average differences in quality do exist and hiring authorities do not have full information, they may select principals based on race even if they do not care about the race of the principal. For example, principals from one racial group may be more effective on average, so hiring authorities may be more likely to hire from one group even with no racial prejudice.

Spanning supply and demand explanations, segments of the literature highlight the importance of social interactions and processes outside of the scope of traditional labor market theory. For example, access to mentoring and informal social networks may improve chances for upward mobility within an organization (Cox & Nkomo, 1990). Some contend the shortage of minorities in school leadership is a consequence of minority teachers' lack of mentoring for leadership positions (Brown, 2005; Tillman, 2005). Recent research on informal recruitment mechanisms in an urban district discovers principals are more likely to encourage teachers to

pursue school administration if they share the same race/ethnicity with the teacher (Myung et al., 2011). The study also shows minority teachers are more likely to receive encouragement from their principals to pursue a career in school leadership. Thus, racial differences in access to mentoring and informal recruiting mechanisms may shape the racial composition principal workforce.

In summary, the racial composition of the principal workforce is the product of a complex interaction of social forces. Teachers develop preferences for school leadership by their intrinsic interest and access to information and social networks. School districts also have preferences for school leaders and school constituencies (e.g. parents, student, and teachers) preferences can school district preferences. Racial differences in these factors influence the racial composition of the principal workforce.

## **Data**

We use a combination of national, state, and local data sources to investigate racial differences in the transition from teaching to school leadership. The SASS provides nationally representative demographic information on students, teachers, and principals. Administrative data from the Wisconsin Department of Public Instruction (WDPI) contains staff-level data from 1995 to 2010. We also use unique survey data from a sample of teachers in Milwaukee Public Schools (MPS) to ascertain teachers' preferences for school leadership.

### Schools and Staffing Survey

The National Center for Educational Statistics conducts periodic surveys of schools and school personnel called the Schools and Staffing Surveys. For this study, we use the 2007-08 SASS, which is both nationally, and state representative and is based on a stratified 10 percent probability sample of 9,800 districts and 46,700 schools with high response rates (79 percent of principals, 80 percent of schools, and 84 percent of teachers). For the purposes of this study, we use the online table library to access estimates from demographic survey items including school type and the race/ethnicity of teachers, administrators, and students (NCES, -a, -b, -c).

### State Administrative Data

We acquired administrative records from WDPI for staff persons affiliated with every public school district in Wisconsin. The rich dataset spans 15 years (1994-95 to 2009-10 school years) and provides a detailed account of instructional and non-instructional personnel. The data include demographic information (e.g., age, race, gender, etc.), staff roles (e.g., assistant principal, principal, teacher), experience, education, and school location. The dataset allows us to observe which teachers move into school administration, even if teachers traverse district boundaries. We use these data to describe Wisconsin as a whole as well as Wisconsin's largest school district, Milwaukee Public Schools (MPS).

The state of Wisconsin contains 444 school districts and 2,305 schools. The public education system in Wisconsin enrolls 873,760 students and employs 59,401 teachers. MPS enrolls approximately 82,000 students and employs 5,400 teachers. The comprehensive and longitudinal nature of the data facilitates the examination of the relationship between race and teacher movement into school administration in urban and non-urban environments. In contrast,

SASS provides only one or two years of linked data and does not cover the full teacher workforce, which is the reason we turn to a state-specific sample.

Table 1 presents sample demographic characteristics. Our sample consists of approximately 40,000 teachers. MPS employs a large share of the teachers in Wisconsin with 18 percent observed working in MPS in their first year. In addition, teachers in MPS have lower levels of education than teachers in other parts of the state. For example, approximately 10 percent of teachers in MPS have less than a bachelor's degree compared to one percent of teachers outside MPS, perhaps due to more teachers' aides in MPS, which are included in the teacher figure. Finally, we find regional differences in working conditions with respect to student characteristics. Teachers in MPS tend to work in schools with higher percentages of minority and poor students. For instance, teachers in MPS work in schools averaging 85 percent minority, whereas teachers outside MPS work in schools averaging 15 percent minority students. Moreover, teachers in MPS work in schools where more than three quarters of students (77 percent) are eligible for free or reduced priced meals compared to 25 percent for teachers working in other parts of the state. Parents have some influence on who leads their schools. Higher concentrations of minority students may lead some minority parents to advocate for principals who share their background and cultural experiences.

Table 2 presents sample descriptive statistics disaggregated by race in order to explore racial differences in teacher characteristics and working conditions. We find that black teachers in Milwaukee are more likely to be female than black teachers outside of MPS (73 percent compared to 62 percent). Moreover, black and Hispanic teachers in MPS are less likely to possess a graduate degree than black and Hispanic teachers outside MPS. For example, four percent of black teachers and three percent of Hispanic teachers in MPS possess a masters or

doctorate degree compared to 15 percent of black teachers and 11 percent of Hispanic teachers outside MPS. Finally, we find that Whites teachers experience the highest regional differentials in student characteristics (i.e., race and poverty) than teachers of other races.

### Survey Data

We administered surveys to MPS teachers with the goal of determining their perspectives and experiences in their current roles as well as their aspirations for the future. Due to logistical restraints, we were unable to sample all teachers. Instead, we administered surveys to a random sample of approximately 10 teachers per school. Of the 1,440 teachers surveyed, 1,016 responded to the survey for a response rate of 71 percent.

The teacher survey aims to gauge teacher preferences for school leadership on a variety of dimensions. In order to ascertain teachers' views of school leadership, the survey asks teachers to rate the appeal of different dimensions of the principalship using a Likert scale ranging from “very unappealing” to “very appealing.” Teachers rate the following job dimension: salary, work hours, perceived status, tasks, and responsibilities. We create a composite appeal scale score by averaging teacher's rating across the items. We averaged instead of creating a factor score in order to give equal weight to the individual components.

The teacher survey also probes for teachers' future career goals by asking whether they “plan to do the following at some point in the future” with the job of principal as a response option of interest. However, attitudes and beliefs must accompany actions if a teacher wants to become a principal. Therefore, the survey also asks teachers if they possess an administrative credential or plan to obtain a credential in the future. The state of Wisconsin requires that teachers possess an administrator's license in order to serve as a school administrator, so this



credential is important for MPS teachers planning to become principals. Finally, the teacher survey asks teachers if different constituencies have encouraged or “tapped” them to pursue school leadership. The constituencies include parents, community members, central office staff, and principals.

## **Methods**

### Nationally, what is the representation of racial and ethnic minorities in the principal workforce?

Our investigation into the role of race in the principal pipelines begins with an analysis of the racial composition of the workforce. We use demographic data from the SASS Table Library and Wisconsin Department of Public Instruction to generate descriptive statistics of the share of principals from each racial/ethnic category. In addition, we evaluate the relative representation of minority principals by comparing the racial make-up of principals to that of teachers and students. Finally, we evaluate regional differences by disaggregating the demographic data by state and urbanicity. The results from these simple statistics will answer the first research question and inform our approach to the subsequent research questions.

### To what extent do race and ethnicity predict teachers moving into the principalship and can these differences be explained by other characteristics of teachers or the schools in which they teach?

The descriptive statistics generated from the prior analysis may suggest racial differences in the transition from teaching to school leadership, but observable and unobservable factors may moderate or explain the relationship between a teacher’s race and the probability he or she will become a principal in the future. Therefore, we construct discrete-time hazard models using longitudinal administrative data from Wisconsin to examine whether racial differences in the

likelihood of a teacher becoming a principal can be explained by other factors that might affect the supply and demand for principals of different races.

Bias from censored data may threaten the validity of our hazard models. Under ideal circumstances, estimates for the likelihood of becoming a principal come from teachers we observe from the beginning to end of their careers in education. We eliminate bias due to left censoring by restricting the analysis sample to first-year teachers active between 1994-95 and 2008-09. There is no left censoring because we observe teachers from the beginning of their careers. However, the hazard models remain susceptible to bias from right censoring because our analysis timeline ends after the 2009-10 school year and we are unable to observe the end of the education workforce lifecycle for all teachers. However, the threat of right censoring is minimal because the end of the analysis timeline is independent of the timing of a teacher's decision to pursue school leadership and we observe teachers for up to 15 years. The typical principal has 13 years of teaching experience (NCES, 2008). Thus, we are able to observe a fair amount of teachers in our data become principals.

