

# Prejudice and Racial Matches in Employment\*

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## Abstract

We develop a search model in which some employers hold unobservable racial prejudice. Workers observe their potential supervisor's race, which acts a signal of the firm's prejudice. Black workers are thus willing to accept employment with lower expected match quality from firms with black supervisors. Because black workers are unlikely to face prejudice-based termination, these jobs hold higher option value. We derive predictions on the differences in observed wages and job stability across supervisor race and rates of prejudice. We find empirical support for our predictions using a unique longitudinal dataset that includes information on the worker's supervisor race matched with state-level measures of prejudice.

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# 1 Introduction

In this paper, we develop a new theoretical explanation for black and white differences in wages and unemployment in the U.S. based on workers' imperfect information about employer's prejudice. We depart from most of the recent work in this area of research which has focused on the role of pre-market skills or uncertainty about workers' productivity or training. In our model, some employers hold prejudice towards black workers, yet workers do not observe employers' prejudice. They do, however, observe the race of their potential supervisor upon randomly matching with an employer in job search, which serves as a signal of the employer's underlying prejudice. Because unprejudiced firms offer a lower chance of involuntary separation after hiring, black workers are willing to take a lower wage to work for an employer with a black supervisor. In other words, unprejudiced firms offer black workers jobs with higher option value than those offered by prejudiced firms. Our model offers several unique predictions on the relation among wages, job stability, supervisor race, and levels of prejudice. We test these theoretical predictions using a unique longitudinal dataset, which includes information on the supervisor's race and the prevailing level of prejudice in the local labor market, and find empirical support for the predictions of our model.

Racial disparities in the U.S. labor market are well-documented. In the 2000s, year-round full-time employed black men earned less than 80% of that earned by white men and faced more than double the rate of unemployment (Lang and Lehmann, 2012). A substantial portion of this wage gap can be attributed to differences in skill. In their seminal paper, Neal and Johnson (1996) find that after controlling for age and performance on the Armed Forces Qualifying Test (AFQT), the black-white wage gap reduces to modest level of 7%.<sup>1</sup>Motivated by the findings in Neal and Johnson (1996), researchers in recent years have largely focused on premarket factors and statistical discrimination as explanations for the observed racial

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<sup>1</sup>See also Black et. al (2006), who find no wage gap for black men born outside the South to parents with more than a high school degree and Carruthers and Wanamaker (2013) who find that 83% of the earnings gap in 1940 can be explained by pre-market differences in education.

disparities in the labor market.<sup>2</sup>

While undeniably important, skill differences alone seem insufficient to explain racial disparities. The original Neal and Johnson (1996) result has been tempered by subsequent research controlling for additional predictors of wage. For example, Carneiro, Heckman, and Masterov (2005) find that adjusting for years of schooling at the time of the AFQT testing lead to the reemergence of a substantial racial wage gap. Additionally, Lang and Manove (2011) show that after accounting for both education and cognitive test scores, a sizable wage gap resurfaces. Moreover, Lang and Manove (2011), Bjerk (2006), and Black et al. (2006) find additional variation in the size of the wage gap and the role of observable skill differences as an explanation for wage differentials across education levels and type of jobs. In particular, Bjerk (2006) show that observable measures of skills can explain the black-white wage gap in white-collar jobs, there remains a significant unexplained differential in blue-collar jobs. Furthermore, substantially less attention has been paid to racial gaps in employment and unemployment compared to wage differentials between black and white workers, despite the fact that the size of the unexplained employment gap is substantially larger (e.g., Stratton 1992, Johnson and Neal 1998, Ritter and Taylor 2011). The existence of significant unexplained black-white differentials in employment suggests that better understanding the factors behind racially varying frictions in job search is an important task.

Our work builds on the taste-based discrimination framework that dates to Becker (1971). In Becker's seminal work, some employers hold prejudice against black workers who are unwilling to employ blacks at the same wages as whites. Becker shows, interestingly, that in a perfectly competitive labor market, prejudice *does not* cause wage differences, provided there are enough unprejudiced employers in the labor market to provide employment to the black workers. Instead, Becker predicts perfect segregation but no wage differential: all black workers will work for unprejudiced employers at the same wages as those paid by prejudiced

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<sup>2</sup>For example, there has been and long and recent debate over when the black-white test gap emerges. See, for example, Fryer and Levitt (2004, 2006), Fryer (2011), and Bond and Lang (2013). In fact, Fryer subtitles his handbook chapter on the subject "The Declining Significance of Discrimination."

employers to whites. Subsequent research have shown that wage differentials can persist when there are search frictions (e.g., Black 1995, Bowlus and Eckstein 2002, Rosen 1997). A common prediction of these search models is that the existence of prejudiced employers lowers the arrival rate of offers to blacks, thus causing black workers to set a lower reservation wage or match quality for accepting employment.

In this paper, we employ a random search framework in which some employers possess racial prejudice. Productivity on the job is entirely match-specific and is initially uncertain. Workers and firms receive a signal of the true quality of their productivity when they match, and workers are paid their expected productivity until the uncertainty is resolved. After one period on the job, match quality is fully revealed, and the worker may choose to quit and return to unemployment if the match quality is revealed to be low. Similar to Black (1995), prejudiced firms may sometimes refuse to offer employment to blacks upon matching. However, prejudiced firms may also sometimes fire the employee after each period.<sup>3</sup> When workers meet an employer during a job search, they do not observe whether the employer is prejudiced. However, they can observe the race of the their potential supervisor at the firm. The presence of black supervisors at the firm serves as a signal that the employer lacks prejudice. Because black workers have greater confidence that they will not be terminated upon the revelation of the job-specific match quality, blacks are willing to accept lower wages from firms with black supervisors. This is because jobs from unprejudiced firms provide black workers with greater option value to stay in jobs that are revealed to be well-matched to them. In other words, if the job is later revealed to be a better match than the worker initially expected, he will not lose this benefit due to an arbitrary termination based on prejudice.

Consequently, our model produces several empirically testable predictions. Black workers will have lower average wages in jobs with a black supervisors. However, they will be

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<sup>3</sup>In our model, arbitrary termination is simply determined by a random draw. However, termination can be thought of as either the employer learning about how much animus he holds towards the worker over time or the employer implementing his prejudiced views in the maximal way allowable while still avoiding legal repercussions.

compensated for lower wages by longer employment spells. In other words, although black workers are willing to accept “riskier” jobs with worse signals of match quality from firms with black supervisors, the jobs they accept will provide them with lower expected termination risk from prejudiced employers or greater option value. As the proportion of prejudiced employers increases in the local labor market, the expected termination risk from employers without black supervisors increases and the wage and job stabilities effects are magnified. Our model predicts that black workers with black supervisors wages will actually *decrease* relative to black workers with white supervisors as prejudice increases. We test our theoretical predictions using the National Longitudinal Survey of Youth 1997 cohort (NLSY97) and the General Social Survey (GSS). Using the confidential geocode variables for both datasets, we construct the rate at which people report prejudiced beliefs by state and match these to workers in the NLSY97 living in these states. The NLSY97 provides data on supervisor’s race for most of the panel, allowing us to examine wages and employment patterns for black and whites workers across jobs with different supervisors races or perceived prejudice.

Likely due to lack of data on prejudice or on race of employers or supervisors, existing research on the impact of prejudice levels or supervisor’s race on labor market outcomes is limited. Closely related to our work is that of Charles and Guryan (2008). They test the predictions of the canonical Becker model using measures of prejudice from the GSS constructed at the state-level and find empirical support for the prediction that the prejudice levels of the “marginally prejudiced” firm in the state can explain wage differences between black and white workers. In a more recent work, Fadlon (2014) develops and tests a model of statistical discrimination in which black and white employers observe skill levels of workers with differing accuracy based on race. Inferring the race of the employer using the supervisor race question in the NLSY97, Fadlon (2014) find supporting evidence for the prediction that the correlation between employee’s wage and skill level is stronger for employees whose race matches the race of the supervisor. Giuliano et. al (2009, 2011) show using personnel data from a single firm that black managers disproportionately hire blacks relative to managers

of other races, and that black workers under black managers have better career trajectories.

Our current work differs in many important respects from these papers. First, we develop a model of random search based on imperfectly observed employer’s prejudice. Second, instead of equating supervisor’s race with the race of the employer as in Fadlon (2014), we assume that the presence of a black supervisor provide a noisy signal of the employer’s underlying level of prejudice. Third, because we model a job search process with frictions, our model yields unique predictions about the racial differentials in wages and job stability across employers and labor markets with varying levels of prejudice.

The rest of our paper is outlined as follows. In Section 2, we introduce our theoretical model of search with learning and employer prejudice and derive our main empirical predictions. We describe the NLSY97 and the GSS in Section 3 and show results of from our empirical test of model predictions in Section 4. Section 5 concludes.

## 2 A Simple Model of Search and Racial Matches in Employment

### 2.1 Primitives

We develop our ideas with a three-period overlapping generations model. All of our key concepts can be captured in three periods: the tradeoff between taking a suboptimal job or waiting, uncertainty over match quality that is revealed over time, and the differing value of matches that vary in their stability.

A continuum of workers is born each period. Workers differ in their race but are otherwise identical. They are risk-neutral and do not discount the future. All workers begin unemployed. Unemployed workers earn  $h$  and match with a firm. If that firm offers them a job and the worker accepts, they transition to employment in the next period.

A worker’s productivity on the job depends only on his job match quality, which is either

good or bad. Workers always earn a wage equal to their expected marginal productivity.<sup>4</sup> Good matches produce  $\omega > h > 0$ , while bad matches produce 0.<sup>5</sup> Upon matching, workers and firms receive a signal of the match  $q$  which represents the probability that the match will be good. The signal is distributed uniformly over  $[0, 1]$ . We will present results that hold at the reservation wage for any log-concave distribution; the uniform assumption assures that any properties of the reservation wages also hold for the general distribution.<sup>6</sup> In an appendix, we will explore the conditions under which our predictions hold for a general wage distribution.

After working for one period, both the firm and the worker learn the quality of the match. If the match is revealed to be bad, the worker quits and transitions to unemployment in the next period. Otherwise the worker remains employed at earns  $\omega$ .<sup>7</sup>

A worker's race may be either white ( $w$ ) or black ( $b$ ). Some firms possess prejudice against black workers. The prejudice manifests itself in two ways. First, prejudiced firms may choose not to make job offers to black workers upon meeting them. Second, prejudiced firms may arbitrarily choose to terminate the employment relationship at the end of each period.

Before moving forward, we define equilibrium.

**Definition 1.** An equilibrium is a set of decision rules  $H$  such that each agent's decision maximizes their expected lifetime utility.

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<sup>4</sup>Our wage set-up is similar in spirit to Jovanovic (1979), who shows that in a search model with incomplete and evolving information about match quality, one equilibrium is for a worker to be paid at each point in time his expected marginal product.

<sup>5</sup>This ensures that workers do not prefer jobs with bad match quality to unemployment.

<sup>6</sup>In particular, we need that any positive change in the difference between reservation wages implies a positive change in the difference between realized mean wages.

<sup>7</sup>Note that given the timing structure, jobs which are accepted in period 2 begin in period 3, so the quality of the match is never learned.

## 2.2 White Workers

While the focus of our model is the interaction of black workers and prejudice, we first assess the behavior of white workers in order to analyze our model in the simplest setting and to compare the outcomes of white workers to the outcomes blacks in the following section. Since white workers do not face prejudice, they receive a wage offer from every firm with which they match.

We can solve the white worker problem by working backwards starting in period 3. Since a worker's lifespan ends after period 3, job search does not enter her utility function. We can thus write this value as,

$$U_3^w = h \tag{1}$$

That is, the utility for a worker who is unemployed in period 3 depends only on the value of home production. Likewise, a worker who is employed in a position with probability  $q$  of being a good match is,

$$V_3^w(q) = q\omega \tag{2}$$

where  $q = 1$  for matches which have been revealed as good. There is no value associated with uncertainty because the worker does not survive to a period 4.

