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# Prejudice and Racial Matches in Employment\*

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## Abstract

We develop a search model in which some employers hold unobservable racial prejudice towards black workers. Prejudiced employers may refuse to hire and may terminate black workers based on their prejudice. Workers do not observe employer prejudice, but they observe the race of their potential supervisor at the firm, which serves as a signal of the employer's prejudice. Jobs in firms with black supervisors hold higher option value for black workers, because they are less likely to face prejudice-based termination. Hence, black workers are willing to accept employment with lower expected match quality from firms with black supervisors. We derive theoretical predictions on differences in observed wages and job stability across supervisor race and prejudice levels. We find empirical support for our predictions using a unique longitudinal dataset with 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 job search model in which black workers respond to imperfect signals of employer prejudice in the local labor market. We test the theoretical predictions from the model using a unique dataset on local prejudice levels and supervisor’s race and provide a new explanation for the observed black-white differences in wages and unemployment in the U.S.<sup>1</sup> Our work builds on the taste-based discrimination framework that dates to Becker (1971). In Becker’s seminal work, prejudiced employers dislike hiring black workers, and to offset their utility loss, they are only willing to hire black workers at a lower wage than whites. However, in a perfectly competitive labor market, prejudice *does not* cause long-run wage differentials, provided that there are enough unprejudiced employers in the labor market to offer employment to black workers. Instead, as emphasized by Arrow (1972), employment will be segregated, but there will be no long-run wage discrimination as unprejudiced firms enter and growing demand for black workers eliminates wage differentials.

Subsequent research have shown, however, that wage differentials can persist when there are search frictions (e.g., Black 1995, Bowlus and Eckstein 2002, Rosen 1997). A common prediction from these search models is that the existence of prejudiced employers lowers the arrival rate of job offers to blacks. Because search is costly, black workers are willing to set a lower reservation wage or match quality for accepting employment. The search framework can also facilitate predictions about employment differences between black and white workers. Compared to wage differentials, much less attention has been paid to racial gaps in employment, despite the fact that the size of the unexplained employment gap is substantially larger (e.g., Stratton 1993, Johnson and Neal 1998, Ritter and Taylor 2011; Lang and Lehmann 2012). The existence of large, unexplained black-white differentials in employment suggests that disentangling the factors behind racially varying frictions in job search is important for a better understanding racial inequalities in the labor market.

We begin with a random search model in which some employers hold prejudice towards black workers and workers face two sources of information friction: a job-specific match quality and employer prejudice. Productivity on the job is initially uncertain to both worker and firm. Upon matching, they receive a signal of the true productivity, and workers are paid their expected product until the uncertainty is resolved. After one period on the job, match quality is revealed, and if the match is poor, it is terminated and the worker returns

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<sup>1</sup>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 (Neal and Johnson, 1996), yet a sizable wage gap still remains even accounting for observable differences in education and cognitive test scores especially among low-skill workers (e.g., Carneiro, Heckman, and Masterov 2005, Lang and Manove 2011, Bjerck 2006, and Black et al. 2006).

to unemployment. An employer’s prejudice manifests itself in two ways. First, similar to Black (1995), prejudiced firms may sometimes refuse to offer employment to blacks upon matching. Second, prejudiced firms may arbitrarily fire black employees after each period of employment.<sup>2</sup> When workers meet an employer during job search, they cannot observe whether the employer is prejudiced or not.<sup>3</sup> However, they observe the race of their potential supervisor at the firm. The presence of black supervisors serves as an informative signal that the employer lacks prejudice. Because black workers have greater confidence that they will not be arbitrarily terminated after the job-match quality is revealed, blacks are willing to accept lower wages from firms with black supervisors. In other words, jobs from unprejudiced firms provide black workers with a greater option value; if the job is revealed to be a better match than the worker had initially expected, he or she will not lose future wage benefits as a result of an arbitrary, prejudice-based termination.

Our model produces several new empirically testable predictions about wage and employment differentials between black and white workers across supervisor race and prejudice levels. First, black workers will have lower average wages in jobs with a black supervisor. However, they will be 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 a lower expected termination risk (i.e., greater option value). Second, 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 stability effects are magnified. Our model predicts that as prejudice levels rise in the local labor market, black workers in jobs with black supervisors’ wages will decrease both absolutely and relative to their wages in jobs with white supervisors, and their job stability will decrease absolutely. 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 measures of prejudice 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 exam-

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<sup>2</sup>In our model, arbitrary termination is 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 or the employer acting on his prejudiced views to the fullest extent possible without facing legal repercussions.