After restructuring the data to reduce the threat of censoring, we estimate a baseline hazard model (unadjusted for covariates) using parametric and non-parametric specifications. The parametric specification of the hazard model includes a linear and quadratic time variable. The non-parametric model includes dichotomous variables for every time period in the analysis. Both specifications produce hazard estimates, but we prefer to use the more parsimonious quadratic specification assuming relatively equal fit of the models.

Once we determine the baseline specification for modeling transition to the principalship, we estimate hazard functions for each racial group of interest using the sample of first-year teachers of Wisconsin. The hazard functions allow us to plot the probability of becoming a

principal over time for each racial group. These plots allow us to see average racial differences, but they do not account for moderating factors.

Upon selecting a preferred model specification, we estimate the effect of race on the probability of a teacher becoming a principal using hazard models with school, district, and year fixed effects. In particular, we estimate a discrete-time hazard model of becoming a principal for individual  $i$ , in the  $t$ -th year of teaching,  $Y_{it}$ , is the conditional probability of becoming a principal after  $t$  years of teaching or serving in other Wisconsin positions after having starting teaching, given that the individual did not become a principal during the previous  $t$  years of teaching. We estimate the model described by equation 1:

$$\text{logit} [\Pr(Y_{it}= 1)] = \alpha_0 + \alpha_1 \text{time}_t + \alpha_2 (\text{time}_t)^2 + X_i \beta + Z_t \beta + \zeta_s + \varphi_y + \varepsilon_{it} \quad (1)$$

*where*

$\text{time}_t$  is years of teaching experience

$X_i$  is a vector of individual teacher characteristics

$Z_t$  is a vector of time-varying school characteristics

$\zeta_s$  is a district (or school) fixed effect

$\varphi_y$  is a year (or cohort) fixed effect

The vector of individual characteristics from the administrative data allows us to account for some observable characteristics of the teacher (i.e., age, gender, education, and race). The vector of time-varying school characteristics include principal characteristics (i.e., experience, gender, and race), student characteristics (i.e., gender, poverty, and race), and teacher colleague characteristics (i.e., age, experience, gender and race). The district fixed effects account for time-invariant factors associated with districts. In other words, the district fixed effect ensures

that we are comparing black, Hispanic, and white teachers working for the same district and accounts for time-invariant district policies and practices (e.g., residency requirement). We also run a specification check that includes school instead of district fixed effects to determine whether differences in advancement between schools explains racial or ethnic differences. Finally, the year-fixed effects account for factors influencing the probability of becoming a principal that are associated with a given year (e.g., district hiring freezes, fluctuations in principal retirements, and growth in school population).

Once we estimate race coefficients for the full state sample, we include a variable for a teacher's experience in MPS as well as MPS experience-race interactions to determine whether the importance of race varies across context. MPS is the only large urban district in the state and the district enrolls a significant proportion of poor and minority students in the state, thus the role of race might differ from the state as a whole. Finally, we explore the relationship between race and where teachers become principals by estimating competing risk hazard models using multinomial logistic regression where the categories of interests are as follows: remain in teaching, become a principal in MPS, and become a principal in another district.

We report hazard model estimates in two formats. First, we report the results in the form of odds ratio (i.e.,  $p/(1-p)$ ). We obtain these estimates by exponentiating the log odds estimates from logistic regression. The odds ratio provides information about the relative likelihood of an event occurring, but does not provide information about the magnitude of an event's probability. Therefore, we also estimate the average marginal probability which captures the change in probability corresponding with a one-unit change in the independent variable, while holding all over variables constant (at their means). However, estimating marginal probabilities from fixed effects logistic regression models is not ideal because the predicted probability depends on the

group (as defined by the fixed effect). Therefore, we report the average marginal conditional on the fixed effect being zero. In other words, we estimate the average marginal probability over the observed variables and set the fixed effect at the average for the sample.

Where in the pipeline from teaching jobs to the principals do racial or ethnic differences emerge?

We also use the hazard model framework to explore whether racial differences emerge in earlier stages of the principal pipeline. First, we assess whether possessing experience in intermediary positions increases the likelihood of a teacher becoming a principal by incorporating experience variables in the model. Given that we find a positive association between intermediary positions and ascension into the principalship, we model the transition from classroom teaching to intermediary positions (i.e. assistant principals, instructional leaders, and non-instructional leaders) using a discrete-time hazard model with school or district, and year fixed effects, as described in Equation 1. Similarly, we report model estimates in the form of odds ratios and average marginal probabilities.

To what extent do the preferences of early career teachers explain the patterns observed in the pipeline to school leadership?

Estimating hazard models allows us to assess whether race is an important factor in principal labor market outcomes. However, these estimates do not allow us to understand which supply and demand factors act as mechanisms. Racial differences in becoming a principal may be driven by racial differences in the preferences of teachers. Therefore, we examine survey data from MPS to explore why teachers of certain races may be more or less likely to become principals. These factors include the appeal of school leadership, future aspirations, and credential acquisition. The survey data also provides information about which education

constituencies encouraged teachers to pursue school administration. These questions provide some insight into the demand side preferences for school leaders. We test for racial differences in survey responses at various levels of teaching experience. Survey results from more experience teachers are susceptible to bias because some of the more experienced teachers in their cohort have already left to be principals or have been turned down for promotion. Therefore, examining teacher responses at different levels of experience should mitigate bias driven these differences.

## **Results**

### Nationally, what is the representation of racial and ethnic minorities in the principal workforce?

The analysis of demographic data from national, state, and local sources shows variation in the representation of Blacks in the principal workforce. At the national level, 11 percent of principals are black, though the percentage of black principals nearly doubles (21 percent) in urban communities (see Figure 1). In Wisconsin, the share of black principals is five percent and the representation of black principals in Milwaukee is 49 percent. The representation of black principals differs from that of black teachers. The second panel of Figure 1 presents the share of black principals relative to black teachers (i.e. the percentage of black principals minus the percentage of black teachers). At the national level, the share of black principals is four percentage points higher than the share of black teachers, that is more than a 50 percent increase. It is nine percentage-points (75 percent) higher in urban communities. In Wisconsin, the share of black principals relative to teachers is three percentage points (150 percent) higher and 29 percentage points (145 percent) higher in Milwaukee. The share of black principals is higher than the share of black teachers and the difference in representation is much greater in urban

areas. Thus, black principals are relatively *over-represented* in the principal workforce compared to teachers.

The over-representation relative to teachers does not necessarily imply over-representation since a higher proportion of teachers than students are white. The third panel of Figure 1 shows the share of black principals relative to the share of black students (i.e., the percentage of black Principals minus the percentage of black students). The relative share of black principals is negative for all categories of interest. In other words, the representation of black principals is lower than that of students. The United States and Wisconsin both have negative shares of 5 percentage points. The relative share of black urban principals nationwide increases slightly to negative four-percentage points. Milwaukee has the smallest absolute relative share at negative eight percentage points. These relative shares are much smaller than the relative shares for teachers, which range from -8 to -37 percentage points (see Figure 1, panel 4).

Taken together, these results indicate black principals are more representative of the black student population than are black teachers, though still not fully representative. This result is somewhat surprising given that almost all principals are former teachers. In the next sections, we explore the role of race and ethnicity in the transition from teacher to principal.

To what extent do race and ethnicity predict teachers moving into the principalship and are these differences explained by the characteristics of teachers or the schools in which they teach? Do race and ethnicity predict where teachers become principals?

Figure 2a presents the baseline hazard function for a teacher becoming a principal in the Wisconsin using non-parametric and quadratic specifications. The probability of becoming a principal steadily increases upon entry into teaching and reaches its apex after 11 years of

education experience. Thus, teachers have the highest probability of becoming a principal after 11 years. For subsequent hazard model estimates we use the quadratic specification because it accurately and parsimoniously approximates the non-parametric specification.