An unemployed white worker in period 2 will accept any job offer which provides him higher value over period 3 unemployment. Since the value of a job is strictly increasing in its initial match quality signal, the worker employs a reservation wage strategy. Denoting  $q_2^{rw}$  as a white worker's reservation wage in period 2, we can express the value of period 2 unemployment as

$$U_2^w = h + \int_{q_2^{rw}}^1 V_3^w(q') - U_3^w df(q') + U_3^w \tag{3}$$

This value function represents the value of period 2's home production, and the possible gain from the job offer the worker will receive over remaining unemployed in period 3. Given expressions (1) and (2),  $V_3^w(q) \geq U_3^w \forall q \geq h$ , and thus  $q_2^{rw} = \frac{h}{\omega}$ . Substituting (1) and (2)



into (3), and recognizing that  $f(q)$  is uniform,

$$U_2^w = h + \frac{1}{2\omega}(\omega^2 + h^2) \quad (4)$$

Workers who hold jobs in period 2 benefit from both their wage and the option value of holding a job with uncertain quality. We can express this value as

$$V_2^w(q) = q\omega + q(\omega - U_3^w) + U_3^w \quad (5)$$

The worker earns a wage  $q\omega$  and also has probability  $q$  of earning  $\omega$  next period (because the match is revealed good). If the match is not good, they leave the position, becoming unemployed and receiving  $U_3^w$ . Substituting in equation (1) and simplifying, we can re-write (5) as

$$V_2^w(q) = q(2\omega - h) + h \quad (6)$$

Workers begin unemployed in period 1 and receive a job offer from a firm. The worker will maximize his utility by accepting the offer whenever  $V_2^w(q) \geq U_1^w$ . Because  $V_2^w(q)$  is strictly increasing in  $q$ , the worker follows a reservation wage strategy. Denoting this reservation wage as  $q_1^{rw}$ , we can write the value of initial unemployment as

$$U_1^w = h + \int_{q_1^{rw}}^1 V_2^w(q') - U_2^w df(q') + U_2^w \quad (7)$$

We can find the reservation wage by equating (5) and (4), and noting that  $U_3^w = h$ ,

$$q_1^{rw} = \frac{1}{2\omega} \frac{(\omega^2 + h^2)}{(2\omega - h)} \quad (8)$$

Note that since  $h$  is bounded by 0 and  $\omega$ ,  $q_1^{rw}$  is continuous and well-defined over the full range of parameters.

## 2.3 Black Workers

We now turn attention to black workers. A fraction  $p \in (0, 1)$  of firms possess a prejudice against black workers. With probability  $s \in (0, 1)$ , a prejudiced firm will refuse to make a wage offer to a black worker upon matching. Also, after each period with probability  $s$  a prejudiced firm will terminate the employment of a black worker. Thus, black workers have a lower chance of receiving offers when unemployed and also have lower option value from offers by prejudiced firms.

Workers do not observe whether a firm is prejudiced when they meet. However, they do observe the race of their supervisor at the firm, which acts as a signal of a firm's prejudice. A firm with a black supervisor is known with certainty to be not prejudiced.<sup>8</sup> A fraction  $b \in (0, 1)$  of non-prejudiced firms have black supervisors. Thus, the probability that an offer from a firm with a white supervisor is an offer from a prejudiced firm is

$$\pi \equiv \frac{p(1-s)}{(1-b)(1-p) + p(1-s)}. \quad (9)$$

This expression is simply derived from Bayes rule where the denominator is the fraction of firms with white supervisors who will offer employment to a black worker: unprejudiced firms and a fraction  $(1-s)$  of prejudiced firms.

Again, working backwards, an unemployed black worker receives no value from job offers due to the finiteness of his lifespan, so

$$U_3^b = h \quad (10)$$

Similarly, the value of a job in period 3 to a black worker is not a function of the supervisor's race. Regardless of whether the firm is prejudiced, the worker will work one period, earn  $q$ ,

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<sup>8</sup>This is a simplifying assumption. Our results hold so long as firms with black supervisors are less likely to be prejudiced than those with white supervisors.

and then die. Thus, we can write the value of period 3 employment as

$$V_3^b(q) = q\omega \quad (11)$$

Given expressions (10) and (11), we can derive the value of being unemployed in the second period for a black worker. If a black worker matches with a black supervisor firm, she receives an offer with certainty; these firms are never prejudiced. However, firms with white supervisors are prejudiced with probability  $p$ . Thus with probability  $ps$ , a black worker matches with firm unwilling to offer her a job. The value of unemployment in period 2 is then

$$U_2^b = h + (1 - ps) \int_{q_1^{rb}}^1 V^b(q') - U_3^b df(q') + U_3^b \quad (12)$$

The worker accepts any job offer which presents more value than unemployment in period 3, and thus  $q_2^{rb} = \frac{h}{\omega}$ . Using this relationship, applying the uniform distribution, and substituting in (10) and (11), we can simplify (12) to

$$U_2^b = (1 + ps)h + \frac{1 - ps}{2\omega}(\omega^2 + h^2) \quad (13)$$

Period 2 unemployment offers less value to black workers than white workers since there is some positive probability that they do not receive a job offer.

Unlike jobs held in period 3, supervisor race does affect the value of black worker jobs in period 2. When employed by a firm with a black supervisor, the worker faces no risk from prejudice. Thus they are always able to continue employment if the match is revealed as good. Denoting  $V_2^{bj}$  as the value of a job held in period 2 by a black worker with a supervisor of race  $j$ , we can write the value of a black supervisor job with good-match probability  $q$  as

$$V_2^{bb}(q) = q\omega + q(\omega - U_3^b) + U_3^b \quad (14)$$

which simplifies to

$$V_2^{bb}(q) = q(2\omega - h) + h \quad (15)$$

Thus conditional on  $q$ , a black worker values a job with a black supervisor the same as a white worker values all jobs.

Jobs with white supervisors, however, carry a termination risk for black workers. A firm with a white supervisor that makes an offer to a black worker in period 1 still has probability  $\pi$  of being prejudiced, and thus has probability  $\pi s$  of terminating the worker at the end of period 2 regardless of the match quality. Thus, the value of employment at wage  $q$  in period 2 to a black worker with a white supervisor is

$$V_2^{bw}(q) = q\omega + q(1 - \pi s)(\omega - U_3^b) + U_3^b \quad (16)$$

which simplifies to

$$V_2^{bw}(q) = q(2\omega - h) + h - q\pi s(\omega - h) \quad (17)$$

As can be immediately seen comparing (17) to (15), jobs with white supervisors are less valuable to black workers than jobs with black supervisors conditional on  $q$ . They carry less option value since good matches are sometimes terminated.

Black workers begin period 1 unemployed. With probability  $(1 - p)b$  they match with a firm with a black supervisor. With probability  $(1 - p)(1 - b)$  they match with an unprejudiced firm with a white supervisor. With probability  $p(1 - s)$  they match with a prejudiced firm which makes them an offer. With probability  $ps$  they match with a prejudiced firm which does not make them an offer. Workers accept any job offer which provides them with a higher value than period two unemployment. Since the value of all jobs are strictly increasing in  $q$ , workers follow a reservation wage strategy. As black workers cannot observe which firms are

prejudiced, only supervisor race, we can write the value of unemployment in period 1 as,

$$U_1^b = h + (1-p)b \int_{q_1^{rbb}}^1 V_2^{bb}(q') - U_2^b df(q') + [(1-p)(1-b) + p(1-s)] \int_{q_1^{rbw}}^1 V_2^{bw} - U_2^b df(q') + U_2^b \quad (18)$$

where  $q_1^{rbj}$  is the black worker's reservation wage for accepting employment with a supervisor of race  $j$  in period 1.

We can solve for the reservation wages by equating the value of employment to the value of unemployment in period 2. For the jobs with black supervisors, equating (15) and (12) yields,

$$q_1^{rbb} = \frac{psh + \frac{1-ps}{2\omega}(\omega^2 + h^2)}{2\omega - h} \quad (19)$$

Likewise, we can equate (17) and (12) to find the reservation match quality for jobs with white supervisors,

$$q_1^{rbw} = \frac{psh + \frac{1-ps}{2\omega}(\omega^2 + h^2)}{(2\omega - h) - \pi s(\omega - h)} \quad (20)$$

## 2.4 Comparative Statics: Supervisor Race

We have two dimensions along which we can compare worker outcomes in our model: 1) across supervisor race and 2) across worker race. Beginning with the former, we introduce a lemma that will be the basis for our main results.

**Lemma 2.** *In equilibrium, black workers have (weakly) higher reservation wages (or signals) for employment with firms with white supervisors than with firms with black supervisors.*<sup>9</sup>

While black workers do not differentiate job offers on the basis of supervisor race in period 2 due to an end of game problem, we can see from (19) and (20) that they have strictly lower reservation signals for black supervisor firms in period 1. Intuitively, black workers are more selective on the initial match quality signal for jobs with white supervisors, because they have lower option value. For jobs with black supervisors, black workers are willing to accept

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<sup>9</sup>Proof of this and all other results can be found in the theoretical appendix

jobs that have a lower likelihood of being good matches, because if the job is revealed to be a good match, workers can keep them and earn the high wage  $\omega$  with certainty in period 3. On jobs with white supervisors, there is some probability that the firm is prejudiced and the worker will face termination even if the job is revealed to be a good match. Thus, the upside of jobs with a low match quality signal is reduced for jobs with white supervisors, making them less acceptable for black workers.

**Proposition 3.** *Conditional on tenure and potential experience, black workers with white supervisors earn (weakly) higher wages on average than black workers with black supervisors.*

Proposition 3 follows directly from Lemma 2. Since black workers have a higher reservation wage (or match quality signal) for white supervisors, the distribution of accepted jobs with white supervisors comes from a distribution with higher average match quality than for accepted jobs with black supervisors. Thus, when looking at the observed wage distribution, we expect higher average wages for workers at firms with white supervisors. Proposition 3 leads to the next result which describes the impact of increasing prejudice levels on wages.

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**Proposition 4.** *Conditional on tenure and potential experience, the average wage of black workers with black supervisors (weakly) decreases as prejudice increases.*

This result is intuitive. As the fraction of prejudiced firms increases in the labor market, the job arrival rate for black workers decreases; with probability  $s$  prejudiced employers do not offer black workers employment. This lowers the value of unemployment for black workers, thus the reservation wage (or signal) for jobs with black supervisors decreases. Since the distribution of accepted jobs with black supervisors has decreased, the average wage of black workers with black supervisors also decreases.

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<sup>10</sup>The fact that the distribution of wages is uniform is of no consequence for this result. So long as the distribution of match quality signals are the same for black and white workers, the distribution of accepted wages for jobs with white supervisors will dominate that for jobs with black supervisors.

**Proposition 5.** *Conditional on tenure and potential experience, the average wage of black workers with white supervisors may increase, decrease, or remain constant as prejudice increases*

Perhaps surprisingly, the average wage of black workers with white supervisors may increase as the level of prejudice increases. As more firms become prejudiced, the probability that a job offer from a white supervisor firm represents an offer from a prejudiced firm increases as well. These job offers lose value as their termination threat has increased. Thus a black worker is motivated to become more selective on the types of job offers he accepts from white supervisor firms. At the same time, because the value of unemployment has decreased, black workers are motivated to become less selective on jobs overall. Which of these two effects dominates depends on model parameters.

**Proposition 6.** *Conditional on tenure and potential experience, the difference in mean wages between black workers with white supervisors and black workers is increasing in the level of prejudice, so long as prejudice among white supervisors is not too pervasive. A sufficient condition for this property to hold is  $(1 - b)(1 - 2ps) > p^2s(b - s)$*

Proposition 6 is our model's most surprising wage result. When the fraction of prejudiced firms increases, the wage gap between workers with black supervisors and workers with white supervisors actually increases. This result follows from Propositions 4 and 5. As prejudice increases, it decreases the value of unemployment causing black workers to become less selective on the jobs they accept. To do this, they must accept jobs with black supervisors that have lower match quality than before. However, since increasing prejudice also increases the perceived termination risk of job offers from white supervisor firms, their value decreases even if the worker holds their reservation wage constant. Since the worker must remain indifferent in his valuation of black supervisor and white supervisor jobs at the reservation wage, he will in general decrease his reservation wage more for black supervisor jobs.