<sup>3</sup>In a standard taste-based discrimination model, prejudiced firms do not make offers to black workers, so they know with full confidence that their potential employer is not prejudiced. However, there are many reasons to think that a job offer does not preclude a black worker from facing prejudice on the job. For example, the hiring officer may be unprejudiced, but the supervisor may be prejudiced. Implicit Association Tests have also shown that many individuals who do not believe they are prejudiced may still possess subconscious prejudices which may impact the employment relationship. See, for example, Ziegert and Hanges (2005), Bertrand, Chugh and Mullainathan (2005), and Rooth (2007).

ine wages and employment patterns for black and white workers across jobs with different supervisor races or perceived prejudice.

Likely due to lack of data, there exists only limited research on the impact of prejudice levels or employer/supervisor’s race on labor market outcomes. Closely related to our work is that of Charles and Guryan (2008) in which they test the predictions of the canonical Becker model. Using measures of prejudice from the GSS, they 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.<sup>4</sup> Fadlon (2015) uses the NLSY97 to test a model of statistical discrimination in which black employers observe black workers’ skill levels with better accuracy than white employers. To support this he finds that the correlation between wage and skills is stronger for workers who have a same race supervisor. Finally, using personnel data from a single firm, Giuliano et. al (2009, 2011) show that black managers disproportionately hire blacks relative to managers of other races, and that black workers under black managers have better career trajectories.

Our work differs in many important aspects from these papers. First, our model focuses on imperfect information on employer prejudice. Second, rather than equate supervisor’s race with that of the hiring officer, we assume that the presence of a black supervisor provides a signal of the prejudice a worker may face on the job. Third, all employers observe the match quality signal of workers with equal precision. Finally, our model yields unique predictions about racial differentials in wages and job stability across employers and labor markets with varying levels of prejudice.

The rest of our paper proceeds as follows. In Section 2, we introduce our model of search with unobservable employer prejudice and derive our main predictions. We describe the data in Section 3 and present results from our empirical tests in Section 4. Section 5 concludes.

## 2 Model of Search and Racial Matches in Employment

In this section we outline a simple model to illustrate our ideas formally and to motivate our empirical work. Prejudice will have two negative repercussions on black workers. Prejudiced employers do not always make job offers to black workers, which decreases the arrival rate of jobs and makes black workers less selective in accepting employment than whites. Prejudiced employers also terminate black workers at higher rates, but black workers cannot observe which employers are prejudiced. They do observe the race of a supervisor, and prejudiced

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<sup>4</sup>Charles and Guryan (2011) extends this analysis by showing that, despite decreases in the average level of prejudice in the U.S. over the past half-century, there has been little change in the level of prejudice held by the marginally prejudiced individuals who are most likely to interact with blacks given the segregation implied by Becker’s model.

firms do not employ black supervisors. Thus, black workers anticipate a higher chance of termination from a white supervisor firm. As a consequence, black workers are more selective on jobs they accept from white supervisor firms than black supervisor firms. The higher perceived termination risk decreases the option value of employment at white supervisor firms. Our theoretical model formalizes this intuition.

## 2.1 Primitives

We begin with a three-period model. Workers differ in their race but are otherwise identical. They are risk-neutral and do not discount the future. We outline the timing of our model graphically in Figure 1. All workers begin unemployed. In each period, unemployed workers earn  $h$  and are randomly matched with a firm (period 1). If that firm offers them a job and the worker accepts, they transition to employment with that firm in the *next* period (period 2). A worker's productivity on the job depends only on his job match quality, which is either good or bad. Workers are paid their expected marginal product.<sup>5</sup> In good matches, workers produce  $\omega > h > 0$ , while in bad matches, workers produce 0.<sup>6</sup> Upon matching, workers and firms observe a signal  $q$  which represents the probability that the match will be good. This signal is distributed uniformly over  $[0, 1]$ , which ensures that any results at the reservation wages hold for the average wages. In Appendix A.2, we describe the conditions under which our predictions hold for a more general distribution.<sup>7</sup>

After one period of employment, both the firm and the worker learn the quality of the match. If the match is bad, the worker quits and transitions to unemployment in the next period (period 3). Otherwise he remains employed at the firm and earns  $\omega$ .<sup>8</sup> A worker is either white ( $w$ ) or black ( $b$ ). Some firms possess prejudice against black workers, and the prejudice manifests itself in two ways. First, prejudiced firms may choose not to make a wage offer to black workers upon meeting them. Second, prejudiced firms may arbitrarily terminate the employment relationship after each period.

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<sup>5</sup>This wage setting mechanism greatly eases exposition and is commonly imposed on models with search frictions and evolving information about productivity. See, for example, Fryer Jr., Pager, and Spenkuch (2013). Jovanovic (1979) shows that this is one (of many) wage equilibrium in such models. All of our results would follow if wages were set by a non-cooperative two-stage alternating offer bargaining game. These results are available upon request.

<sup>6</sup>This ensures that workers do not prefer jobs with bad match quality to unemployment.

<sup>7</sup>In particular, all of our results except for Proposition 3 hold for any log-concave distribution.