Estimating the relationship between race and the likelihood of becoming a principal begins with the disaggregation of the baseline hazard model by race. Figure 2b presents the baseline hazard function disaggregated by race. Black teachers have the highest probability of becoming principals throughout the teacher lifecycle. Hispanic teachers have the lowest probabilities and the probabilities for white teachers are situated between the two minority groups. The racial differences in the hazard functions are statistically significant.

The benefit of hazard models relative to simple statistics is that they allow adjustments for covariates. For this analysis, we consider possible covariates that might explain the bivariate relationship between race and ethnicity and transitions to leadership. Table 3 presents maximum likelihood estimates, in the form of odds ratios and average marginal probabilities, from a conditional logistic regression representing the discrete-time hazard model of becoming a principal in Wisconsin. The first specification reports the race coefficients corresponding to the baseline hazard functions depicted in Figure 2b. The second specification builds upon the first specification with the inclusion of controls for individual characteristics (i.e. age, gender, experience, and education) and school characteristics. The remaining specifications incorporate combinations of year, school, and district fixed effects.

The hazard model estimates suggest that black teachers are more likely to become principals than their white peers, even after controlling for teacher characteristics and an assortment of fixed effects. The inclusion of teacher characteristics, school characteristics, and year fixed effects increases the odds ratio from 2.18 to 6.36. The inclusion of district or school



fixed effects produces similar estimates (7.60 and 7.12, respectively). In other words, black teachers are seven times more likely than white teachers to become principals in Wisconsin, when we look within schools or districts and across teachers with other similar characteristics. We also find significant results when we estimate marginal probabilities. The baseline model reveals that black teachers are 1.0 percentage points more likely to become a principal than their white counterparts. The inclusion of school characteristics and years fixed effects produces a significant estimate of 2.0 percentage points. The model specifications with district or school fixed effects produce higher marginal probabilities (assuming the fixed effect is zero) but with less precision resulting statistically insignificant findings. The odds ratios are estimated using all the observations in the sample whereas the marginal probabilities are estimated for a particular group of observations in the sample.

The results from the hazard model also suggest that Hispanic teachers are more likely to become principals than similarly situated white teachers. The baseline specification produces estimates that show Hispanic teachers are 31 percent less likely to become principals than white teachers. The inclusion of individual and school characteristics as well as year controls reverse the direction of the association with Hispanic teachers 2.9 times more likely to become a principal than their white peers. The Hispanic coefficient increases after introducing district fixed effects. However, the Hispanic odds ratio decreases to 2.8 and becomes statistically insignificant when we add school fixed effects to the model. The initial average marginal probability estimate is negative, but becomes positive in subsequent specifications. However, the average marginal estimates for Hispanic teachers are not statically significant across specifications.

In sum, these results suggest that teachers of different races differ systematically by individual or school characteristics associated with the transition from teaching to school administration. Moreover, the increase and stability in the odds ratios with the addition of district and school fixed effects suggests that, on average, black and Hispanic teachers work in environments that put them at a disadvantage for moving into school leadership. Although the average marginal estimates for black and Hispanic teachers appear small, they are, in fact, practically significant when compared with other salient individual characteristics. The magnitude of the black and Hispanic marginal estimates from the preferred specification meet or exceed the estimates for age, gender, and graduate degree.

The results from the hazard models do not support the proposition that race is more salient in MPS for black teachers than in the rest of the state. Table 4 presents results for hazard model specifications that include variables measuring experience in MPS and MPS experience-race interactions. On average, black teachers are between 5 and 8 times more likely to become principals than similarly situated white teachers. However, the black-MPS experience interaction term is not statistically significant. The odd ratios for the black-MPS interactions are around one, but have high standard errors. The lack of statistical power may stem from the fact that in Wisconsin most black teachers are concentrated in MPS, thus leaving few black teachers outside of MPS to serve as a comparison. Thus, we are unable to conclude that black teachers in MPS are as likely to become principals than black teachers in other parts of the state. In contrast to the aforementioned finding, we find some evidence suggesting Hispanic teachers' with experience working in MPS are more likely to become principals. The Hispanic-MPS interaction suggests that the likelihood of becoming a principal increases for Hispanics with more experience in MPS.

The investigation into differential racial effects by experience working in MPS produces mixed findings. We do not find evidence to support the notion that black teachers experience different likelihoods of becoming a principal based on their exposure to MPS. However, we do find some evidence that Hispanic teachers in MPS are more likely to become principals with experience in MPS. It is important to note that Hispanic teachers in MPS are more likely than non-MPS Hispanic teachers to be exposed to Hispanic principals and teachers. Furthermore, the MPS/non-MPS disparity in same-race principals and teachers is greater for Hispanic teachers than teachers of other races. For example, the MPS/non-MPS same-race principal exposure differs by a factor of 13 (38%/3%) for Hispanic teachers, compared to three (61%/22%) for black teachers and two (97%/47%) for white teachers. Moreover, exposure to same-race teachers differ by a factor of four (23.9%/6.8%) for Hispanic teachers, two (32.5/14.9) for black teachers, and one for white teachers. Thus, Hispanic teachers in MPS have exposure to more same-race peers and principals, who may serve as mentors or role models. This may be especially important given that the growing Hispanic population has not reached a critical mass, relative to the black and white populations, in the state.

The previous results report the likelihood of becoming a principal, but they do not take into account where teachers become principals. This concern is compelling because differences in where teachers become principals may confound estimates of racial differences in becoming a principal. For example, if jobs are available in schools where black teachers and not white teachers seek jobs then greater movement among black teachers could be due to demand differences across districts. To address this concern, we estimate competing risk hazard models where teachers have the option of remaining in teaching, becoming a principal in MPS, or becoming a principal outside of MPS. Table 5 presents relative risk ratios and average marginal

probability estimates from a multinomial logistic regression using the statewide sample of teachers. Overall, the relative risk ratios suggest that black teachers are 10 times more likely than white teacher to become a principal in MPS and seven times more likely to become principals outside of MPS. In addition, Hispanic teachers are nine times more likely than their white peers to become a principal in MPS. The model was not able to produce odd ratio estimates for Hispanic teachers likelihood of becoming a principal outside MPS. Overall, the odds ratio results suggest that race is correlated with becoming a principal, but not necessarily where they become principals.

The average marginal estimates from Table 5 do suggest racial differences in where teachers transitions to school leadership. Black teachers are .030 percentage points more likely than white teachers to become a principal in MPS. Whereas, the average marginal estimate for black teachers is 0.32 percentage points for becoming a principal outside MPS. The difference in these estimates suggests that black teachers are even more likely than white teachers become principals outside MPS than within MPS. However, the results from the competing risk model differ for Hispanic teachers. Unlike black teachers, Hispanic teachers are more likely than white teachers to remain in teaching and less likely to become principals outside MPS, but the estimates are statistically significant.

Where in the pipeline from teaching jobs to the principals do racial or ethnic differences emerge?

The previous results support the notion that race is strong predictor of becoming a principal. Yet, it is not clear where in the pipeline racial differences are most salient. In order to explore other stages in the pipeline, we identify teachers with experience as assistant principals

(AP), instructional leaders (IL), and non-instructional leaders (NIL).<sup>1</sup> We run another set of hazard models with variables to account for these prior experiences as well interactions with race. These results, given in Table 6, assess the extent to which racial differences in the transition to the principalship can be explained by racial differences in the transition to prior school leadership posts. We find teachers with experience as an assistant principal or as an instructional leader are more likely to become principals. We do not find statistically significant results for experience as a non-instructional leader. Moreover, we do not find that teachers of different races differentially benefit from these prior experiences. Finally, the addition of prior experience controls appears to attenuate the effect of race suggesting that racial differences in leadership experiences partially but not completely explain racial differences in the transition from teaching to school leadership.