The exception is when workers are fairly certain that white supervisors firms are prejudiced; i.e.  $\pi$  is very high. This generally occurs for large values of  $b$  and  $p$ . In this situation,

the termination risk from a white supervisor job is so high that changes in the match quality signal have very little marginal impact on the value of the job opportunity; regardless of initial match quality the job will likely be terminated after one period. Since the worker must be indifferent between unemployment and employment at the reservation wage, in this scenario there will need to be very large adjustments in the reservation wage for white supervisors when prejudice changes slightly. The parameters required for this proposition to fail are unlikely to be relevant in our current society. It would hold even if 75% of firms were prejudiced and 50% of unprejudiced firms employed a black supervisor, which are well above estimates from both our own paper and other sources.<sup>11</sup>

We now discuss two propositions related to stability of matches.

**Proposition 7.** *Conditional on starting potential experience, black workers have more stable matches (longer job durations) with black supervisors than white supervisors.*

Although black workers lower their reservation wage (or match-quality signal) for accepting jobs with black supervisors, they will never do so severely enough to have lower stability than in jobs with white supervisors. At the equilibrium reservation wages, workers are indifferent between offers from white supervisors and black supervisors. Since the reservation wage is higher for jobs with white supervisors than for jobs with black supervisors, it must be that the latter jobs have higher stability. Because the distribution of match probabilities is uniform, this difference at the reservation wage generalizes to the full equilibrium distribution of accepted offers.

**Proposition 8.** *Conditional on starting potential experience, the stability of black worker's*

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<sup>11</sup>Structural estimates from Bowlus and Eckstein (2002) imply that 56% of firms have some prejudice against hiring blacks. Using our own measures of prejudice, we do not observe any region of the country in which greater than 62% of the population possess prejudice. Lang and Lehman (2012) draw on similar surveys of social attitudes to conclude that widespread “strong prejudice” cannot be a credible foundation for a discrimination model, although the prejudice in our model is more similar to their idea of “weak prejudice.” Giuliano et. al (2009) report that 6.6% of retail managers in the Consumer Population Survey are black, and 5.9% of managers within the particular firm for which they have data. In our model, if 75% of firms were prejudiced and 50% of non-prejudiced firms employed black supervisors, then 12.5% of white workers should have a black supervisor. However, in our data, white workers encounter black supervisors during only 9% of their job-spells.



*matches with black supervisors decreases as prejudice increases.*

This result follows from Proposition 4. The presence of greater fraction of prejudiced firms induces black workers to accept riskier jobs that have higher probability of being revealed to be a bad match and that will result in voluntary separation.

**Proposition 9.** *Conditional on starting potential experience, the stability of black worker's matches with black supervisors decreases as prejudice increases.*

While the effect of prejudice on the average wage of black workers with white supervisors is ambiguous, the effect on job stability is not. Increasing prejudice makes all black worker-white supervisors matches *ex ante* less stable; there is now a higher probability that these are matches with a prejudiced firm. While they can compensate for this decreased stability by becoming more selective on the quality of jobs they can accept, the decrease in the value of unemployment prevents them from being willing to do so in a way that increases their job stability.

We make no claims on how the difference in job stability by supervisor race changes in equilibrium as prejudice increases. Since prejudice directly influences the stability of matches with white supervisors, while indirectly affecting it by incentivizing black workers to be more selective on the offers they accept, the overall effect of an increase in prejudice is ambiguous.

## 2.5 Comparative Statics: Worker Race

We now compare the equilibrium wages and job stability across worker's race. Similar to the comparative statics on supervisor's race, we start with a lemma.

**Lemma 10.** *Compared to white workers' reservation match quality signal, black workers have (weakly) lower reservation match quality for employment in jobs with black supervisors.*

The result is intuitive. If there were no prejudiced firms, white workers' reservation match quality signal would be equal to that of black workers. From Proposition 4, we know that

black workers' reservation signal is decreasing in prejudice, as they compensate for a lower value of unemployment.

**Proposition 11.** *Conditional on tenure and potential experience, the average wage of black workers in jobs with black supervisors is (weakly) lower than the average wage for white workers.*

Similar to Proposition 3, since black workers have a lower reservation match quality signal for jobs with black supervisors, the distribution of accepted jobs comes from a support of lower wages. Therefore, examining the observed wage distribution, we expect lower average wages for black workers in jobs with black supervisors than for white workers.

**Proposition 12.** *Conditional on tenure and potential experience, the average wage of black workers in jobs with white supervisors may be lower, equal to, or higher than the average wage of white workers.*

The relative comparison of the wages of black workers in jobs with white supervisors and the wages of white workers depend on the fraction of prejudiced firms, the probability of arbitrary termination, and the informativeness of the supervisor's race. For example, if the supervisor's race is a very informative of the employer's prejudice, then black workers will only accept jobs with white supervisors if the match quality signal is very high. Similarly, if the likelihood of arbitrary termination is very high, black workers will only accept jobs offering a very high initial wage.

**Proposition 13.** *Conditional on starting potential experience, black workers have on average less job stability than white workers.*

Lemma 10 directly implies that black workers with black supervisors will have less job stability than white workers. Further, Proposition 7 shows that black worker jobs with white supervisors will be even less stable than jobs with black supervisors. Thus our model produces the empirical regularity that blacks have lower job stability than whites.

### 3 Data

We use data from the National Longitudinal Survey of Youth 1997 (NLSY97) and the General Social Survey (GSS) to test our theoretical predictions. The NLSY97 is a national representative sample of individuals who were aged 12 to 18 in 1997. The individuals have been surveyed and assessed annually on a wide array of topics including scholastic aptitude, family characteristics, and labor market outcomes. Of most interest to us are the annual job surveys. In each year, the NLSY97 tracked each job in which the respondent worked in the previous year in a way that can be linked across surveys. Hence, we are able to measure the duration of employment matches that terminated before 2012 (the final released year of the survey) and the duration of employment as of 2012 for those which were still current. Important for our purposes, the NLSY97 recorded information on the race of an individual's supervisor for each job until the 2009 survey. This variable allows us to estimate separate effects by supervisor race to test the predictions of our model.

The GSS is an annual survey of social attitudes given to a nationally representative sample in the United States. Included in this survey are various questions assessing individuals racial attitudes. Specifically, they include questions related to beliefs on whether individuals believe blacks lag whites due to inborn genetic deficiency or lack of will, whether blacks should receive “special favors”, whether they would vote for a black president, whether they support open housing laws, and whether they support affirmative action laws.<sup>12</sup> We combine the cross-sectional samples from the 2006, 2008, and 2010 waves of the GSS and drop all nonwhite respondents to calculate time-invariant geographic measures of prejudice. In Table 1, we report these responses by census division.<sup>13</sup> Our primary measure of prejudice will be whether a respondent holds “any prejudice,” which is equal to 1 if they answer in a way unsupportive towards blacks to any of these questions with the exception of affirmative

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<sup>12</sup>For a detailed description of the questions we used, see the data appendix.

<sup>13</sup>The number of states in a census division ranges from 3 (Division 2) to 8 (Division 5). For confidentiality reasons, we are not permitted to display descriptive statistics at a level that is less aggregated than 3 states.

action, which we exclude due to its widespread opposition.<sup>14</sup>

In spite of the the racial progress made over the last half century, there are still non-trivial geographic differences in rates of prejudice. Prejudice appears to be highest in the South (divisions 5-7), particularly in the West South Central (division 7) which consists of Arkansas, Louisiana, Oklahoma, and Texas. The Middle Atlantic (division 2) and Pacific (division 9) appear to have the least level of prejudice, although the ordering depends on the question. In our regression analysis, we will measure prejudice at the state-level, which has more dispersion. The standard deviation for the fraction of “any prejudice” individuals by state is .08.

We calculate the fraction of prejudiced responses at the state level and match these with the NSLY97 geocode files to get a panel of jobs, supervisor race, and levels of prejudice for the state in which the worker lives. Supervisor race is of particular importance. Throughout a job spell, workers often work under different supervisors of different races.<sup>15</sup> As we view supervisor race as a signal to workers, our primary interest is in using this question to measure the prevalence of blacks in observable authority positions in a firm. We, therefore, record a worker as working for a firm with a black supervisor if we *ever* observe them working with a black supervisor during that job spell. In this sense, we can think of our variable as a noisy measure of an ideal variable on whether the employer employs any blacks in supervisory positions.<sup>16</sup>

We drop all job-year observations with reported wages less than \$1.00 per hour or above \$100.00 per hour, job-years with less than 30 hours or more than 80 hours of work per

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<sup>14</sup>Not all questions were asked in all years. For calculating whether an individual holds “any prejudice,” we use only the questions available in that year. The number of observations reported in Table 1 are the number for whom we can calculate a value for “any prejudice.”

<sup>15</sup>For instance, in our data 4% of white workers work underneath a black supervisor at a given point in time, but 8% of white workers are employed in a job spell where they have in the past or will in the future work underneath a black supervisor.

<sup>16</sup>Since all job spells are finite, and assuming most supervisors are white, our measure is biased towards 0 (having a white supervisor). Further this bias will be greater for shorter job spells, as we have less information to infer the composition of the firm’s hierarchy. It will also be greater for jobs that last after 2008, for which we do not observe supervisor’s race. As we will discuss later, this should only be a problem if we believe this bias differs in magnitude for white and black workers conditional on supervisor race. Excluding all survey years after 2008 from our analysis does not meaningfully influence our main results.

week, and job-years before an individual completed his education.<sup>17</sup> We drop individuals who report less than 9 years of education and keep only white and black individuals in order to focus our attention on the black-white wage and employment gap. We likewise drop job spells where we observe non-white, non-black supervisors in each year, and job spells for which we never observe supervisor's race. These restrictions yield a sample with 34,123 job-year observations, 31,556 of which have at least one valid state-level measure of prejudice. Previous research has shown that there are large racial differences in the rates and selection of women into the labor force (Neal, 2004). If prejudice differentially influences the local labor market for black workers, it will also likely differentially impact the labor force participation of black of women. We therefore perform all of our analysis on both the full sample and only males. Our male sample has 18,348 job-year observations, 16,955 of which have a valid measure of prejudice.

In table 2, we show descriptive statistics of our sample broken down by race. To avoid over-weighting jobs with very short spells, we weight each observation by the number of days the worker was employed in that position in a given year.<sup>18</sup> We can thus view our results as representative of the average job a worker worked in a given year. As expected from previous research, blacks earn lower wages, have lower education on average, have shorter job durations, score in lower percentiles on the Armed Services Vocational Aptitude and Battery (ASVAB), and have a higher implied female labor force participation rate.<sup>19</sup> There is a startling amount of implied segregation by supervisor race. Only 8% of white workers, and 7% of white men, work at an establishment in which they will encounter a black supervisor, compared to 53% of black workers, and 52% of black men. While there are

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<sup>17</sup>A small number of workers report starting jobs very early in their lifetime (in some cases even before they were born). We drop all jobs that report being started before age 14 even if they pass our hours restrictions, as these likely represent data errors that can distort our tenure measure.

<sup>18</sup>Because the NLSY97 is a panel, we use the interview dates to calculate the number of days of employment at a firm each observation represents for jobs that were held over multiple surveys. We weight all jobs that were worked for more than 365 days between surveys (either due to the survey being not quite annual or because the worker did not respond in a survey year) as if they were worked for exactly 365 days. Our results are not sensitive to this modification, and are robust to weighting all jobs equally.

<sup>19</sup>Tenure is measured in days in the NLSY97.

some statistical differences in prejudice by race across geography, these differences appear to be small and are unlikely to be of economic significance.<sup>20</sup> The average state of black residence in our sample has just 1% more individuals who report any prejudiced beliefs than the average state of white residence.