<sup>8</sup>As jobs which are accepted in period 2 begin in period 3, the quality of the match is never learned.

## 2.2 White Workers

We first analyze the behavior of white workers. As whites do not face prejudice, they act as our baseline against which we can compare the impact of prejudice on black workers. Working backwards, an unemployed worker in period 3 receives  $h$ , the value of home production, while an employed worker with probability  $q$  of being a good match earns  $q\omega$ . It then follows that the worker will accept any offer for period 3 employment with a match quality greater than  $q_3^{rw}$ , where

$$q_3^{rw} = \frac{h}{\omega}. \quad (1)$$

The superscript  $rw$  denotes the reservation wage for white workers, and the subscript number denotes the period in which employment begins.

Unemployed white workers receive employment offers with probability 1. Thus, their value of unemployment in period 2 is

$$U_2^w = h + \omega [1 - F(q_3^{rw})] E(q|q \geq q_3^{rw}) + F(q_3^{rw})h \quad (2)$$

where  $F(q)$  is the cumulative distribution function of match probabilities. Substituting for  $q_3^{rw}$  and applying the uniform distribution assumption to  $F$ ,

$$\begin{aligned} U_2^w &= h + \omega \left(1 - \frac{h}{\omega}\right) \frac{1 + \frac{h}{\omega}}{2} + \frac{h}{\omega}h \\ &= h + \frac{\omega^2 + h^2}{2\omega} \end{aligned} \quad (3)$$

An employed worker in period 2 receives his expected product. In period 3, he receives  $\omega$  if the match is good, which occurs with probability  $q$ . If the match is revealed to be bad he returns to unemployment and earns  $h$ . Therefore, the value of employment in period 2 with a match quality signal  $q$  is

$$\begin{aligned} V_2^w(q) &= q\omega + q\omega + (1 - q)h \\ &= 2q\omega + (1 - q)h. \end{aligned} \quad (4)$$

Finally, in the first period, white workers will accept offers only when  $V_2^w(q) \geq U_2^w$ . This occurs when

$$q > \frac{\omega^2 + h^2}{2\omega(2\omega - h)} \equiv q_2^{rw} \quad (5)$$

which represents the zero prejudice baseline reservation match quality signal.

## 2.3 Black Workers

We now turn to the strategy of black workers. A fraction  $p \in (0, 1)$  of firms possess 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.<sup>9</sup> In addition, a prejudiced firm will terminate the employment of a black worker with probability  $s$  after each period. Thus, on average, black workers have a lower chance of receiving job offers when unemployed and have lower option value from job offers from 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; firms with black supervisors are unprejudiced with certainty.<sup>10</sup> A fraction  $b \in (0, 1)$  of non-prejudiced firms have black supervisors.

We again work backwards. Just as with white workers, black workers receive  $h$  when unemployed in period 3 and  $q\omega$  when employed in a job with probability  $q$  of being a good match. Thus, they follow an identical reservation  $q$  strategy,

$$q_3^{rb} = \frac{h}{\omega}. \quad (6)$$

Prejudice does not enter this decision, because a worker's life ends after period 3. Conditional on receiving an offer, the threat of termination does not matter as there is no period 4.

This is not the case in period 2. With probability  $p$ , black workers will encounter a prejudiced firm, and with probability  $s$ , a prejudiced firm will refuse to offer them employment.<sup>11</sup> Thus, the value of unemployment is

$$U_2^b = h + \omega(1 - ps) [1 - F(q_3^{rb})] E(q|q \geq q_3^{rb}) + [ps + (1 - ps)F(q_3^{rb})] h \quad (7)$$

Applying the uniform distribution and substituting for  $q_3^{rb}$ , the value of unemployment in period 2 simplifies to

$$\begin{aligned} U_2^b &= h + \omega(1 - ps) \left(1 - \frac{h}{\omega}\right) \frac{1 + \frac{h}{\omega}}{2} + \left[ps + (1 - ps) \frac{h}{\omega}\right] h \\ &= (1 + ps)h + \frac{(1 - ps)(\omega^2 + h^2)}{2\omega}. \end{aligned} \quad (8)$$

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<sup>9</sup>We note that it is not necessary for our results for prejudiced firms to sometimes refuse to make offers to black workers. This modeling feature is simply for realism and keeping in line with previous search models of prejudice. In the absence of this, an increase in prejudice causes a decrease in the value of unemployment for black workers by decreasing the value of all job offers from white supervisor firms, and the results then all carry through.

<sup>10</sup>Our results hold so long as firms with black supervisors are less likely to be prejudiced than those with white supervisors.

<sup>11</sup>Note that supervisor race does not matter for jobs offered at this stage, as workers are unconcerned about future termination risk due to the finiteness of the model.