Hazard models of teacher movement into intermediary positions provide evidence that racial differences in leadership experiences contribute to observed racial distributions of principals. We estimate hazard models that predict movement from teaching to intermediary positions (AP, IL, and NIL) for all teachers in the sample. The first panel in Table 7 shows that black teachers are between 6 and 8 times more likely to become an assistant principal compared to white teachers, even after controlling for individual characteristics and fixed effects. The estimates increase slightly from the unconditional model specification with the inclusion of individual characteristics and district fixed effects. However, the largest increase estimates come from the specification with school fixed effects. This change suggests that black teachers are more likely to become APs despite working in schools that are less likely to have teachers become APs. Similarly, we find statistically significant results for Hispanic teachers with point

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<sup>1</sup> IL = { Subject Coordinator, Reading Specialists, Department Head, Teacher In Charge }, NIL = { Business Manager, Guidance Counselor, School, Psychologist, Athletic Coach, Librarian, Media Specialist }

estimates suggesting that they are two to three times more likely than white teachers to become assistant principals. In contrast to black teachers, the results for Hispanic teachers remain relatively stable across model specifications. These racial differences translate into 1.3 percentage points for the black teachers and 0.7 percentage points for Hispanic teachers. We find marginal evidence showing that black teachers are more likely to move into IL positions and no evidence of racial differences in the transition from teaching to NIL positions.

The results from the prior tables show that race is a significant predictor of teacher movement into some intermediary positions. In particular, minority teachers are more likely to possess leadership experiences that may make them appealing principal candidates. However, they tend come from schools that are, on average, less likely to produce leaders.

To what extent do the preferences of early career teachers explain the patterns observed in the pipeline to school leadership?

The previous results provide evidence of racial differences in career trajectories of school leaders. However, we have not been able to distinguish supply and demand factors that account for these racial differences. Here we use survey data from teachers to explore plausible explanations for the differences we find.

To hold a leadership position, candidates have to seek out the job and the hiring authority has to select them. Observing who school leaders are does not tell us the extent to which supply or demand factors drive the placement. However, obtaining an administrative credential is largely a supply-side decision of the candidate as opposed to the employer. The first panel of Table 8 shows proportion of teachers with administrative credentials disaggregated by race. Black teachers are more likely to report having an administrative credential than white teachers.

Twenty-nine percent of black teachers have a credential compared to only 11 percent of white teachers.

An examination of teachers at different stages of their careers reveals a more nuanced understanding of the racial differences in credential acquisition. We find racial differences in credential acquisition among teachers with at most 6 years of teaching experience. In particular, 18 percent of black teachers in this stage of their careers report having a credential compared to 3 percent of white teachers. A teacher with an administrative credential in the early stages of his or her career may send a positive signal to prospective employers and give him/herself more time in the applicant pool, thus increasing the likelihood of becoming a principal.

We also find racial differences in teachers' intent to pursue an administrative credential. Although, some teachers may get obtain an administrative to increase their wages, the intent to pursue an administrative credential provides a signal (albeit fuzzy) of a teacher's desire for school leadership. Our analysis finds a greater proportion of black teachers report currently pursuing a credential than white teachers (10 percent compared to 2 percent). The racial gap in intent widens when examine novice teachers. Among teachers with no more than three years of experience, four percent of white teachers report currently pursuing a credential compared to 22 percent of black teachers and 25 percent of Hispanic teachers. This further supports the supply-side explanation for racial differences in principal labor force exist because black teachers are more likely to desire a career in school administration.

Overall, these results suggest racial differences teacher preferences explain some if not all of the difference in the likelihood that teachers from different races move in leadership positions. The one caveat to this conclusion is that teachers may not seek out administrative credentials if they do not think they can be hired, so this analysis may not isolate the supply-side

effect. To further explore this possibility, we examine the career aspirations of novice teachers, before they are likely to have a sense of the preferences of hiring authorities.

Disposition or a preference for school administration is another factor that contributes to a teacher's decision to pursue a credential and to apply for a school administrative position. Table 8 presents survey results from questions about teachers' future career aspirations. Among novice teachers, black teachers are more likely to express explicit interest in becoming a principal or assistant principal. Approximately 25 percent of black teachers expressed interest in becoming a principal whereas only 13 percent of white teachers expressed interest. Similarly, 33 percent of novice black teachers and 13 percent of novice white teachers expressed interest in the position of assistant principal.

Black teachers are also more likely to find specific aspects of the principalship appealing. Table 8 presents results of a job appeal measure derived from survey questions that gauge teachers' perceptions of the different aspects of the school administration. Overall, black teachers find the job of principal more appealing than their white peers. Similar differences exist when the sample includes teachers with 10 years or less of experience. However, we find no racial differences for teachers in the earliest stage of their careers (0-3 years).

There are two possible conclusions to derive from these results regarding aspirations for school leadership. First, white and black teachers begin teaching with similar interests in the principalship, but white teachers become relatively less interested in the job. The results from the appeal of job characteristics support this hypothesis. Alternatively, white teachers gain information about their lower likelihood of obtaining leadership positions, so they lose interest.

Encouragement from colleagues, parents, and district leaders may increase the probability of pursuing a career in school administration. Moreover, tapping may transfer valuable



information to prospective principals that make more viable job candidates. Table 9 presents survey results of the proportion of teachers reporting tapping. Interestingly, there is no statistically significant racial difference in the proportion of teachers reporting being tapped by their principal or assistant principal and the differences in the sample are small especially for teachers with six or fewer years of experience. These results provide evidence that racial differences in leadership are not driven by differences in encouragement to pursue leadership by teachers' principals.

Tapping can also occur from sources outside of the school. Overall, black teachers are about twice as likely to be tapped by staff from other schools than their white counterparts (36 percent versus 17 percent). They are also more likely than white teachers to report being tapped by central office staff (17 percent versus 8 percent). The racial difference in tapping conducted by central office staff is also statistically significant for teachers early in their careers (0 – 3 years). Parents and community members are an additional source of tapping. Black teachers experience more tapping by parents and community members than white teachers. Nearly one-third (32 percent) of black teachers, compared with 13 percent of white teachers, report tapping from a parent in their school. Similar proportions of teachers report tapping from a community member. These results suggest that black teachers receive more encouragement to pursue school administration than their white peers.

Overall, the survey results indicate that both teachers' preferences and teachers' access to jobs drive the large racial differences that we see in the transition from teaching to school leadership. Racial differences in teacher preferences are greater after their first few years of teaching suggesting that some of the demand difference may influence teachers' expressed preferences.

## **Discussion**

This paper contributes to the emerging literature on principal labor markets by systematically exploring how race influences the transition from teaching to school leadership. Prior empirical studies on access to school leadership positions have tended to focus on gender and those concentrating on race do not employ large-scale, longitudinal administrative data. Moreover, this study is one of the first to explore racial differences in teachers' preferences for school leadership.

Demographic data from the analysis show an overrepresentation of minority principals compared to teachers, though there is still an underrepresentation compared to the student population. Our analysis suggests that among similar teachers in the same school black teachers are up to ten times more likely to move into leadership positions.

The statistical analyses generated from administrative and survey data strongly suggest that race is an important factor in the transition from teaching to school administration. National and local data show that the racial composition of principals is more representative of the student population than the racial composition of teachers. Estimates from discrete-time hazard models find that, in Wisconsin, black teachers are more likely than their white peers to ascend into the role of principal. Prior leadership experience as an assistant principal or instructional leader dampens the racial effect, but race remains a strong predictor of becoming a principal. Furthermore, race is a key determinant of movement into intermediary school positions that are highly predictive of becoming a principal. Teacher survey data provide possible explanations for the observed racial differences. Black teachers are more likely than white teachers to possess an administrative credential or to indicate that they are pursuing one. Black teachers also are more

likely than white teachers to express interest in school leadership and find the job of principal more appealing. Finally, black teachers are more likely to receive encouragement to pursue the school leadership.

Whether these racial differences are beneficial or detrimental is not clear. Either scenario is plausible. The differences are beneficial if they improve student performance. For example, minority principals may serve as role models for minority students or enhance the effectiveness of school policy and practices (e.g. disciplinary procedures and instructional practices), especially minority students. Moreover, principals interact with various constituencies including staff, students, parents, and community members. Minority principals may strengthen the school's relationships with these groups by exploiting shared cultural experiences. On the other hand, racial differences in the transition from teaching to school leadership could be detrimental if they interfere with student performance. For example, the lower likelihood of moving into school leadership may induce or amplify racial tensions among school staff, lowering teacher effectiveness. Finally, these racial differences may hamper the recruitment and retention of highly qualified and effective teachers who may leave a school or district in pursuit of working conditions that provide more opportunity for advancement.