In table 3, we break down our sample by supervisor race. Black supervisors' workers earn lower wages, are less educated, and score in lower percentiles of the ASVAB than those who work for white supervisors. However, this is likely because black workers account for 76% of black supervisor job-years, compared to just 20% of white supervisor job-years. The prevalence of black supervisors does not appear to meaningfully differ with geographical prejudice. On each of our measures, the mean level of state prejudice experienced by an employee is nearly identical.

## 4 Results

### 4.1 Wage Effects

In this section, we test the key predictions of our model along two dimensions: wages and job stability. We first look at how wages vary across supervisor race. Our main specification estimates a pooled regression model of

$$\log W_i = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \varepsilon_i \quad (21)$$

where  $X_i$  is a vector of job- and worker-specific controls,  $b_i^w$  is an indicator equal to one if the worker is black,  $b_i^e$  is an indicator equal to one if the employer is a black supervisor establishment, and  $\varepsilon_i$  is the econometric error term. The coefficient  $\gamma_1$  represents the conditional black-white wage gap among white supervisors. The coefficient  $\gamma_2$  represents the conditional

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<sup>20</sup>As workers may sometimes switch states of residence during a job spell, we measure prejudice only through the state they resided in when they first report the spell. This is primarily a concern during the final year of the spell, where the job may have ended because the worker moved to a new location.

difference in wages between workers with black supervisors and white supervisors for white workers. The coefficient  $\gamma_3$  represents the conditional difference in the “supervisor wage gap” for black workers relative to whites.

There are inevitably unobservable differences between establishments that employ black supervisors and those that do not that are correlated with wage. Our identifying assumption is that these unobservables influence the wages of blacks and whites equally. As there is no reason to think that supervisor’s race should influence the wages of whites, these differences will be accounted for by  $\gamma_2$ . Our model’s prediction then is that  $\gamma_3 < 0$ : blacks accept positions with lower wages to work at firms with a strong black presence.

We display these results in Table 4. As there are likely common shocks to wages for individuals, we cluster our standard errors at the individual level. This formulation allows for errors to be correlated within job spells, the unit of variation of our main variable of interest. In column (1) we estimate a standard Mincer regression with controls for education, gender, and quadratics in experience and tenure. Black workers whom we only observe with white supervisors earn 12% less than white workers with white supervisors. Interestingly, white wages do not vary with supervisor race once controlling for worker characteristics, which suggests unobservable firm differences across supervisor race may not be too severe. Consistent with our model, blacks earn 5.8 percent less in firms we observe with black supervisors relative to whites with black supervisors.

One concern is that blacks are clustered in different occupations, industries, and locations, and that these wage differences are simply reflecting occupation, industry or geographic pay differentials. We control for state, and year fixed effects in column (2), and industry, occupation, state, and year fixed effects in column (3).<sup>21</sup> In each of these specifications, our main parameter of interest remains statistically significant. While the full set of controls

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<sup>21</sup>For state fixed effects, we use the state in which the individual was living when they first reported the job. This is to avoid, for example, recording a job which was terminated due to a move as being in the state in which the worker recently moved to. Industry fixed effects are 2-digit NAICS (2002) codes, while occupation fixed effects are 2-digit SOC (2002) codes. We converted the default census industry and occupation codes provided by the NLSY into NAICS and SOC codes using the crosswalk provided by the Census.

reduces the racial wage gap at white supervisor establishments by roughly one-third, the racial wage gap at black supervisor establishments actually increases. Our point estimates suggest that the racial wage gap at white supervisor establishments is 7.2%, but 9.8% at black supervisor establishments.<sup>22</sup>

Alternatively, we can use the panel nature of the survey to look at within worker effects. In columns (4)-(6), we estimate

$$\log W_{it} = \beta X_{it} + \gamma_2 b_{it}^e + \gamma_3 b_i^w b_{it}^e + \omega_i + \varepsilon_{it} \quad (22)$$

where  $X_{it}$  is a vector of time-varying controls, and  $\omega_i$  is a worker fixed effect. Here we identify the impact of working with a black supervisor for each race from workers who have worked in jobs with both a black and white supervisor. This strategy would be appropriate if the bias induced by the unobservable differences in workers who work for supervisors of varying races is less than the bias induced by the unobservable factors which would cause an individual to accept a job offer with a supervisor of a different race than before.

Our within worker results are consistent with the estimates from our pooled specification. In column (4) which includes quadratics in tenure and potential experience, we see that relative to whites, blacks see a 5.5 percent decrease in their wages when moving from an establishment with a white supervisor to one with a black supervisor. We add state and year fixed effects in column (5), and state, year, industry, and occupation fixed effects in column (6). In each of these specifications,  $\gamma_3$  remains negative, statistically significant, and of similar magnitude to the analogous pooled specification.

As we discussed in the previous section, there is substantial evidence that the labor force participation decisions of women vary with race. To ensure that our results are not being driven by these differences, we reproduce Table 4 using only men in Table 5. We observe similar results for men as we do for the full sample; if anything, our point estimates are larger.

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<sup>22</sup>This differences is statistically significant at the 1% level.



Our model also makes predictions on how the correlation between supervisor race and wages will vary with levels of prejudice in the market. We measure prejudice using the “any prejudice” variable discussed earlier, which reflects the fraction of individuals in a state who reported any prejudiced belief. This measure is imperfect for two reasons. First, it is measured from a sample of the general populace, while our model is only interested in rates of prejudice among managers and economic decision makers within firms. Second, it measures a wide-array of prejudiced beliefs, while our model is concerned only with prejudice as it relates to hiring and retaining workers. We can thus write the prejudice parameter from our model in state  $s$ ,  $p_s^*$ , as a function of our measured prejudice as

$$p_s^* = \psi_s \nu_s p_s \tag{23}$$

where  $p_s$  is our constructed measure of prejudice,  $\nu_s$  is the fraction of individuals in the state who hold any prejudiced belief and also would make prejudiced employment decisions if they had decision making power within a firm and  $\psi_s$  is the ratio at which these individuals differ in management positions from the general population. If all individuals who express prejudiced beliefs in surveys would take prejudiced action in employment decisions, and prejudice is uncorrelated with whether individuals work in positions with economic power,  $\psi_s = \nu_s = 1$  and our “any prejudice” measure is identical to the prejudice parameter in our model. If, for example  $\psi_s$  and  $\nu_s$  are less than one, in the absence of other econometric problems, our estimated coefficients will include both the effect of changing prejudice in the market place and the rates at which labor market prejudice differs from the way in which we measure it in the population. Unless our measure of prejudice is *negatively* correlated with marketplace prejudice, our estimate of the sign, and thus our test of our model, will still be correct.

Our main concern is that  $\psi_s$  and  $\nu_s$  varies across states in some systematic way. If  $\psi_s$  and  $\nu_s$  are correlated with our prejudice measure, it would suggest the necessity of higher

order terms. Specifications including polynomials in prejudice do not appear to affect our results. If they are correlated with unobservable local labor market conditions, it will bias our estimates in a way that is difficult to determine.

For our pooled cross-sectional approach, we estimate

$$\log W_{is} = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \gamma_4 p_s + \gamma_5 b_i^w p_s + \gamma_6 b_i^e p_s + \gamma_7 b_i^w b_i^e p_s + \varepsilon_{is} \quad (24)$$

We normalize our measure of prejudice to be mean zero, and so that a one unit increase represents a 10 percentage point increase in the number of respondents who report prejudice in that worker's state. Thus  $\gamma_1, \gamma_2$ , and  $\gamma_3$  represent the same statistics as in (21) for the mean state. The coefficient  $\gamma_4$  represents the rate at which white workers wages with white supervisors changes with a 10 percentage point increase the number of prejudiced individuals in a worker's state, while  $\gamma_5$  represents the differential effect for black workers with white supervisors. The parameter  $\gamma_6$  represents the rate at which white workers wages with black supervisors change relative to white workers with white supervisors as prejudice increases. Finally,  $\gamma_7$  estimates how black wages with black supervisors change as prejudice increases relative to the rate at which white workers with black supervisors' change.

As with our previous empirical model, there are likely unobservable firm characteristics that influence wages and are correlated with the race of supervisors. Further, it is likely that these characteristics differ in areas of the country where there are more or less prejudice. So long as these characteristics do not have different effects on black and white workers, they should be accounted for by  $\gamma_4$  and  $\gamma_6$  (i.e. the prejudice-varying impact of different raced supervisors on white worker wages.) Our model makes two empirical predictions. First,  $\gamma_7 < 0$ ; the supervisor race wage gap among black workers is increasing in the level of local prejudice. Second,  $\gamma_5 + \gamma_7 < 0$ ; black workers with black supervisors in more prejudiced areas earn less than those in less prejudiced areas.

We estimate equation (24) in Table 6. To allow for errors to be correlated within states, we

cluster our standard errors at the state level, which is the level of variation for prejudice.<sup>23</sup> Column (1) estimates the basic Mincer specification. The coefficient on prejudice, which represents the impact of increasing prejudice on the wages of white workers, is strongly and statistically significantly negative. Meanwhile, the interaction between prejudice and black supervisor, which represents the differential impact of prejudice for white workers with black supervisors is positive, though not statistically significant. There are two likely reasons for these results. First, due to the geographical concentration of prejudice in the south, prejudice is likely correlated with lower wage economic conditions. Second, the types of firms which employ black supervisors likely vary with levels of prejudice. For instance, in areas of high prejudice, employing a racially diverse leadership group may become correlated with other positive business decisions that lead to higher wages. We thus do not place a strong weight on the interpretation of these variables for analyzing the impact of prejudice. Our model, however, is concerned with how prejudice impacts black workers. To the extent that our estimates for white workers capture these unobservable geographic differences, our tests for black workers should still remain valid.

Turning our attention to the impact on black workers, in column (1) we see that prejudice does not have any impact on the wages of black workers with white supervisors. This is consistent with our model; black workers respond to an increase in prejudice by being more selective on the types of jobs they accept with white supervisors, which may lead to their observed wages increasing or remaining constant. As predicted, the wages for blacks with black supervisors ( $\gamma_5 + \gamma_7$ ) are decreasing in prejudice and the “supervisor race gap” ( $\gamma_7$ ) is increasing, although neither of these effects are statistically significant. In part to control for the geographic concentration of prejudiced beliefs, we add in fixed effects for the eight geographic census divisions, and thus our effects are estimated off of variation within states that are in close geographical proximity to one another. These results are displayed in column (2) which also includes year fixed effects. Including these controls magnifies the

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<sup>23</sup>This approach generally produces more conservative estimates than clustering at the individual-level.

effect of prejudice on black workers. While  $\gamma_7$  remains statistically insignificant, we can now reject  $\gamma_5 + \gamma_7 = 0$  at the 10% level. Industry and occupation controls in column (3) have no impact on our results. Both black workers with black supervisors wages decrease, and the supervisor wage gap increases, as prejudice increases, though only the former effect is statistically significant.

We are again worried that the propensity to work with a same-race supervisor is driven by individual heterogeneity. Additionally, this propensity may be affected by rates of local prejudice. To account for this, we include worker fixed effects in columns (4)-(6). Here the impact of prejudice on workers with white supervisors is identified off of workers who move to a different state. The interactions with being employed with a black supervisor are identified off of variations in the magnitude of the change in wages when switching from a white supervisor establishment to a black supervisor establishment across states with different measured prejudice. This approach provides a stronger confirmation of our model. In column (4) and (5), which include worker characteristics, census division fixed effects, and year fixed effects, the triple interaction term is both larger in magnitude than the cross-sectional approach and statistically significant at the 10%. Our second hypothesis,  $\gamma_5 + \gamma_7$  is also significant at the 5% level. Adding industry and occupation fixed effects in column (6) removes significance on  $\gamma_7$ , though the point estimate remains larger in magnitude than the in the cross section. The overall effect of prejudice on black workers with black supervisors remains negative and significant at the 5% level.