As  $\frac{\omega^2+h^2}{2\omega} > h$ , black workers have a lower value of period 2 unemployment than white workers, which is a direct implication of the  $ps$  probability that they will not receive a job offer.

Prejudice also causes black workers to differentially value job offers from supervisors with different races. As a black supervisor acts as a perfect signal of non-prejudice, these jobs pose no involuntary termination risk. Black workers with black supervisors earn their expected product in period 2 and have a  $q$  probability of earning  $\omega$  in period 3. With probability  $1 - q$ , the job is not a good match, and they return to unemployment in period 3 and receive  $h$ . Thus, the value of a job offer from a black supervisor firm is

$$\begin{aligned} V_2^{bb}(q) &= q\omega + q\omega + (1 - q)h \\ &= 2q\omega + (1 - q)h \end{aligned} \tag{9}$$

where the superscript refers to the value to black workers of a black supervisor job. Note that conditional on  $q$ , the value function is identical to that of white workers. Both white workers and black workers with black supervisors experience no prejudice-based termination risk. In period 1, if black workers receive a job offer from a black supervisor firm, they will accept if and only if  $V_2^{bb}(q) \geq U_2^b$ , which occurs when

$$q \geq \frac{psh}{(2\omega - h)} + \frac{(1 - ps)(\omega^2 + h^2)}{2\omega(2\omega - h)} \equiv q_2^{rbb} \tag{10}$$

where  $q_2^{rbb}$  represents the black worker reservation match probability for black supervisor jobs that begin in period 2. Despite valuing jobs identically conditional on  $q$ , black workers are less selective in the offers they accept from black supervisors than white workers, because they have a lower value of unemployment.

This is not the case for job offers from white supervisor firms. A fraction  $\pi$  of job offers from white supervisor firms come from prejudiced employers, where

$$\pi \equiv \frac{p(1 - s)}{(1 - b)(1 - p) + p(1 - s)}. \tag{11}$$

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: all unprejudiced firms and a fraction  $(1 - s)$  of prejudiced firms. Black workers with white supervisors earn their expected product in period 2, and with probability  $q$  learn the job is a good match in period 3. However, with probability  $\pi$  their employer is prejudiced, and prejudiced employers terminate black employees regardless of match quality with probability  $s$ . Thus, the expected

value of these jobs is

$$\begin{aligned} V_2^{bw}(q) &= q\omega + q(1 - \pi s)\omega + [(1 - q) + q\pi s] h \\ &= (2 - \pi s)q\omega + [1 - q(1 - \pi s)] h \end{aligned} \quad (12)$$

Conditional on  $q$ , the value of white supervisor jobs to black workers is strictly lower than the value of black supervisor jobs to black workers and the value of employment to white workers. This is a direct result of the positive  $\pi s$  probability that they will lose a good match job due to a prejudice-based termination. If they receive a job offer from a white supervisor firm in period 1, they will accept it so long as  $V_2^{bw}(q) \geq U_2^b$ , which occurs whenever

$$q \geq \frac{psh}{(2 - \pi s)\omega - (1 - \pi s)h} + \frac{(1 - ps)(\omega^2 + h^2)}{2\omega [(2 - \pi s)\omega - (1 - \pi s)h]} \equiv q_2^{rbw}. \quad (13)$$

Note that since  $\omega > h$ ,  $q_2^{rbw} > q_2^{rbb}$ . Relative to jobs with black supervisors, black workers have a higher reservation  $q$  for jobs with white supervisors. This is due to black workers' lower option value of jobs with white supervisors. As they have  $\pi s$  probability of losing their job when it is a good match, black workers compensate for this increased risk by only accepting white supervisor jobs when they have a relatively higher initial wage (and higher chance of being a good match).

To summarize, prejudice decreases the value of unemployment for black workers relative to white workers, which in turn induces them to accept less valuable employment opportunities. However, the threat of prejudice reduces the value of employment opportunities for black workers at firms with white supervisors. Thus they are more selective with respect to  $q$  on job offers from white supervisors than black supervisors.

## 2.4 Comparative Statics: Supervisor Race

The results of section 2.3 allow us to develop a rich set of empirical predictions on the behavior of black workers across firms which do and do not have an observable black supervisor, which we outline here. When the results we present include weak inequalities, it is only because workers ignore supervisor race in the final period of the model.

**Proposition 1.** *Conditional on tenure and potential experience, black workers with white supervisors earn (weakly) higher wages on average than black workers with black supervisors.*<sup>12</sup>

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<sup>12</sup>Proof of this and all other results can be found in Appendix A.1.

As we showed in the previous subsection, black workers have a higher reservation  $q$  for jobs with white supervisors than black supervisors, as there is a higher threat of termination from white supervisor firms. Thus, the wages for black workers with white supervisors is drawn from a strictly higher distribution than the wages of black workers with black supervisors.