A first step in understanding racial differences in transitions is distinguishing the preferences of teachers or candidates from the preferences of employers. In this paper, we found that black teachers express greater preferences for leadership positions than do white teachers suggesting supply-side factors explain some of the differences in transitions. However, differences in preferences appear to increase with teacher experience possibly indicating that processes or culture associated with school leadership is relatively more appealing to black teachers. As an indication of this, while black teachers are no more likely to report being

encouraged by their principal to pursue school leadership positions, they are more likely to report being encouraged by other groups including central office staff, community members and parents. Surveys have some disadvantages for distinguishing supply from demand, since the data are self-reports, which can be biased. Future studies could also examine which teachers actually apply to principal positions and which ones were accepted to further distinguish supply from demand. Audit studies and information experiments could also add to our understanding of race and employer preferences.

If the demand for black principals is based on the belief that their presence is productive for schools, then future research should test the validity of such claims. In particular, future research could explore whether race serves as a proxy for leadership traits or attributes that may be beneficial for minority students. Further research is needed to deconstruct race and uncover potential cultural dimensions of school leadership.

If future research supports supply side explanations for racial differences in movement into school leadership positions, then a deeper exploration of this phenomenon may have implications for increasing diversity in management in other sectors. Moreover, future research must work its way up the organization chart to determine if the racial composition of minority principals translates into similar racial representation in central office positions. Finally, we need to understand how teacher preferences for school leadership evolve upon entry into teaching. In particular, we need to understand how financial and familial factors shape preferences for school leadership.

Understanding the factors that drive racial differences do not provide clear guidance on the full effects of racial differences. Even if racial differences are based on effectiveness, differential advancement could affect working conditions for teachers and differentially impact

groups of teachers. Further work exploring the effects could provide greater insights into the long-run effects (both good and bad) of the phenomenon.

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Figure 1: The Shares of Black Principals, Teachers, and Students

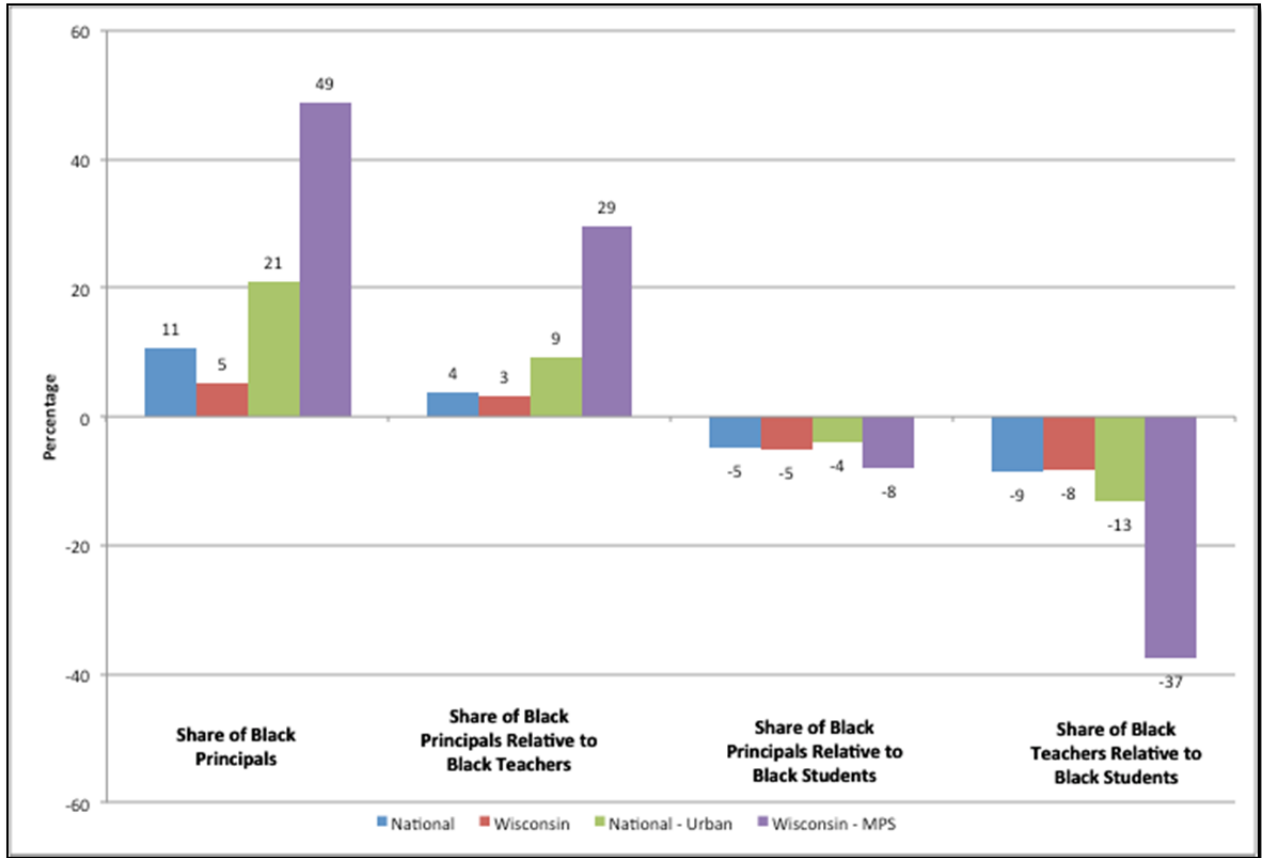




Figure 2a: Baseline Hazard Model for Becoming a Principal

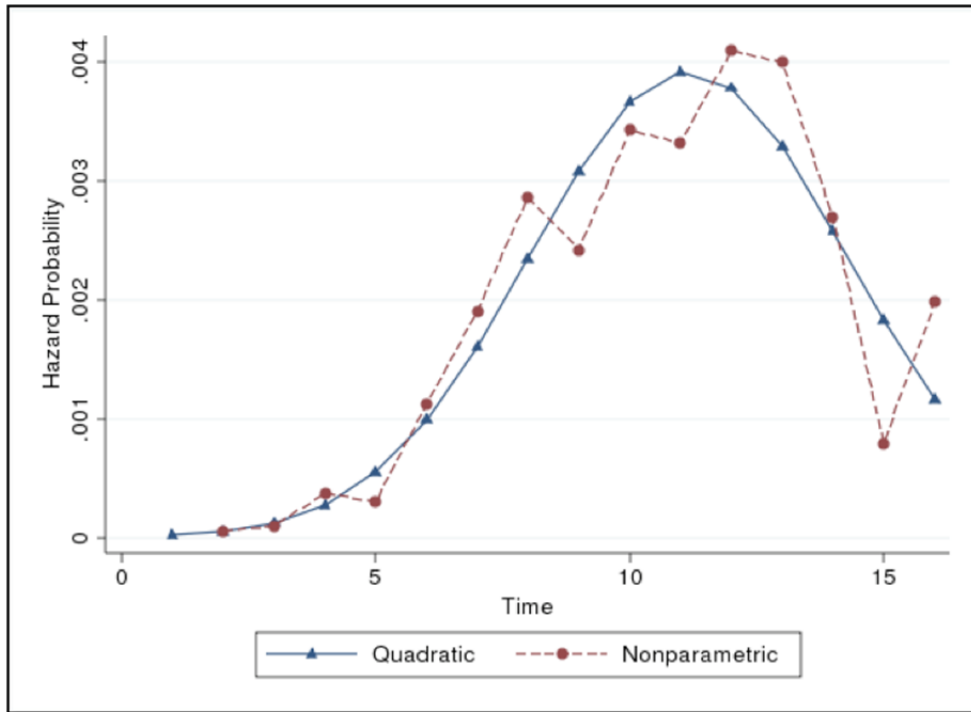
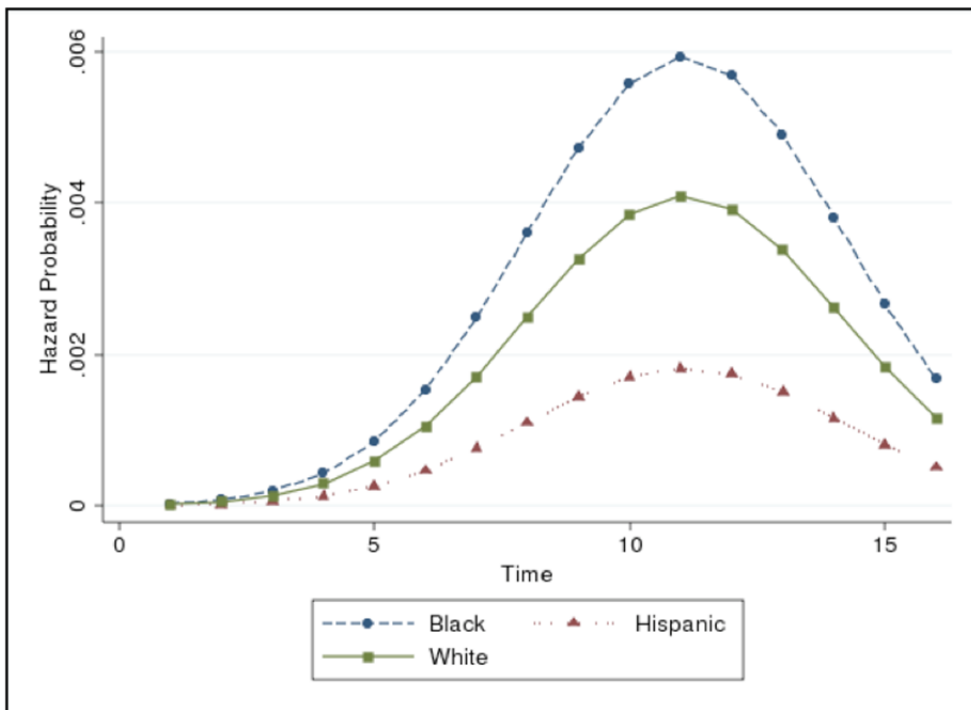