We repeat our estimates from Table 6 on a sample of only male workers in Table 7. When we look only at men, we see strong evidence that the supervisor race gap is increasing in prejudice. In each of our cross-section specifications, the coefficient on our triple interaction term is negative, significant, and larger in magnitude than the comparable estimate from the full sample. We lose statistical significance when we add controls to the within-worker specifications, but the point estimates are above those which were significant in the full sample estimation, suggestion that this is primarily due to the reduced sample size. We

observe less strong evidence for the overall effect,  $\gamma_5 + \gamma_7$ , obtaining statistical significance only on the cross-sectional specification with a full set of controls. This is partially due to sample size. Each point estimate is larger in magnitude than the lowest significant estimate in Table 6. However, this is also partly due to the effect of prejudice on black workers with white supervisors. While the full sample of workers suggests that this is small and negative, we generally see insignificant positive effects on men’s wages. We again note that both of these effects are consistent with our theoretical model.

## 4.2 Job Stability

Our model makes a separate prediction on the stability of job matches by supervisor race. As jobs with black supervisors offer less exposure to prejudice than jobs with white supervisors, we expect these jobs to have greater job stability for black workers. To investigate this relationship, we calculate the total duration of each job-worker match, to create a sample of jobs rather than job-years.

To test our model, we estimate a Cox-Proportional Hazard model on the duration of these employment relationships,

$$Z_i(t) = \exp(\beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e) \lambda(t) \quad (25)$$

where  $Z_i(t)$  is the hazard rate at time  $t$  for individual  $i$ ,  $X_i$  is a vector of job- and worker-specific controls, and  $\lambda(t)$  is the baseline hazard function. While we, again, expect that unobservable firm characteristics which may influence job stability are correlated with the likelihood of employing a black supervisor, these will be captured by  $\gamma_2$  provided they do not effect black and white workers in different ways. Our model predicts that  $\gamma_1 > 0$  and  $\gamma_3 < 0$ . Blacks have higher hazard rates with white supervisors as these firms are more likely to take prejudiced action against them.

We show the results of this estimation in Table 8 for our full worker sample. Consistent

with our model, blacks have less stable matches with white supervisors than whites. While all workers have more stable matches at firms with black supervisors, our point estimates suggest that blacks gain more stability than whites at these firms. While the effect is not statistically significant with only a basic set of worker controls, it gains significance once controlling for occupation, industry, state, and start year fixed effects in column (3).<sup>24</sup> These results imply that, for a worker with otherwise identical characteristics, blacks with white supervisors have a 1.30 times higher hazard risk than whites with white supervisors, while blacks with black supervisors have roughly the same hazard risk.<sup>25</sup>

Because of the incidental parameters problem, we cannot estimate our hazard model with individual fixed effects.<sup>26</sup> We instead attempt to control for unobservable differences in cognitive ability by including a quartic in ASVAB test score. In column (4) we include this with just a basic set of worker controls. Relative to column (1), the magnitude of  $\gamma_3$  increases but remains statistically significant. With a full set of controls in column (5), the point estimate is in fact larger than that in column (3). While not statistically significant, the size of the estimate suggests that the differences in job stability across supervisor race are not driven by differences in the cognitive ability of individuals who accept jobs with different raced supervisors.<sup>27</sup>

Table 9 repeats the estimates of Table 8 on our sample of men. Our estimates of  $\gamma_3$  are not statistically significant and are smaller in magnitude for the men when not controlling for ASVAB. However, once we add in the cognitive test score controls, our point estimates increase above those for the full sample, again suggesting that the lack of significance is due

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<sup>24</sup>Workers sometimes report changes in occupation and industry during a job spell. We use fixed effects for the first occupation and industry which they report.

<sup>25</sup>Our model predicts that black workers with black supervisors should have lower hazard rates than white workers and our results do not contradict this. Black workers with black supervisors have a 1.37 times higher hazard risk than whites with black supervisors.

<sup>26</sup>The common approach of stratifying on the individual cannot be applied with right-censored data (Van den Berg, 2001). Horowitz and Lee (2004) derive a series of estimators that involve weighted sums of the effects estimated off of pairs of jobs within each individual, but do not discuss how to construct an efficient estimator from these sums.

<sup>27</sup>We have roughly 2500 less job-spell observations due to individuals having not taken the ASVAB in the NLSY97.

to a sample size reduction.

Our model generates one final set of predictions on the interaction between job stability and prejudice. As prejudice increases, black workers' jobs become less stable regardless of supervisor race. Jobs with white supervisors become less stable as prejudice directly influences their stability. Jobs with black supervisors become less stable because blacks lower their reservation wage as employment opportunities decrease. We investigate this for our full sample in Table 10, by adding in interaction effects between race, supervisor race, and measured rates of geographic prejudice. We find only weak support for our model. Similar to before, as prejudice increases, whites in jobs with black supervisors see a decrease in their hazard rate, likely indicating that these represent better jobs in areas of high prejudice. Relative to whites in these jobs, blacks see an increase in their hazard rates, however this effects is never statistically significant. Surprisingly, we see no evidence that black jobs with white supervisors become less stable as prejudice increases. Our point estimates are typically small, negative, and never significant.

We see more evidence for our model when we look only at men in Table 11. When we control for a basic set of worker characteristics, census division fixed effects, and start year fixed effects, the total effect of prejudice on black workers with black supervisors is statistically significant; as prejudice increases these jobs become less stable. The job stability of blacks with white supervisors also decreases in prejudice in this specification, though the effect is not significant. However, much of these effects appear to be explainable by differences in sorting patterns by cognitive ability. Including a quartic in the ASVAB sends the prejudice effect on black worker-white supervisor matches to zero, and the effect on black worker-black supervisor matches becomes insignificant.

### **4.3 Robustness**

Since supervisor race is calculated at the job spell level, longer job spells are more likely to be categorized as black supervisor jobs. One concern then is that our supervisor race effects

are not due to our discrimination model, but instead are proxying for the characteristics of jobs which make them more stable. Given our identification strategy, this is only a problem if these characteristics affect black workers differently than whites. That being said, we can check the sensitivity of our results to this by directly controlling for the duration of the job spell in our wage regression. It should be clear that this is not an ideal control; in our model, the mechanism by which black workers earn lower wages with black supervisors is by choosing jobs which are worse matches and inherently less stable. However, since there is randomness due to incomplete information in our model, our variables of interest should have the same predicted sign once controlling for duration. We show the results of this exercise in Table 12. Columns (1)-(4) show results for the full sample, while (5)-(8) show results for men. Each specification includes the full set of controls. Our results are robust to this approach. Adding a quadratic in duration has virtually no impact on our point estimates of interest, and each maintains its significance level from the baseline regression.

We constructed our measure of prejudice by finding the fraction of individuals within each state who responded in a prejudiced manner to any of five different questions on racial attitudes. While we feel this is a sensible way to measure whether an individual holds prejudice, which in our theoretical model is a dichotomous variable, there is any number of alternative ways we could have constructed our measure. For instance, we could have reported individuals as having “more prejudice” if they responded in a prejudiced way to multiple questions. We could have weighted responses to each question differently as in Charles and Guryan (2008). Given all the different ways prejudice could be constructed, it is inevitable that there is some way to describe the data that would reverse our results.<sup>28</sup> In our econometric model, any deviations from our measurement and the “correct” way to measure prejudice would be represented by differences in  $\nu_s$  across states, which as we note before, presents a bias that is difficult to determine.

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<sup>28</sup>This is essentially the argument of Bond and Lang (2014)’s work on subjective well-being. If we assume that the questions represent manifestations of some latent continuous prejudice variable, there are always some distributional assumptions of the latent variable that would represent the data equally well and reverse the rank ordering of state prejudices.



We assess the sensitivity of our results to measurement choice in Table 13. Each box in column (1) reports the coefficient on the interaction between black, black supervisor, and prejudice from a pooled cross-sectional regression on log wage with controls for worker characteristics, and census division, industry, occupation, and year fixed effects. The rows measure the fraction prejudiced using only that specific question to determine prejudice. Column (2) uses the same approach, but instead using individual fixed effects. While statistical significance varies, we observe remarkably consistent point estimates across our prejudice questions. Excluding the outlying result on each side, every result falls between  $-.036$  and  $-.051$ . Thus it is likely that any reasonable choice of measurement would show that “supervisor wage gap” increases as rates of prejudice increase.

Column (3) reports for a Cox proportional hazard model on the duration of employment with controls for worker characteristics, and census division, industry, occupation and start year fixed effects. Each point estimate is the sum of the black-prejudice and black-black supervisor-prejudice interactions, and thus represents the overall impact of prejudice on the wages of black workers with black supervisors. The  $p$ -values from an  $F$ -test of equality with zero are reported in brackets. Our results here are similarly robust. Only when measured by the fraction of individuals who would not vote for a black president, do we see any evidence that the job stability of black workers with black supervisors increases in prejudice. The other four coefficients vary from zero to positive. Thus, unless we measured prejudice in a way that was highly weighted towards political prejudice, we would likely observe a negative effect of prejudice on the stability of black worker-black supervisor matches. At the same time, none of the individual prejudice measures yields a statistically significant effect of prejudice on stability. It would thus be difficult to construct a reasonable measure of prejudice that provided strong support for our model’s stability prediction.

Columns (4)-(6) report the same results for men. While we see more variance in the point estimates for this subsample, the same general conclusions hold. Any reasonable measure of prejudice would be negatively correlated with the wages of black workers with black

supervisors. Prejudice would also be negatively correlated with these workers' job stability, but only weakly.

## 5 Conclusion

In this paper, we develop a search model where some employers hold prejudices that are unobservable to workers. A supervisor's race acts as a signal of the employer's prejudice level. Since prejudiced employers may sometimes fire black workers arbitrarily, these jobs present less option value to black workers. Thus, they have lower reservation wages for employment when they can observe a black supervisor. This effect leads to lower wages overall and less job stability, but blacks still have relatively more stable matches when employed at a firm with a black supervisor. Increasing the level of prejudice decreases the value of search for black workers. This negative effect on the value of search leads black workers to adopt lower reservation wages for jobs with black supervisors, causing these matches to have both lower wages and less job stability. It also decreases the value of employment with white supervisors, leading black workers to be more selective on the types of white supervisor jobs they accept. Thus, while white supervisor jobs become less stable as prejudice increases, the accepted wages actually increase relative to the wages accepted by workers with black supervisors. We confirmed the main predictions of our model using longitudinal data on job spells with information on supervisor race, matched with data on levels of local prejudice.

Although measured prejudice in the United States has declined over the last half century, our paper demonstrates that the remaining level of prejudice, and the incomplete information on which firms possess this prejudice, can still have negative effects on black employment outcomes. While increasing the number of blacks in leadership positions at firms will have a positive overall effect on black welfare, this effect may not be reflected directly in wage data. The presence of search frictions causes blacks to be less selective on match quality for positions in which they will not be exposed to prejudice.