**Proposition 2.** *Conditional on tenure and potential experience, the average wage of black workers with black supervisors (weakly) decreases as prejudice increases.*

As the fraction of prejudiced firms increases in the labor market, the job arrival rate for black workers decreases, because prejudiced employers sometimes refuse employment to black workers. This decreases the value of unemployment for black workers, and thus black workers lower their reservation signal for jobs with black supervisors. As the lower limit of the match quality signal of accepted jobs with black supervisors decreases, the average wage of black workers decreases also.

**Proposition 3.** *Conditional on tenure and potential experience, the difference in mean wages between black workers with white supervisors and black workers with black supervisors is (weakly) 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 3 is perhaps 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. As prejudice increases, the value of unemployment decreases which causes black workers to become less selective on the jobs they accept. For black supervisor jobs, this simply requires a reduction in  $q_2^{rbb}$ . However, an increase in the number of prejudiced firms increases the probability that white supervisor firms are prejudiced. This increased termination risk decreases the value of white supervisor jobs holding  $q_2^{rbw}$  constant. Thus an equal reduction in reservation job *value* due to a increase in prejudice will generally involve a larger decrease in  $q_2^{rbb}$  than  $q_2^{rbw}$ .

The exception is when workers are fairly certain that white supervisors firms are prejudiced (i.e.,  $\pi$  is very high) which generally occurs for large values of  $b$  and  $p$ . In this case, the termination risk from a white supervisor job is sufficiently 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, jobs with a white supervisor will likely be terminated after one period. Since the worker must be indifferent between unemployment and employment at the reservation wage, large downward adjustments in the reservation wage for white supervisors

are required when prejudice changes slightly. The parameters required for this proposition to fail are unlikely 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>13</sup>

Our model also generates predictions on job stability.

**Proposition 4.** *Conditional on starting potential experience, black workers have (weakly) more stable matches (longer job durations) in jobs with black supervisors than with white supervisors.*

Although black workers have a lower reservation match quality signal for accepting jobs with black supervisors, it is never sufficiently low so as to offset the termination risk posed from white supervisor jobs. At the reservation wages, workers are indifferent between offers from white supervisor firms and black supervisor firms. Since white supervisor job wages are higher at the reservation match probabilities, it must be that black supervisor jobs are more stable.

**Proposition 5.** *Conditional on starting potential experience, the stability of black workers' matches with black supervisors (weakly) decreases as prejudice increases.*

This result follows from Proposition 2. Black workers accept black supervisor jobs with lower probabilities of being good matches as prejudice increases, leading to more bad matches and turnover.

**Proposition 6.** *Conditional on starting potential experience, the stability of black workers' matches with white supervisors (weakly) decreases as prejudice increases.*

The effect of prejudice on the average wage of black workers with white supervisors is ambiguous; the effect on job stability is not. As discussed before, an increase in prejudice levels increases the probability that white supervisor firms are prejudiced, which increases the termination risk at these jobs. Although black workers can compensate for this by becoming more selective on the quality of jobs they can accept, prejudice increases also decrease the

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<sup>13</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 a level of prejudice above 75% in any region other than the South, and only on the weakest questions of prejudice. Lang and Lehmann (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 may be 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 8% of their job-spells.

value of unemployment, making them unwilling to do so enough to completely offset this risk.

## 2.5 Comparative Statics: Worker Race

We can also compare the results of 2.2 and 2.3 to generate predictions across worker race.

**Proposition 7.** *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.*

As we saw in section 2.3, black workers have lower reservation match quality probabilities for jobs with black supervisors than white workers, and thus the distribution of accepted black worker-black supervisor wages is strictly lower. Note that this is not necessarily the case for black workers with *white supervisors*. This comparison depends on the fraction of prejudiced firms, the probability of arbitrary termination, and the informativeness of the supervisor's race. For example, if supervisor race is a very informative of employer prejudice, and thus termination risk to black workers from white supervisors is very high, black workers will only accept jobs from white supervisor firms with a very high  $q$ . This would lead to very few black worker-white supervisor jobs, but these jobs would pay higher wages conditional on tenure than earned by the typical white worker.

**Proposition 8.** *Conditional on starting potential experience, black workers have on average (weakly) less job stability than white workers regardless of supervisor race.*

As black workers are less selective in accepting jobs with black supervisors than white workers, these jobs will be less stable. Further, Proposition 6 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 surveys a sample of individuals who were aged 12 to 18 in 1997 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 tracks all jobs in which the respondent worked in the previous year and allows these jobs to be linked across survey

years. 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 the most current job. Important for our purposes, the NLSY97 provides information on the race of the individual’s supervisor for each job until the 2009 survey. This variable allows us to estimate the effect of supervisor race on labor market outcomes predicted by our theoretical model.