Figure 2b: Baseline Hazard Function by Race



**Table 1: Teacher Sample Characteristics**

	Wisconsin	MPS	Non-MPS
Sample Size	39,795	6,992	32,803
<b>Individual Characteristics</b>			
Asian	1%	2%	1%
Black	4%	19%	1%
Hispanic	2%	6%	1%
White	93%	72%	97%
Female	73%	73%	73%
High School	2%	10%	1%
Associates	<1%	<1%	<1%
Bachelors	87%	69%	91%
Masters	6%	5%	6%
Doctorate	<1%	<1%	<1%
Other Degree	1%	5%	1%
Missing Degree	3%	12%	1%
Mean Age (Std Dev)	30.1 (8.2)	32.7 (9.2)	29.6 (7.9)
<b>Characteristics of Supervising Principals</b>			
Black	11%	49%	3%
Hispanic	2%	8%	<1%
White	87%	44%	97%
Female	40%	61%	35%
Mean Experience in Ed (Std Dev)	21.2 (9.2)	23.4 (8.2)	20.7 (9.3)
<b>Characteristics of Teacher Colleagues</b>			
Mean % Black (Std Dev)	4.5 (10.9)	22.0 (15.3)	0.8 (3.7)
Mean % Hispanic (Std Dev)	1.5 (5.2)	5.7 (10.5)	0.6 (2.2)
Mean % White (Std Dev)	93.1 (13.2)	70.4 (15.0)	98.0 (5.5)
Mean % Female (Std Dev)	71.2 (17.9)	73.6 (15.1)	70.7 (18.3)
Mean Experience in Ed (Std Dev)	13.1 (3.6)	9.7 (3.5)	13.8 (3.2)
<b>School-Level Characteristics</b>			
Mean % Black Pupils (Std Dev)	15.2 (27.9)	64.1 (31.3)	5.4 (12.7)
Mean % Hispanic Pupils (Std Dev)	6.9 (13.7)	17.1 (26.2)	4.8 (7.9)
Mean % White Pupils (Std Dev)	73.1 (32.0)	14.2 (14.4)	85.0 (18.6)
Mean % Poor Pupils (Std Dev)	33.4 (25.6)	77.1 (12.9)	24.7 (17.3)
Elementary	46%	59%	44%
Middle	21%	18%	21%
High	32%	20%	34%
Combined	1%	4%	1%

**Table 2: Teacher Sample Characteristics by Race and Region**

	Black MPS	Black Non-MPS	Hispanic MPS	Hispanic Non-MPS	White MPS	White Non-MPS
Sample Size	1,310	293	446	301	5,056	31,869
<b>Individual Characteristics</b>						
Female	73%	62%	72%	73%	73%	73%
High School	11%	1%	11%	<1%	9%	1%
Associates	0%	0%	0%	0%	<1%	<1%
Bachelors	55%	81%	65%	87%	73%	92%
Masters	4%	15%	3%	11%	5%	6%
Doctorate	<1%	0%	0%	<1%	<1%	<1%
Other Degree	6%	3%	6%	1%	4%	1%
Missing Degree	24%	0%	15%	0%	9%	1%
Mean Age	35.0	33.3	34.5	33.3	31.9	29.5
(Std Dev)	(9.3)	(9.4)	(8.3)	(8.4)	(9.1)	(7.9)
<b>Characteristics of Supervising Principals</b>						
Black	61%	22%	21%	10%	48%	2%
Hispanic	3%	2%	38%	3%	7%	<1%
White	36%	75%	45%	87%	47%	97%
Female	57%	41%	67%	46%	62%	35%
Mean Prin. Exp in	23.4	20.2	22.1	20.8	23.5	20.7
Ed (Std Dev)	(8.6)	(9.1)	(8.6)	(9.1)	(8.0)	(9.3)
<b>Characteristics of Teacher Colleagues</b>						
Mean % Black	32.5	14.9	12.0	2.6	20.2	0.7
(Std Dev)	(18.2)	(21.1)	(11.6)	(6.9)	(13.4)	(2.7)
Mean % Hispanic	2.7	1.8	23.9	6.8	4.9	0.5
(Std Dev)	(5.2)	(3.6)	(17.4)	(7.8)	(9.2)	(1.9)
Mean % White	63.2	81.8	62.1	89.4	73.0	98.3
(Std Dev)	(17.8)	(21.8)	(13.2)	(11.0)	(13.4)	(4.3)
Mean % Female	71.8	73.0	75.5	73.3	73.9	70.7
(Std Dev)	(13.6)	(16.4)	(13.8)	(17.0)	(15.6)	(18.4)
Mean Exp in Ed	9.5	11.6	9.4	12.6	9.7	13.8
(Std Dev)	(3.5)	(4.3)	(3.5)	(3.6)	(3.5)	(3.5)
<b>School-Level Characteristics</b>						
Mean % Female	48.3	47.9	49.7	48.5	48.7	48.3
Pupils (Std Dev)	(4.9)	(6.3)	(3.5)	(3.3)	(5.7)	(3.4)
Mean % Asian	3.2	2.6	2.9	3.9	3.9	3.1
Pupils (Std Dev)	(4.1)	(4.3)	(4.3)	(4.9)	(5.2)	(4.9)
Mean % Black	78.7	41.3	29.6	14.6	63.6	4.9
Pupils (Std Dev)	(22.8)	(37.2)	(27.4)	(16.6)	(31.0)	(11.6)
Mean % Hispanic	6.8	9.0	54.4	17.9	16.4	4.6
Pupils (Std Dev)	(13.0)	(10.3)	(32.0)	(19.3)	(25.2)	(7.5)
Mean % White	10.7	46.2	12.1	62.5	15.3	85.8
Pupils (Std Dev)	(13.2)	(33.1)	(11.6)	(26.6)	(16.1)	(17.5)
Mean % Poor	77.7	37.6	79.0	39.0	76.8	24.4
Pupils (Std Dev)	(10.6)	(23.4)	(12.8)	(23.2)	(13.4)	(16.9)
Elementary	47%	53%	65%	46%	61%	44%
Middle	33%	19%	14%	23%	14%	21%
High	17%	24%	17%	30%	21%	34%
Combined	3%	4%	4%	<1%	4%	1%