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# A Theoretical Appendix

## A.1 Proof of Lemma 2

*Proof.* Inspecting (19) and (20) we can see that the numerators are identical. Comparing denominators,

$$2\omega - h > (2\omega - h) - \pi s(\omega - h)$$

since  $\pi s$  is bounded between 0 and 1. Thus  $q_1^{rb} < q_1^{bb}$ . Since reservation wages are identical in period 2, this proves the lemma.  $\square$

## A.2 Proof of Proposition 3

*Proof.* For conditioning on tenure and experience we simply need to check that in each tenure and potential experience combination blacks with white supervisors earn higher wages than blacks with black supervisors. In period 3, workers have 2 periods of potential experience and either 0 or 1 periods of tenure. All workers with 1 period of tenure work in jobs which are good matches and pay 1. Since workers follow the same reservation wage regardless of supervisor type in period 2, the average wage of workers who accepted a job in period 2 is equal across supervisors, so workers with 0 tenure and 2 periods of potential experience earn equal average wages. In period 2, workers who accepted a job in period 1 have 1 period of tenure and 1 period of potential experience. Taking the expectation of the truncated distribution at  $q_1^{bb}$ , the average wage of workers with black supervisors is

$$\bar{q}_2^{bb} = \frac{1}{2}(\omega + q_1^{bb})$$

and likewise for black workers with white supervisors,

$$\bar{q}_2^{bw} = \frac{1}{2}(\omega + q_1^{bw})$$

Since  $q_1^{rbb} < q_2^{rbb}$  (Lemma 2),  $\bar{q}_2^{bb} < \bar{q}_2^{bw}$ . □

### A.3 Proof of Proposition 4

*Proof.* The wages for jobs accepted in period 2, and jobs accepted in period 1 that remain in period 3 are unaffected by prejudice. For, jobs which are accepted in period 1, the period 2 average wage is

$$\bar{q}_2^{bb} = \frac{\omega + q^{rbb}}{2}$$

and is thus a strictly increasing function of  $q^{rbb}$ . Taking the derivative with respect to  $p$ ,

$$\frac{\partial \bar{q}_2^{bb}}{\partial p} = \frac{s \left[ h - \frac{1}{2\omega}(\omega^2 + h^2) \right]}{2\omega - h} = -\frac{s}{2\omega} \frac{(\omega - h)^2}{2\omega - h}$$

which is strictly less than zero. □

### A.4 Proof of Proposition 5

*Proof.* The wages for jobs accepted in period 2, and jobs accepted in period 1 that remain in period 3 are unaffected by prejudice. For, jobs which are accepted in period 1, the period 2 average wage is

$$\bar{q}_2^{bw} = \frac{\omega + q^{rbw}}{2}$$

and is thus a strictly increasing function of  $q^{rbw}$ . Taking the derivative of  $q^{rbw}$  with respect to  $p$ ,

$$\begin{aligned} \frac{\partial q^{rbw}}{\partial p} &= \Delta_1(\omega^2 + h^2) + \Delta_2 2\omega h \\ \Omega_1 &= \frac{s(2\omega - h)}{[(1 - \pi s)(2\omega - h)]^2 [(1 - p)(1 - b) + p(1 - s)]^2 2\omega} \\ \Delta_1 &= (b - s)[(1 - b)(1 - p)^2 - p^2 s(1 - s)] + p^2 s(1 - s)(1 - b) \\ \Delta_2 &= (1 - b)^2(1 - p)^2 + p(1 - ps)(1 - s)(1 - b) + p(1 - s)(1 - b)(1 - p) + p^2 s(1 - s)(b - s) \end{aligned}$$

This expression could be positive if, for instance,  $b$  is relatively small. Or it could be negative, if, for example,  $b$  and  $p$  are large while  $\omega$  and  $h$  are small.  $\square$

## A.5 Proof of Proposition 6

*Proof.* First, note that for jobs accepted in period 2 (i.e. jobs with 2 periods of potential experience and 0 periods of tenure), since workers follow the same reservation wage strategy regardless of supervisor type, the average wages will be the same. Likewise, jobs that are accepted in period 1 and still exist in period 3 (i.e. jobs with 2 periods of potential experience and 1 period of tenure) are all good matches and all pay  $\omega$ . We thus only need to check the distribution of wages for jobs which are accepted in period 1 during period 2. From the uniform assumption, the difference in average wages is

$$q_2^{\bar{b}w} - q_2^{\bar{b}b} = \frac{\omega + q^{rbw}}{2} - \frac{\omega + q^{rbb}}{2} = \frac{1}{2}(q^{rbw} - q^{rbb})$$

Taking the derivative of this expression with respect to prejudice,

$$\frac{\partial(q_2^{\bar{b}w} - q_2^{\bar{b}b})}{\partial p} = \frac{1}{2} \left( \frac{\partial q^{rbw}}{\partial p} - \frac{\partial q^{rbb}}{\partial p} \right)$$

where,

$$\begin{aligned} \frac{\partial q^{rbw}}{\partial p} &= \frac{\frac{\partial \pi}{\partial p} s(\omega - h) [psh + \frac{1-ps}{2\omega}(\omega^2 + h^2)]}{[(2\omega - h) - \pi s(\omega - h)]^2} - \frac{\frac{s}{2\omega}(\omega - h)^2}{[(2\omega - h) - \pi s(\omega - h)]} \\ \frac{\partial q^{rbb}}{\partial p} &= -\frac{\frac{s}{2\omega}(\omega - h)^2}{2\omega - h} \\ \frac{\partial \pi}{\partial p} &= \frac{(1-s)(1-b)}{[(1-b)(1-p) + p(1-s)]^2} \end{aligned}$$

This expression simplifies to

$$\frac{\partial(q_2^{\bar{b}w} - q_2^{\bar{b}b})}{\partial p} = \frac{1}{2} \Omega_2 [\Lambda_3 + \Lambda_4]$$



where,

$$\begin{aligned}\Omega_2 &= \frac{s(1-s)(\omega-h)}{2\omega[(1-b)(1-p)+p(1-s)]^2(2\omega-h)[(2\omega-h)-\pi s(\omega-h)]^2} \\ \Lambda_3 &= 2\omega h p s(2\omega-h)[(1-b)(2-p)+p(1-s)]+p^2 s^2(\omega-h)^3(1-s) \\ \Lambda_4 &= (2\omega-h)(\omega^2+h^2)[(1-b)(1-2ps)-p^2 s(b-s)]\end{aligned}$$

Note that since  $\omega > h \geq 0$  and  $b < 1, p < 1, s < 1$ ,  $\Omega$  and  $\Lambda_1$  are both strictly positive. By inspection,  $\Lambda_2$  is positive so long as  $(1-b)(1-2ps) > p^2 s(b-s)$  and is thus a sufficient condition to guarantee the overall sign of the derivative is positive.  $\square$

## A.6 Proof of Proposition 7

*Proof.* All jobs which begin in period 3 last 1 period. For period 2 jobs, we simply to need to check which supervisor-type jobs have a higher probability of lasting 2 periods. For a job with match signal  $q$  and a black supervisor, the job last two period whenever it is a good match, which occurs with probability  $q$ . For jobs with a white supervisor, the job must be both a good match and the employer must not terminate the worker due to prejudice. This occurs with probability  $(1-q)(1-\pi s)$ . Integrating over the distribution of accepted jobs, black supervisor jobs with last longer provided

$$\frac{1+q^{rbb}}{2} \geq \frac{1+q^{rbw}}{2}(1-\pi s)$$

substituting for the reservation wages and multiply both sides by 2,

$$1 + \frac{(1+ps) + \frac{1-ps}{2\omega}(\omega^2+h^2)}{2\omega-h} \geq \left[ 1 + \frac{(1+ps) + \frac{1-ps}{2\omega}(\omega^2+h^2)}{(2\omega-h) - \pi s(\omega-h)} \right] (1-\pi s)$$

which simplifies to

$$\frac{1}{2\omega-h} - \frac{(1-\pi s)}{(2\omega-h) - \pi s(\omega-h)} \geq -\pi s$$

the left-hand side of the inequality is negative, while the right-hand side is positive since,

$$(2\omega - h) - (\omega - h)\pi s > (2\omega - h) - (2\omega - h)\pi s$$

□

## A.7 Proof of Proposition 8

*Proof.* Again, all jobs that were accepted in period 2 have 1 period of duration. The probability of a job accepted with a black supervisor in period 1 lasting two periods is the probability that this job is a good match. Given the uniform distribution of job offers, this amounts to

$$\frac{1 + q^{rbb}}{2}$$

In Proposition 4, we showed that  $\frac{\partial q_{bb}^r}{\partial p} < 0$ , which proves the proposition. □

## A.8 Proof of Proposition 9

*Proof.* All jobs that were accepted in period 2 have 1 period of duration. The probability of a job accepted with a black supervisor in period 1 lasting two periods is the probability that this job is a good match. Given the uniform distribution of job offers, this amounts to

$$\frac{1 + q^{rbw}}{2}(1 - \pi s)$$

Taking the derivative of this expression with respect to  $p$ ,

$$-\frac{1}{2} \frac{d\pi}{dp} s + \frac{dq^{rbw}(1 - \pi s)}{dp}$$

The first term represents the change in the probability of a match lasting two periods at the upper-bound ( $q = 1$ ), which is negative since  $\frac{d\pi}{ds}$ . The second term represents the change

in probability of the match lasting two periods at the reservation match quality. This term must also be negative. Suppose not, and that the reservation match quality become more stable when  $p$  increased. Given that  $\frac{d\pi}{dp} > 0$ , this could only happen when  $q^{rbw}$  increases in  $p$  (which is possible). However, this would imply that both  $q^{rbw}$  and  $(1 - \pi s)q^{rbw}$  has increased, and thus the total value of employment at the reservation match quality  $V_2^{bw}(q^{rbb})$  has also increased. But,  $V_2^{bw}(q^{rbb}) = U_2^b$ . Taking the derivative of (13),

$$\frac{\partial U^b}{\partial p} = -\frac{s}{2\omega}(\omega - h)^2$$

which is strictly less than zero. Thus, we have a contradiction.  $\square$

## A.9 Proof of Lemma 10

*Proof.* Taking the difference of (8) and (19),

$$q_1^{rw} - q_1^{rbb} = \frac{ps(\omega - h)^2}{2\omega - h} > 0$$

For period 2 jobs, the reservation wages are identical ( $h$ ).  $\square$

## A.10 Proof of Proposition 11

*Proof.* This follows directly from Lemma 10, since the difference in period 2 mean wages is simply  $\frac{1}{2}(q_1^{rw} - q_1^{rbb})$  for jobs accepted in period 1. For jobs accepted in period 2, the reservation wage strategies and thus the mean wages are identical. Jobs accepted in period 1 all pay  $\omega$  in period 3.  $\square$

## A.11 Proof of Proposition 12

*Proof.* Taking the difference of (8) and (20),

$$q_1^{rw} - q_1^{rbw} = \frac{1}{2\omega}(\omega^2 + h^2)(1 - s) - (2\omega - h)(\omega - h)[(1 - b)(1 - p) + p(1 - s)]$$

The expression can be positive, for instance, when  $\omega$  is close to  $h$ , or negative, for instance, when  $h$  is close to 0 and  $p$  is large.  $\square$

## A.12 Proof of Proposition 13

*Proof.* All jobs accepted in period 2 have duration of 1. For jobs accepted in period 1, the difference in stability for white workers with white supervisors and black workers with black supervisors is

$$\frac{1}{2}(q_1^{rw} - q_1^{rbw})$$

which we know is negative from Lemma 10. Likewise since white supervisor jobs are always less stable for black workers than black supervisor jobs (Proposition 7), we know that white workers will also experience longer job durations than black workers with white supervisors. Since the average job stability for black workers is a linear combination of two stabilities which are less than the average stability for white workers, we know that white workers overall average stability will be higher.  $\square$

# B Data Appendix

## B.1 GSS Prejudice Measures

Here we list the exact wording and coding of the questions we used to measure prejudice in the general social survey

### **B.1.1 Lack Will**

The variable RACDIF4 asks, “On the average African Americans have worse jobs, income, and housing than white people. Do you think these differences are because most African Americans just don’t have the motivation or willpower to pull themselves up out of poverty?” Respondents could choose ‘Yes,’ ‘No,’ or ‘Do Not Know.’ We coded ‘Yes’ answers as prejudiced responses and ‘Do Not Know’ as missing. The question was asked in 2006, 2008, and 2010.

### **B.1.2 Inborn Differences**

The variable RACDIF2 asks, “On the average African Americans have worse jobs, income, and housing than white people. Do you think these differences are because most African Americans have less in-born ability to learn?” Respondents could choose ‘Yes,’ ‘No,’ or ‘Do Not Know.’ We coded ‘Yes’ answers as prejudiced responses and ‘Do Not Know’ as missing. The question was asked in 2006, 2008, and 2010.

### **B.1.3 Against Housing Laws**

The variable RACOPEN asks, “Suppose there is a community-wide vote on the general housing issue. There are two possible laws to vote on. One law says that a homeowner can decide for himself whom to sell his house to, even if he prefers not to sell to African Americans. The second law says that a homeowner cannot refuse to sell to someone because of their race or color. Which law would you vote for?” Respondents could choose ‘A homeowner can decide for himself whom to sell his house to, even if he prefers not to sell to African Americans,’ ‘A homeowner cannot refuse to sell to someone because of their race or color,’ ‘Neither,’ or ‘Don’t Know.’ We coded the first and third response as prejudiced and ‘Don’t Know’ as missing. This question was asked in 2006, 2008, and 2010.