The GSS is a biannual survey of social attitudes conducted on a nationally representative sample in the United States.<sup>14</sup> Included in this survey are various questions assessing individuals’ racial attitudes with which we can measure prejudice. We combine the cross-sectional samples from the 1998-2010 waves of the GSS and calculate the fraction of white individuals who hold certain racial beliefs at the state-level.

Prejudice in our model is specifically defined as a distaste for black workers strong enough that one would make employment decisions on the basis of race. Although the GSS asks questions about a variety of racial attitudes, none directly addresses attitudes towards black workers in the workplace. We thus view each of these as measures that are positively correlated with employment prejudice and measured with error. If we define  $p_k$  as the rate of employment prejudice in state  $k$  and  $m_{jk}, j \in \{1, \dots, J\}$  as the  $J$  measures of prejudice in the GSS, then we can relate these measures by<sup>15</sup>

$$m_{jk} = \alpha_j p_k + \epsilon_{jk} \tag{14}$$

Under the assumptions that  $E[\epsilon_{jk}\epsilon_{lk}] = 0 \forall j \neq l$  and  $E[p_k\epsilon_{jk}] = 0$ , we can estimate  $p_k$  up to a positive scalar using standard factor analysis.<sup>16</sup>

We restrict our attention to questions that we felt best measure racial animus rather than,

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<sup>14</sup>The Survey was conducted every year from 1972 to 1994 (except in 1979, 1981, and 1992). Since then, it has been conducted biannually.

<sup>15</sup>One way to interpret this would be that  $\alpha_j$  is the rate at which an individual who holds employment prejudice  $p$  also holds belief  $m_j$ . Values of  $\alpha_j > 1$  then indicate that only some individuals who hold  $m_j$  would display prejudice in employment decisions, while values of  $\alpha_j < 1$  would indicate that there are additional individuals in the population who would display prejudice in employment decisions beyond those who express  $m_{jk}$ .

<sup>16</sup>Factor analysis is an increasingly common tool used to estimate latent variable models in economics. It has been used, for example, to estimate college quality (Black and Smith, 2006), the skill content of jobs (Bacolod, Blum, and Strange, 2009), parental investment (Aizer and Cunha, 2012), and the prevalence of crack cocaine (Fryer Jr. et al., 2013). It also frequently used to estimate cognitive and non-cognitive human capital in a dynamic setting. See, for example, Cunha and Heckman (2008), Cunha, Heckman, and Schennach (2010), and Sarzosa (2015).

Charles and Guryan (2008) take great care to measure prejudice as the “marginally prejudiced individual” which in Becker’s friction-less model is the relevant prejudice measure for the theoretical predictions. We intentionally measure prejudice differently, as in our model with market frictions the relevant measure of prejudice is the fraction of prejudiced employers, which is identified up to a positive scalar multiple by factor analysis under the set of assumptions we laid out.

for example, political sentiments.<sup>17</sup> From this subset of questions, we select a diverse set of five questions for  $m_j$  that had large samples of respondents: 1) whether they believe racial disparities are due to blacks’ “lack of will”, 2) whether they believe racial disparities are not due to discrimination, 3) whether they would be opposed to a close family member marrying a black individual, 4) whether they are opposed to open housing laws, and 5) whether they believe blacks are “lazy.”<sup>18</sup> In practice, the choice of questions is of little consequence to our results.<sup>19</sup> We calculate the fraction of prejudiced responses for each question at the state-level. To avoid confounding our measures with time trends in prejudice, we adjust each state’s yearly prejudice rates using a common national time trend.<sup>20</sup> We then use these measures to estimate the factor model.<sup>21</sup> Following convention, we normalize our measure to be mean 0 and standard deviation 1 across states.<sup>22</sup>

In Table 1, we report these racial attitudes and our prejudice measure by census division.<sup>23</sup> Prejudice appears to be highest in the South (divisions 5-7), particularly in the East South Central (division 7) which consists of Alabama, Kentucky, Mississippi, and Tennessee. The New England (division 1), Mountain (division 8), and Pacific (division 9) regions appear to have the least level of prejudice, although the ordering depends on the question. Our prejudice measure matches the conclusions one would draw from the underlying questions, with prejudice highest in the South and lowest on the two coasts. We also see substantial variation in prejudice within each census division; the standard deviation of state-level prejudice is less than 0.4 in only two of the nine divisions. To provide a context for interpreting the prejudice magnitudes, a one standard deviation increase in prejudice corresponds roughly to moving from New England to the West North Central (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota).

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<sup>17</sup>For example, we did not consider a question on whether a racist book should be removed from a library, as this may elicit one’s attitudes towards free speech. We also did not consider any of the numerous questions gauging attitudes on affirmative action, which may provoke responses on one’s political ideology.

<sup>18</sup>For a detailed description of these questions, see the Appendix B.