**Table 3: Estimates from Principal Hazard Model**

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Odds Ratio				Average Marginal Probability (Conditional on Fixed Effect = 0)			
Time	3.3427*** [0.4170]	2.9974*** [0.4410]	3.0835*** [0.4895]	3.1988*** [0.5320]	0.0031*** [0.0002]	0.0030*** [0.0003]	0.0389 [0.0452]	0.0555 [0.0350]
Time <sup>2</sup>	0.9489*** [0.0065]	0.9567*** [0.0075]	0.9561*** [0.0081]	0.9535*** [0.0084]				
Black	2.1786*** [0.4833]	6.3602*** [2.4119]	7.5960*** [3.3652]	7.1199*** [3.4172]	0.0101*** [0.0029]	0.0198*** [0.0041]	0.1483 [0.1128]	0.1377 [0.1177]
Hispanic	0.687 [0.3505]	2.8899+ [1.7783]	4.1532* [2.9097]	2.7583 [2.2930]	-0.0048 [0.0066]	0.0113+ [0.0066]	0.1042 [0.0920]	0.0712 [0.0811]
Age		0.9229*** [0.0135]	0.9281*** [0.0148]	0.9269*** [0.0154]		-0.0009*** [0.0002]	-0.0055 [0.0040]	-0.0053 [0.0045]
Female		0.1900*** [0.0309]	0.1769*** [0.0323]	0.1788*** [0.0347]		-0.0178*** [0.0018]	-0.1267 [0.0910]	-0.1208 [0.0998]
Graduate Degree		7.8349*** [1.4294]	11.5680*** [2.3969]	13.1408*** [2.9020]		0.0220*** [0.0021]	0.1791 [0.1281]	0.1807 [0.1486]
School Characteristics		X	X	X		X	X	X
Year Indicator Variables		X	X	X		X	X	X
District Fixed Effects			X				X	
School Fixed Effects				X				X
N	20,187	20,187	20,187	20,187	20,187	20,187	20,187	20,187
Pseudo R <sup>2</sup>	0.15	0.41	0.52	0.57				

**Table 4: Estimates from Principal Hazard Model with MPS Experience Controls**

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Odds Ratio				Average Marginal Probability (Conditional on Fixed Effect = 0)			
Time	3.4462*** [0.4333]	2.9944*** [0.4441]	3.0893*** [0.4970]	3.2202*** [0.5466]	0.0032*** [0.0002]	0.0030*** [0.0003]	0.0699*** [0.0081]	0.031 [0.0570]
Time <sup>2</sup>	0.9478*** [0.0066]	0.9563*** [0.0075]	0.9549*** [0.0082]	0.9520*** [0.0086]				
Black	5.1226*** [2.0782]	7.3165*** [3.7608]	7.7655*** [4.6792]	8.0548*** [4.9439]	0.0207*** [0.0048]	0.0210*** [0.0050]	0.1960** [0.0668]	0.0724 [0.1525]
Hispanic	0.1794 [0.2619]	0.432 [0.6354]	0.4526 [0.7549]	0.2737 [0.6814]	-0.0186 [0.0169]	-0.0059 [0.0142]	-0.0588 [0.1493]	-0.0409 [0.1186]
MPS Experience	0.9021** [0.0332]	1.0759 [0.0552]	1.2179** [0.0869]	1.2125* [0.0912]	-0.0013** [0.0004]	0.0008 [0.0005]	0.0194** [0.0074]	0.007 [0.0145]
Black * MPS Experience	0.9714 [0.0638]	0.9762 [0.0735]	1.041 [0.0941]	0.9994 [0.0961]				
Hispanic * MPS Experience	1.3025+ [0.2051]	1.3312+ [0.2291]	1.4082+ [0.2804]	1.3539 [0.4063]				
Age		0.9240*** [0.0136]	0.9300*** [0.0147]	0.9276*** [0.0156]		-0.0008*** [0.0002]	-0.0069** [0.0021]	-0.0026 [0.0055]
Female		0.1886*** [0.0307]	0.1741*** [0.0319]	0.1758*** [0.0342]		-0.0178*** [0.0018]	-0.1656*** [0.0370]	-0.0604 [0.1256]
Graduate Degree		7.7331*** [1.4094]	11.3522*** [2.3610]	12.9485*** [2.8665]		0.0218*** [0.0021]	0.2301*** [0.0497]	0.0889 [0.1849]
Year Fixed Effects		X	X	X		X	X	X
District Fixed Effects			X				X	
School Fixed Effects				X				X
N	20,187	20,187	20,187	20,187	20,187	20,187	20,187	20,187
Pseudo R <sup>2</sup>	0.16	0.41	0.52	0.57				

**Table 5: Estimates from Principal Competing Risks Hazard Model**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Remain in Teaching			Become Principal in MPS			Become Principal Outside MPS		
	Odds Ratio								
Time				6.4842**	4.7099+	4.7324+	3.2129***	2.9317***	2.9759***
				[4.6406]	[4.2849]	[4.2081]	[0.4024]	[0.4313]	[0.4421]
Time <sup>2</sup>		Base Category		0.9272*	0.9453	0.9272*	0.9453	0.9448	0.9503***
				[0.0328]	[0.0432]	[0.0424]	[0.0066]	[0.0075]	[0.0076]
Black					9.3155**	9.7399**	0.7695	7.5456***	7.2029***
					[6.4841]	[6.9498]	[0.2489]	[3.4184]	[3.2408]
Hispanic					7.9046*	8.5599*			
					[8.2176]	[8.8003]			
	Average Marginal Probability								
Time	-0.0006***	-0.0005***	-0.0005***	0.0000***	0.0001**	0.0001**	0.0004***	0.0004***	0.0004***
	[0.0000]	[0.0001]	[0.0001]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Black	-0.0019**	-0.0039***	-0.0038***	0.0006***	0.0003**	0.0003**	-0.0005	0.0032***	0.0031***
	[0.0007]	[0.0008]	[0.0008]	[0.0002]	[0.0001]	[0.0001]	[0.0006]	[0.0007]	[0.0007]
Hispanic	0.0243	0.0211	0.0215	0.0006	0.0003	0.0003	-0.0261	-0.0215	-0.022
	[1.4474]	[2.0861]	[2.4770]	[0.0006]	[0.0047]	[0.0054]	[1.4279]	[2.0679]	[2.4553]
Individual Characteristics		X	X		X	X		X	X
School Characteristics		X	X		X	X		X	X
Year Indicator Variables		X	X		X	X		X	X
Regional Indicator Variables			X			X			X
N	144,180	144,180	144,180	144,180	144,180	144,180	144,180	144,180	144,180
Pseudo R <sup>2</sup>				0.13	0.42	0.43	0.13	0.42	0.43