#### **B.1.4 Against Favors**

The variable WRKWAYUP asks, “Do you agree strongly, agree somewhat, neither agree nor disagree, disagree somewhat, or disagree strongly with the following statement: Irish, Italians, Jewish and many other minorities overcame prejudice and worked their way up. Blacks should do the same without special favors.” Respondents could choose ‘Agree strongly,’ ‘Agree somewhat,’ ‘Neither agree nor disagree,’ ‘Disagree somewhat,’ ‘Disagree strongly,’ or ‘Don’t Know.’ We coded ‘Agree strongly’ and ‘Agree somewhat’ as prejudiced responses and ‘Don’t Know’ as missing. This question was asked in 2006, 2008, and 2010.

#### **B.1.5 Against Black President**

The variable RACPRES asks, “If your party nominated an African American for President, would you vote for him if he were qualified for the job?” Respondents could choose ‘Yes,’ ‘No,’ or ‘Don’t Know.’ We coded ‘No’ as a prejudiced response and ‘Don’t Know’ as missing. This question was asked in 2008 and 2010.

#### **B.1.6 Against Affirmative Action**

The variable AFFRMACT asks, “Some people say that because of past discrimination, blacks should be given preference in hiring and promotion. Others say that such preference in hiring and promotion of blacks is wrong because it discriminates against whites. What about your opinion? Are you for or against preferential hiring and promotion of blacks? Do you favor preference in hiring and promotion strongly or not strongly? Do you oppose preference in hiring and promotion strongly or not strongly?” The respondents could choose ‘Strongly support preferential hiring,’ ‘Support preferential hiring,’ ‘Oppose preferential hiring,’ ‘Strongly Oppose Preferential Hiring,’ or ‘Don’t Know.’ For Table 1, we coded ‘Oppose preferential hiring’ and ‘Strongly Oppose Preferential Hiring’ as prejudiced responses, and ‘Don’t Know’ as missing. We do not, however, use this question in the calculation of our ‘Any Prejudice’ measure. This question was asked in 2006, 2008, and 2010.

### **B.1.7 Any Prejudice**

We code a person as possessing 'any prejudice' if they indicated a prejudiced response to any of the questions described above, with the exception of AFFRMACT.

Table 1: White Prejudice by Census Division

	Census Division								
	Northeast		Midwest		5	South		West	
	1	2	3	4		6	7	8	9
Lack Will	0.40	0.48	0.49	0.45	0.55	0.58	0.61	0.45	0.44
Inborn Differences	0.09	0.12	0.11	0.08	0.08	0.08	0.11	0.05	0.06
Against Housing Laws	0.17	0.17	0.15	0.22	0.19	0.21	0.21	0.16	0.15
Against Favors	0.42	0.38	0.42	0.38	0.43	0.42	0.49	0.42	0.37
Against Black President	0.02	0.04	0.07	0.05	0.06	0.09	0.07	0.04	0.05
Against Affirmative Action	0.91	0.94	0.92	0.93	0.94	0.94	0.94	0.94	0.94
Any Prejudice	0.53	0.51	0.53	0.55	0.56	0.57	0.62	0.54	0.48
Observations	273	805	1201	465	1315	396	504	572	862

Fraction of individuals in each region for the combined 2006, 2008, and 2010 wave of the General Social Survey who reported each belief. See Appendix B for details of the data construction.



Table 2: Descriptive Statistics - Worker Race

	(1)	<u>All</u> (2)	(3)	<u>Men</u> (4)	(5)
	Total	White	Black	White	Black
Log Wage	7.24 (0.46)	7.30 (0.46)	7.12 (0.43)	7.33 (0.46)	7.14 (0.44)
Education	13.54 (2.44)	13.69 (2.48)	13.21 (2.32)	13.29 (2.41)	12.64 (2.15)
Female	0.47 (0.50)	0.45 (0.50)	0.51 (0.50)		
Potential Experience	4.80 (3.18)	4.64 (3.14)	5.15 (3.23)	4.87 (3.21)	5.50 (3.31)
Tenure	955.53 (812.15)	986.45 (823.75)	890.11 (783.06)	989.46 (830.03)	869.32 (774.64)
ASVAB	0.48 (0.28)	0.55 (0.27)	0.31 (0.24)	0.53 (0.28)	0.29 (0.22)
Black Supervisor	0.22 (0.42)	0.08 (0.27)	0.53 (0.50)	0.07 (0.26)	0.52 (0.50)
Lack Will	0.51 (0.11)	0.50 (0.10)	0.52 (0.12)	0.50 (0.10)	0.52 (0.12)
Inborn Differences	0.09 (0.05)	0.09 (0.04)	0.09 (0.06)	0.09 (0.04)	0.09 (0.05)
Against Housing Laws	0.18 (0.04)	0.18 (0.04)	0.18 (0.05)	0.18 (0.04)	0.18 (0.04)
Against Favors	0.41 (0.06)	0.41 (0.06)	0.41 (0.07)	0.41 (0.05)	0.41 (0.07)
Against Black President	0.06 (0.05)	0.06 (0.05)	0.05 (0.04)	0.06 (0.05)	0.05 (0.04)
Against Affirmative Action	0.93 (0.03)	0.93 (0.03)	0.94 (0.03)	0.93 (0.03)	0.94 (0.03)
Any Prejudice	0.54 (0.06)	0.53 (0.06)	0.54 (0.08)	0.53 (0.06)	0.54 (0.07)
Observations	34123	22732	11391	12721	5627

Descriptive statistics by worker race. Each observation is a job-year. Standard deviations in parenthesis. Observations are weighted by days they were worked in that year. See Appendix B for description of prejudice measures.

Table 3: Descriptive Statistics - Supervisor Race

	(1)	(2)	(3)	(4)
	<u>All</u>		<u>Men</u>	
	White	Black	White	Black
Log Wage	7.26 (0.45)	7.16 (0.45)	7.30 (0.46)	7.19 (0.46)
Education	13.62 (2.46)	13.24 (2.36)	13.18 (2.37)	12.76 (2.27)
Female	0.46 (0.50)	0.51 (0.50)	0.00 (0.00)	0.00 (0.00)
Potential Experience	4.73 (3.16)	5.05 (3.22)	5.01 (3.23)	5.24 (3.32)
Tenure	939.25 (800.92)	1012.81 (848.06)	939.75 (804.38)	1009.95 (857.19)
ASVAB	0.51 (0.28)	0.36 (0.27)	0.49 (0.28)	0.34 (0.27)
Black	0.20 (0.40)	0.76 (0.43)	0.18 (0.38)	0.75 (0.43)
Lack Will	0.51 (0.10)	0.52 (0.12)	0.51 (0.11)	0.52 (0.12)
Inborn Differences	0.09 (0.05)	0.09 (0.05)	0.09 (0.04)	0.08 (0.04)
Against Housing Laws	0.18 (0.04)	0.18 (0.04)	0.18 (0.04)	0.18 (0.04)
Against Favors	0.41 (0.06)	0.41 (0.07)	0.41 (0.06)	0.41 (0.07)
Against Black President	0.06 (0.05)	0.05 (0.04)	0.06 (0.05)	0.05 (0.04)
Against Affirmative Action	0.93 (0.03)	0.94 (0.03)	0.93 (0.03)	0.94 (0.03)
Any Prejudice	0.53 (0.06)	0.54 (0.07)	0.53 (0.06)	0.54 (0.07)
Observations	26636	7487	14632	3716

Descriptive statistics by supervisor race measure. Each observation is a job-year. Standard deviations in parenthesis. Observations are weighted by days they were worked in that year. See Appendix B for description of prejudice measures.

Table 4: Racial Employment Matches and Wages - All Workers

	(1)	(2)	(3)	(4)	(5)	(6)
	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
Black	-0.117*** (0.013)	-0.107*** (0.013)	-0.072*** (0.011)			
Black Supervisor	0.027 (0.023)	0.028 (0.023)	0.045** (0.020)	0.034 (0.022)	0.030 (0.022)	0.036* (0.020)
Black X Black Supervisor	-0.058** (0.028)	-0.056** (0.027)	-0.071*** (0.024)	-0.055** (0.026)	-0.051** (0.026)	-0.061*** (0.024)
Worker Fixed Effects	No	No	No	Yes	Yes	Yes
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Industry FE	No	No	Yes	No	No	Yes
State FE	No	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
Observations	34123	34076	33812	34123	34076	33812

Robust standard errors in parenthesis clustered at the individual level. Worker characteristics in columns (1)-(3) include controls for education, a gender dummy, and quadratic terms in potential experience and tenure. Worker characteristics in columns (4)-(6) include quadratic terms in potential experience and tenure. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Table 5: Racial Employment Matches and Wages - Men

	(1)	(2)	(3)	(4)	(5)	(6)
	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
Black	-0.134***	-0.125***	-0.072***			
	(0.017)	(0.018)	(0.016)			
Black Supervisor	0.021	0.033	0.047**	0.033	0.032	0.032
	(0.028)	(0.028)	(0.023)	(0.032)	(0.032)	(0.029)
Black X Black Supervisor	-0.051	-0.063*	-0.084***	-0.068*	-0.070*	-0.073**
	(0.035)	(0.034)	(0.030)	(0.037)	(0.038)	(0.035)
Worker Fixed Effects	No	No	No	Yes	Yes	Yes
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Industry FE	No	No	Yes	No	No	Yes
State FE	No	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
Observations	18348	18323	18119	18348	18323	18119

Robust standard errors in parenthesis clustered at the individual level. Worker characteristics in columns (1)-(3) include controls for education, and quadratic terms in potential experience and tenure. Worker characteristics in columns (4)-(6) include quadratic terms in potential experience and tenure. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Table 6: Prejudice and and Wages - All Workers

	(1)	(2)	(3)	(4)	(5)	(6)
	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
Black	-0.112*** (0.019)	-0.103*** (0.017)	-0.069*** (0.016)			
Black Supervisor	0.033* (0.019)	0.036* (0.019)	0.050*** (0.016)	0.034 (0.024)	0.030 (0.023)	0.032 (0.024)
Black X Black Supervisor	-0.058** (0.024)	-0.056** (0.022)	-0.070*** (0.022)	-0.052 (0.035)	-0.048 (0.034)	-0.053 (0.032)
Prejudice	-0.051* (0.027)	-0.030 (0.030)	-0.021 (0.027)	-0.011 (0.019)	-0.020 (0.020)	-0.016 (0.019)
Prejudice X Black	-0.003 (0.024)	-0.022 (0.024)	-0.013 (0.024)	-0.018 (0.033)	-0.027 (0.030)	-0.031 (0.031)
Prejudice X Black Supervisor	0.027 (0.033)	0.026 (0.033)	0.025 (0.029)	0.062** (0.030)	0.059* (0.031)	0.045 (0.032)
Prejudice X Black X Black Supervisor	-0.037 (0.040)	-0.041 (0.039)	-0.038 (0.034)	-0.079* (0.043)	-0.076* (0.044)	-0.062 (0.043)
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Industry FE	No	No	Yes	No	No	Yes
Census Division FE	No	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
Observations	31556	31556	31298	31556	31556	31298
Prejudice on Black-Black Supervisor $F$	1.268	3.185*	3.330*	4.168**	4.799**	4.148**

Robust standard errors clustered at the state level in parenthesis.  $F$ -test is for Prejudice X Black + Prejudice X Black X Black Supervisor=0. Worker characteristics in columns (1) - (3) include controls for education, a gender dummy, and quadratic terms in potential experience and tenure. Worker characteristics in column (4)-(6) include quadratic terms in potential experience and tenure. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Table 7: Prejudice and and Wages - Men