<sup>19</sup>See Appendix C for results from a large set of alternative measures of prejudice from the GSS.

<sup>20</sup>We first calculate the fraction in each state who holds each view in each wave of the survey. We then estimate a linear time-trend in these data, and subtract the trend from each state-year estimate before combining the years to create one state measure.

<sup>21</sup>The factor loadings are lack of will (.92), no discrimination (.82), oppose marriage of close family member (.83), oppose open housing laws (.68), and lazy (.88).

<sup>22</sup>We note here that  $p$  in our model is more accurately defined as the rate of prejudice held by employers, while we can only measure this for the population at large. This would be a concern if the relationship between prejudice held by the population and prejudice held by employers differed systematically across states in a way that was correlated with local labor market conditions. While it is difficult to test directly for this in the GSS, we see little difference across states in the relationship between real income and responses on our individual prejudice questions, suggesting that this is not likely to be a major concern.

<sup>23</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.

We match these prejudice measures with the individuals in the NSLY97 geocode files to create 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>24</sup> As we view supervisor race as a signal of employer prejudice to workers, we are interested in supervisor race as a 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 whether the employer employs any blacks in supervisory positions.<sup>25</sup>

We drop all job-year observations with reported wages less than \$1 per hour or above \$100 per hour, job-years with less than 30 hours or more than 80 hours of work per week, and job-years before an individual has completed his education.<sup>26</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, 31,666 of which have a valid state-level 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>27</sup> We can thus view our results as representative of the average job a worker worked in a given year. Consistent with previous research, blacks earn lower wages, have lower average education, have shorter job durations, score in the lower percentiles on the Armed Services Vocational Aptitude

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<sup>24</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>25</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. We will also explore robustness of our results to measures of supervisor race that do not have a correlation between the bias and job spell duration.

<sup>26</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>27</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 previous 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.



and Battery (ASVAB), and have a higher implied female labor force participation rate.<sup>28</sup> There is a startling amount of implied segregation by supervisor race. Only 8% of white workers work at an establishment in which they will encounter a black supervisor, compared to 53% of black workers. Black workers live, on average, in areas with slightly higher rates of prejudice.<sup>29</sup> While the difference in responses on each individual question is small, it amounts to a 0.41 standard deviation difference in overall prejudice. This is roughly equivalent to the difference in prejudice between the Mid-Atlantic States and the West North Central States.

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. Similar to black workers, the average worker in a job spell with a a black supervisor lives in a state with a 0.32 standard deviation higher level of prejudice, which is roughly the difference between the Upper Midwest and the Mid-Atlantic States.

## 4 Results

### 4.1 Wage Effects

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

$$\log W_i = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \varepsilon_i \quad (15)$$

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 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

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<sup>28</sup>Previous research has shown that the labor force participation decisions of women differ across race (Neal, 2004). Restricting our sample to only males yields similar results.

<sup>29</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.

supervisors and those that do not which are correlated with wage. While we have some limited employer characteristics in the NLSY97 to use as controls, it is unlikely that they can fully account for these differences. Our identifying assumption is that the remaining unobservable factors influence the wages of blacks and whites equally. Our model assumes that the establishment-level prejudice should not influence the wages of whites, and hence the effect of unobservables establishment differences on wages will be accounted for by  $\gamma_2$ .<sup>30</sup> Our model’s prediction is then  $\gamma_3 < 0$ : blacks accept positions with lower wages to work at firms with a strong black presence in supervisor roles.

We report our results on wages in Table 4.<sup>31</sup> In column (1) we estimate a standard Mincer regression with controls for education, gender, and quartics in experience and tenure. Black workers whom we only observe with white supervisors earn about 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 5.9 percent less in firms observed with black supervisors relative to wages in firms with white supervisors.

To control for differences in geographic dispersion by race, we include state and year fixed effects in column (2). Our results remain unchanged. In column (3), we account for differences in job quality by controlling for industry and occupation fixed effects, the log of establishment size, and indicators for whether the worker receives any job benefits, whether he is a member of a union, and whether he has employer sponsored health insurance.<sup>32</sup> Our main parameter of interest remains negative and statistically significant. Finally, to further account for individual heterogeneity, we control for a quartic in the worker’s ASVAB percentile score in column (4). Although inclusion of the full set of controls reduces the racial wage gap at white supervisor establishments by roughly 60%, the wage differences for black workers across supervisor race is only slightly reduced.<sup>33</sup> Our point estimates suggest that the racial wage gap at white supervisor establishments is 4.7%, but 8.4% at black supervisor

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<sup>30</sup>One concern is that  $\gamma_2$  could be picking up white worker tastes for segregated firms or same-race management. As we will discuss in a later section, the data do not appear to support this interpretation.

<sup>31</sup>As there are likely common shocks to individual wages, we cluster our standard errors at the individual level. This formulation allows errors to be correlated within a job spell, the unit of variation of our main variable of interest.