**Table 6: Estimates from Principal Hazard Model with Prior Experience Controls**

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Odds Ratio				Average Marginal Probability			Average Marginal Probability Conditional on Fixed Effect = 0
Time	3.2955*** [0.4059]	2.2398*** [0.2891]	2.2436*** [0.2913]	2.6354*** [0.4031]	0.0006*** [0.0000]	0.0003*** [0.0001]	0.0003*** [0.0001]	0.0473+ [0.0285]
Time <sup>2</sup>	0.9500*** [0.0064]	0.9643*** [0.0070]	0.9645*** [0.0070]	0.9594*** [0.0082]				
Black	1.2886 [0.2771]	3.6291** [1.5933]	4.7271** [2.3328]	4.6773** [2.4620]	0.0007 [0.0006]	0.0024** [0.0008]	0.0030*** [0.0009]	0.0493 [4.9199]
Hispanic	0.5331 [0.2692]	3.9464* [2.5905]	1.4152 [1.6122]	2.4801 [2.8725]	-0.0016 [0.0013]	0.0026* [0.0012]	0.0014 [0.0019]	-0.0073 [99.9152]
Age		0.9330*** [0.0139]	0.9312*** [0.0142]	0.9291*** [0.0157]		-0.0001*** [0.0000]	-0.0001*** [0.0000]	-0.0052 [0.0043]
Female		0.2403*** [0.0407]	0.2379*** [0.0404]	0.2204*** [0.0423]		-0.0026*** [0.0003]	-0.0027*** [0.0003]	-0.1078 [0.0839]
Graduate Degree		6.0746*** [1.1611]	6.1067*** [1.1753]	9.8592*** [2.2084]		0.0034*** [0.0004]	0.0034*** [0.0004]	0.1632 [0.1276]
AP Experience		3.8596*** [0.2732]	3.8155*** [0.2847]	5.3578*** [0.5862]		0.0025*** [0.0002]	0.0025*** [0.0002]	0.1195 [0.0928]
AP Experience * Black			0.8166 [0.1787]	0.6635 [0.1664]				
AP Experience * Hispanic			2.4159+ [1.1149]	2.023 [1.0062]				
IL Experience		1.7530*** [0.1859]	1.7096*** [0.1901]	1.6952*** [0.2338]		0.0010*** [0.0002]	0.0012*** [0.0002]	0.0442 [0.0394]
IL Experience * Black			4.4502+ [3.7388]	5.675 [6.4800]				
NIL Experience		1.1572* [0.0747]	1.1547* [0.0747]	1.0427 [0.0863]		0.0003* [0.0001]	0.0003* [0.0001]	-0.0688 [37.2485]
Prior Experience Controls		X	X	X		X	X	X
Prior Experience-Race Interactions			X	X			X	X
Year Fixed Effects				X				X
District Fixed Effects				X				X
N	104,280	104,280	104,169	104,280	104,280	104,280	104,169	104,280
Pseudo R <sup>2</sup>	0.12	0.52	0.53	0.64				

**Table 7: Estimates from Intermediary Position Hazard Models**

		(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
		Odds Ratio				Average Marginal Probability		Average Marginal Probability Conditional on Fixed Effect = 0	
AP	Black	2.7968*** [0.4170]	5.9104*** [1.4201]	6.0853*** [1.5292]	7.9354*** [2.1072]	0.0077*** [0.0012]	0.0128*** [0.0018]	0.1234 [0.1590]	0.2703** [0.1008]
	Hispanic	0.9879 [0.3378]	2.4629* [0.9564]	2.6033* [1.0318]	2.3908* [1.0504]	-0.0001 [0.0026]	0.0065* [0.0028]	0.0654 [0.0883]	0.1137 [0.0695]
	N	39,660	39,660	39,660	39,660	39,660	39,660	39,660	39,660
	Pseudo R <sup>2</sup>	0.10	0.23	0.26	0.29				
	IL	Black	1.3812 [0.7999]	4.3710+ [3.7564]	5.1704+ [4.8738]		0.0002 [0.0003]	0.0012 [0.0008]	0.0028 [0.0211]
	N	31,670	18,669	33,674					
	Pseudo R <sup>2</sup>	0.03	0.31	0.41					
NIL	Black	1.0318 [0.3005]	1.4974 [0.5175]	1.4251 [0.5011]	1.3248 [0.4853]	0.0004 [0.0033]	0.0045 [0.0039]	0.0426 [0.0942]	
	Hispanic	1.2514 [0.5249]	1.838 [0.8466]	1.76 [0.8271]	2.2196 [1.1150]	0.0025 [0.0047]	0.0068 [0.0052]	0.068 [0.1460]	
	N	15,225	15,225	15,225	15,225	15,225	15,225	15,225	15,225
	Pseudo R <sup>2</sup>	0.01	0.04	0.06	0.06				
		School Characteristics		X	X	X		X	X
	Year Fixed Effects		X	X	X		X	X	X
	District Fixed Effects			X				X	
	School Fixed Effects				X				X



**Table 8: MPS Teacher Survey Responses Regarding Preparation and Aspirations for School Leadership by Experience**

	All Teachers			0-3 years			0-6 years			0-10 years		
Admin Cred.	Black (N=125) 29%	Hisp (N=51) 22%	White (N=633) 11%	Black (N=11) 9%	Hisp (N=4) 0%	White (N=54) 2%	Black (N=22) 18%	Hisp (N=11) 18%	White (N=118) 3%	Black (N=46) 28%	Hisp (N=25) 20%	White (N=257) 9%
	pvalue = .000			pvalue = .573			pvalue = .008			pvalue = .003		
Seek Admin Cred.	Black (N=80) 10%	Hisp (N=39) 5%	White (N=534) 2%	Black (N=9) 22%	Hisp (N=4) 25%	White (N=52) 4%	Black (N=16) 13%	Hisp (N=9) 11%	White (N=112) 4%	Black (N=30) 10%	Hisp (N=20) 10%	White (N=225) 3%
	pvalue = .000			pvalue = .103			pvalue = .139			pvalue = .026		
AP	Black (N=128) 36%	Hisp (N=51) 25%	White (N=644) 11%	Black (N=12) 33%	Hisp (N=4) 50%	White (N=55) 13%	Black (N=23) 30%	Hisp (N=11) 55%	White (N=119) 11%	Black (N=47) 43%	Hisp (N=25) 44%	White (N=258) 12%
	pvalue = .000			pvalue = .090			pvalue = .000			pvalue = .000		
Prin.	Black (N=128) 29%	Hisp (N=51) 24%	White (N=644) 9%	Black (N=12) 25%	Hisp (N=4) 0%	White (N=55) 13%	Black (N=23) 22%	Hisp (N=11) 27%	White (N=119) 13%	Black (N=47) 34%	Hisp (N=25) 36%	White (N=258) 12%
	pvalue = .000			pvalue = .479			pvalue = .333			pvalue = .000		
Job Appeal	Black (N=142) 27.2	Hisp (N=53) 29.2	White (N=685) 22.5	Black (N=15) 24.3	Hisp (N=4) 30.5	White (N=65) 21.4	Black (N=16) 24.7	Hisp (N=10) 33.2	White (N=100) 22.7	Black (N=111) 27.9	Hisp (N=39) 28.0	White (N=520) 22.6
	pvalue = .000			pvalue = .491			pvalue = .059			pvalue = .000		

DRAFT - Race and the Principal Pipeline

**Table 9: MPS Teacher Survey Responses Regarding Informal Recruiting by Experience Categories**

	All Teachers			0-3 years			0-6 years			0-10 years		
	Black (N=142)	Hispanic (N=53)	White (N=685)	Black (N=15)	Hispanic (N=4)	White (N=65)	Black (N=27)	Hispanic (N=11)	White (N=135)	Black (N=55)	Hispanic (N=25)	White (N=280)
Tapped by Principal	22%	19%	15%	0%	25%	3%	4%	9%	6%	20%	20%	2%
	pvalue = .423			pvalue = .100			pvalue = .874			pvalue = .257		
Tapped by AP	11%	13%	7%	0%	25%	5%	7%	18%	7%	9%	24%	6%
	pvalue = .318			pvalue = .198			pvalue = .511			pvalue = .018		
Tapped by teacher at your school	50%	43%	30%	7%	25%	14%	11%	45%	24%	29%	40%	25%
	pvalue = .000			pvalue = .669			pvalue = .086			pvalue = .344		
Tapped by Staff from another school	36%	30%	17%	0%	0%	6%	4%	27%	5%	24%	28%	11%
	pvalue = .000			pvalue = .701			pvalue = .027			pvalue = .022		
Tapped by someone from Central Office	17%	21%	8%	13%	25%	2%	11%	18%	3%	11%	16%	4%
	pvalue = .001			pvalue = .047			pvalue = .060			pvalue = .062		
Tapped by Parent at Your School	32%	23%	13%	0%	0%	5%	7%	18%	6%	24%	28%	10%
	pvalue = .000			pvalue = .789			pvalue = .248			pvalue = .000		
Tapped by Community Member (not a parent)	36%	17%	12%	7%	0%	9%	15%	27%	10%	24%	24%	10%
	pvalue = .000			pvalue = .856			pvalue = .259			pvalue = .012		