	(1)	(2)	(3)	(4)	(5)	(6)
	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
Black	-0.125*** (0.022)	-0.119*** (0.023)	-0.064*** (0.021)			
Black Supervisor	0.031 (0.030)	0.033 (0.029)	0.050* (0.026)	0.028 (0.033)	0.022 (0.032)	0.023 (0.032)
Black X Black Supervisor	-0.062* (0.032)	-0.059* (0.031)	-0.086*** (0.029)	-0.056 (0.042)	-0.048 (0.041)	-0.054 (0.039)
Prejudice	-0.057** (0.028)	-0.043 (0.032)	-0.027 (0.030)	-0.009 (0.026)	-0.026 (0.028)	-0.008 (0.027)
Prejudice X Black	0.043 (0.033)	0.029 (0.036)	0.034 (0.033)	0.030 (0.036)	0.004 (0.035)	0.000 (0.038)
Prejudice X Black Supervisor	0.057 (0.045)	0.052 (0.045)	0.043 (0.039)	0.059 (0.046)	0.053 (0.047)	0.039 (0.048)
Prejudice X Black X Black Supervisor	-0.100** (0.049)	-0.096* (0.049)	-0.090** (0.040)	-0.104* (0.056)	-0.094 (0.057)	-0.081 (0.056)
Worker Fixed Effects	No	No	No	Yes	Yes	Yes
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Industry FE	No	No	Yes	No	No	Yes
Census Division FE	No	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
Observations	16955	16955	16753	16955	16955	16753
Prejudice on Black-Black Supervisor $F$	1.835	2.693	3.677*	1.208	1.953	1.505

Robust standard errors clustered at the state level in parenthesis.  $F$ -test is for Prejudice X Black + Prejudice X Black X Black Supervisor=0. Worker characteristics in columns (1) - (3) include controls for education, and quadratic terms in potential experience and tenure. Worker characteristics in column (4)-(6) include quadratic terms in potential experience and tenure. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Table 8: Racial Employment Matches and Job Stability - Cox Proportional Hazard Model, All Workers

	(1)	(2)	(3)	(4)	(5)
	Duration	Duration	Duration	Duration	Duration
Black	0.264*** (0.027)	0.251*** (0.029)	0.239*** (0.029)	0.242*** (0.033)	0.228*** (0.035)
Black Supervisor	-0.204*** (0.049)	-0.206*** (0.049)	-0.174*** (0.049)	-0.171*** (0.053)	-0.147*** (0.055)
Black X Black Supervisor	-0.081 (0.058)	-0.075 (0.058)	-0.098* (0.059)	-0.097 (0.064)	-0.100 (0.066)
Worker Characteristics	Yes	Yes	Yes	Yes	Yes
ASVAB Quartic	No	No	No	Yes	Yes
Occupation FE	No	No	Yes	No	Yes
Industry FE	No	No	Yes	No	Yes
State FE	No	Yes	Yes	No	Yes
Start Year FE	No	Yes	Yes	No	Yes
Observations	14742	14716	14599	12091	11977

Cox proportional hazard model for total duration of job spell. Robust standard errors in parenthesis clustered at the individual level. Worker characteristics include controls for education, a gender dummy, and quadratic terms in potential experience at the start of the job spell. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Breslow method used for ties. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Table 9: Racial Employment Matches and Job Stability - Cox Proportional Hazard Model, Men

	(1)	(2)	(3)	(4)	(5)
	Duration	Duration	Duration	Duration	Duration
Black	0.259*** (0.038)	0.248*** (0.040)	0.234*** (0.042)	0.242*** (0.045)	0.226*** (0.049)
Black Supervisor	-0.230*** (0.066)	-0.242*** (0.067)	-0.197*** (0.068)	-0.180** (0.071)	-0.141* (0.073)
Black X Black Supervisor	-0.071 (0.080)	-0.053 (0.081)	-0.077 (0.082)	-0.102 (0.087)	-0.113 (0.090)
Worker Characteristics	Yes	Yes	Yes	Yes	Yes
ASVAB Quartic	No	No	No	Yes	Yes
Occupation FE	No	No	Yes	No	Yes
Industry FE	No	No	Yes	No	Yes
State FE	No	Yes	Yes	No	Yes
Start Year FE	No	Yes	Yes	No	Yes
Observations	7924	7912	7823	6440	6360

Cox proportional hazard model for total duration of job spell. Robust standard errors in parenthesis clustered at the individual level. Worker characteristics include controls for education, and quadratic terms in potential experience at the start of the job spell. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Breslow method used for ties. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$



Table 10: Prejudice and Job Stability - Cox Proportional Hazard Model, All Workers

	(1)	(2)	(3)	(4)	(5)
	Duration	Duration	Duration	Duration	Duration
Black	0.267*** (0.034)	0.258*** (0.033)	0.242*** (0.032)	0.242*** (0.039)	0.218*** (0.039)
Black Supervisor	-0.192*** (0.051)	-0.196*** (0.053)	-0.165*** (0.047)	-0.152*** (0.053)	-0.137*** (0.051)
Black X Black Supervisor	-0.102* (0.054)	-0.083 (0.057)	-0.101* (0.056)	-0.122** (0.062)	-0.099 (0.065)
Prejudice	0.018 (0.031)	-0.006 (0.033)	-0.010 (0.034)	-0.014 (0.030)	-0.019 (0.034)
Prejudice X Black	-0.003 (0.047)	-0.001 (0.045)	-0.015 (0.047)	0.007 (0.046)	-0.020 (0.049)
Prejudice X Black Supervisor	-0.121 (0.097)	-0.120 (0.101)	-0.142 (0.094)	-0.112 (0.105)	-0.131 (0.102)
Prejudice X Black X Black Supervisor	0.132 (0.110)	0.134 (0.115)	0.135 (0.111)	0.097 (0.118)	0.104 (0.123)
Worker Characteristics	Yes	Yes	Yes	Yes	Yes
ASVAB Quartic	No	No	No	Yes	Yes
Industry FE	No	No	Yes	No	Yes
Occupation FE	No	No	Yes	No	Yes
Census Division FE	No	Yes	Yes	No	Yes
Start Year FE	No	Yes	Yes	No	Yes
Observations	13624	13624	13512	11166	11077
Prejudice-Black Supervisor $F$	1.542	1.684	1.588	0.859	0.685

Cox proportional hazard model for total duration of job spell. Robust standard errors in parenthesis clustered at the state level.  $F$ -test is for Prejudice X Black + Prejudice X Black X Black Supervisor=0. Worker characteristics include controls for education, a gender dummy, and a quadratic term in potential experience at the start of the job spell. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Breslow method used for ties. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .

Table 11: Prejudice and Job Stability - Cox Proportional Hazard Model, Men

	(1)	(2)	(3)	(4)	(5)
	Duration	Duration	Duration	Duration	Duration
Black	0.271*** (0.047)	0.256*** (0.046)	0.234*** (0.046)	0.260*** (0.052)	0.227*** (0.056)
Black Supervisor	-0.208*** (0.074)	-0.212*** (0.073)	-0.173** (0.070)	-0.153* (0.081)	-0.121* (0.072)
Black X Black Supervisor	-0.103 (0.084)	-0.081 (0.084)	-0.100 (0.088)	-0.134 (0.098)	-0.122 (0.099)
Prejudice	-0.027 (0.035)	-0.055 (0.034)	-0.069** (0.035)	-0.057 (0.037)	-0.089** (0.036)
Prejudice X Black	0.025 (0.071)	0.039 (0.065)	0.039 (0.069)	0.002 (0.076)	0.000 (0.080)
Prejudice X Black Supervisor	-0.172 (0.128)	-0.180 (0.130)	-0.191 (0.128)	-0.120 (0.137)	-0.137 (0.127)
Prejudice X Black X Black Supervisor	0.184 (0.130)	0.195 (0.134)	0.179 (0.136)	0.141 (0.155)	0.154 (0.155)
Worker Characteristics	Yes	Yes	Yes	Yes	Yes
ASVAB Quartic	No	No	No	Yes	Yes
Industry FE	No	No	Yes	No	Yes
Occupation FE	No	No	Yes	No	Yes
Census Division FE	No	Yes	Yes	No	Yes
Start Year FE	No	Yes	Yes	No	Yes
Observations	7296	7296	7208	5920	5853
Prejudice-Black Supervisor $F$	2.059	2.747*	2.504	0.698	0.991

Cox proportional hazard model for total duration of job spell. Robust standard errors in parenthesis clustered at the state level.  $F$ -test is for Prejudice X Black + Prejudice X Black X Black Supervisor=0  
Worker characteristics include controls for education, and a quadratic term in potential experience at the start of the job spell. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Breslow method used for ties. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .

Table 12: Prejudice and Wages - Controlling for Job Spell Length

	Full Sample				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
Black	-0.067*** (0.011)		-0.064*** (0.016)		-0.065*** (0.016)		-0.056** (0.021)	
Black Supervisor	0.039** (0.020)	0.023 (0.019)	0.043*** (0.016)	0.020 (0.023)	0.040* (0.023)	0.019 (0.029)	0.043* (0.024)	0.010 (0.030)
Black X Black Supervisor	-0.071*** (0.024)	-0.055** (0.023)	-0.070*** (0.021)	-0.048 (0.031)	-0.084*** (0.029)	-0.067** (0.034)	-0.087*** (0.028)	-0.049 (0.037)
Prejudice			-0.021 (0.028)	-0.015 (0.018)			-0.027 (0.030)	-0.000 (0.025)
Prejudice X Black			-0.013 (0.024)	-0.029 (0.028)			0.036 (0.032)	-0.006 (0.035)
Prejudice X Black Supervisor			0.024 (0.029)	0.040 (0.032)			0.035 (0.037)	0.028 (0.046)
Prejudice X Black X Black Supervisor			-0.038 (0.034)	-0.058 (0.042)			-0.087** (0.039)	-0.073 (0.054)
Worker Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Duration Quadratic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	No	No	Yes	Yes	No	No
Census Division FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33812	33812	31298	31298	18119	18119	16753	16753

Robust standard errors in parenthesis clustered at the individual level. Worker characteristics in columns (1) and (3) include controls for education, a gender dummy, and quadratic terms in potential experience and tenure. Worker characteristics in columns (5) and (7) include controls for education, and quadratic terms in potential experience and tenure. Worker characteristics in columns (2), (4), (6), and (8) include quadratic terms in potential experience and tenure. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Table 13: Robustness - Alternative Prejudice Measures

	(1)	(2)	(3)	(4)	(5)	(6)
	<u>Full Sample</u>			<u>Men</u>		
	<u>Log Wage</u>		<u>Duration</u>	<u>Log Wage</u>		<u>Duration</u>
	Pooled	Fixed Effect	Hazard	Pooled	Fixed Effect	Hazard
Lack Will	-0.036** (0.018)	-0.038* (0.022)	0.050 [0.59]	-0.055*** (0.019)	-0.038 (0.030)	0.119 [0.22]
Inborn Differences	-0.039 (0.038)	-0.100** (0.050)	0.102 [0.48]	-0.014 (0.061)	-0.068 (0.075)	0.007 [0.98]
Against Housing Laws	0.008 (0.051)	-0.032 (0.060)	-0.009 [0.95]	0.018 (0.076)	-0.014 (0.094)	0.148 [0.45]
Against Favors	-0.046 (0.033)	-0.051 (0.041)	0.130 [0.15]	-0.089** (0.037)	-0.075 (0.054)	0.197 [0.15]
Against Black President	-0.051 (0.042)	-0.049 (0.057)	-0.099 [0.43]	-0.104 (0.067)	-0.087 (0.081)	-0.170 [0.41]

Log wage columns represent coefficients on the interaction between black, black supervisor and prejudice in a regression on log wages including controls for worker characteristics, and industry, occupation, census divisions, and year fixed effects. Duration columns represent the sum of the coefficient on the interaction between black and prejudice and black, black supervisor, and prejudice in a Cox proportional hazard model on job duration including controls for worker characteristics, and industry, occupation, census division, and start year fixed effects. Standard errors in parenthesis clustered at the state-level.  $p$ -values in brackets. \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$