<sup>32</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 convert the census industry and occupation codes provided by the NLSY into NAICS and SOC codes using the crosswalk provided by the Census.

<sup>33</sup>We lose a non-trivial portion of the sample in this specification due to missing ASVAB scores. There is little difference in our results when we re-estimate columns (1)-(3) excluding those with a missing ASVAB.

establishments.

We can alternatively control for worker heterogeneity by exploiting the panel nature of the NLSY97. In columns (5) through (7), we estimate

$$\log W_{it} = \beta X_{it} + \gamma_2 b_{it}^e + \gamma_3 b_i^w b_{it}^e + \omega_i + \varepsilon_{it} \quad (16)$$

where  $X_{it}$  is a vector of time-varying controls, and  $\omega_i$  is a worker fixed effect. Here we identify the supervisor race effect from workers who have worked in both black supervisor and white supervisor jobs. 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.<sup>34</sup> The trade-off is that we have less power for estimation: only 1,307 of our 5,496 workers have both a black supervisor and white supervisor job spell.

Our within-worker results are consistent with the estimates from our pooled specification. In column (4) which includes quartics in tenure and potential experience, we observe 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, as well as our employer characteristics, in column (6). In each of these specifications,  $\gamma_3$  remains negative, statistically significant, and of similar magnitude to the analogous pooled results

Our model also makes predictions on how the correlation between supervisor race and wages will vary with levels of prejudice in the market. For our pooled cross-sectional approach, we estimate

$$\log W_{is} = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \gamma_4 p_s + \gamma_5 b_i^w p_s + \gamma_6 b_i^e p_s + \gamma_7 b_i^w b_i^e p_s + \varepsilon_{is} \quad (17)$$

As prejudice is normalized to be mean zero,  $\gamma_1, \gamma_2$ , and  $\gamma_3$  represent the same statistics as in (16) for the mean state. The coefficient  $\gamma_4$  represents the rate at which white workers wages with white supervisors changes with a one standard deviation 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

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<sup>34</sup>It is difficult to know how large this bias could be, but workers who have worked in both a white supervisor and a black supervisor job spell have nearly identical education and ASVAB test scores to those who have worked only in occupations with a supervisor of one race. This of course does not rule out that there could be differences across the two samples in time invariant unobservables, or that time-varying unobservables differ at the times in which they accept employment with a supervisor of a different race.

as prejudice increases. Finally,  $\gamma_7$  estimates how black wages with black supervisors change as prejudice increases relative to the rate at which white wages 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 (17) in Table 5.<sup>35</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 nine

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<sup>35</sup>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. This approach generally produces more conservative estimates than clustering at the individual-level.

geographic census divisions in column (2), and thus our effects are estimated off of variation within states that are in close geographical proximity to one another.<sup>36</sup> These controls have little impact on our results; the coefficients of interest retain the proper sign but are not statistically significant. Adding industry, occupation, and employer controls in column (3), and a quartic in ASVAB score in column (4) likewise yield similar results.

We include worker fixed effects in columns (5)-(7). 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. In column (5), which includes only controls for time-varying worker characteristics, the effect of increasing prejudice on black worker-black supervisor wages ( $\gamma_5 + \gamma_7$ ) is negative and significant at the 1% level. This result is robust to including census division and year effects in column (6) and industry and occupation effects in column (7). The effect of prejudice on the “supervisor race” wage gap, the triple interaction term, is negative and much larger than estimated in the pooled cross-section. This too becomes statistically significant with a full set of controls in column (7).<sup>37</sup> Interestingly, the results of column (5) to (7) suggest that black workers with white supervisors also see a decrease in their wages as prejudice increases. Our estimates suggest that a one standard deviation increase in prejudice, which roughly corresponds to moving from New England to the West North Central division of the Midwest, leads to a 11% decrease in the accepted wages of black workers at establishments with black supervisors, and a 6 percentage point widening of the observed wage gap between black workers with white supervisors and black workers with black supervisors.

## 4.2 Job Stability

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

In our three-period model, employment durations last at most two periods, and there

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<sup>36</sup>As an additional robustness check, we estimated all of our main results excluding workers in the South which has by far the highest concentration of prejudice. The magnitudes of our results are nearly universally stronger, although they are estimated with less precision. These results are available upon request.

<sup>37</sup>One concern is that, as our main results are identified off of only workers who move to a different state or work under jobs with supervisors of different races, our stronger results are due to a change in the sample relative to the pooled cross-sections. However, this does not appear to be the case. Estimating our model without worker fixed effects on the sample of workers who move states or work jobs with supervisors of different races yields nearly identical results to the full sample.

is only one opportunity for a prejudiced employer to terminate the relationship. In reality, an employer has many opportunities to terminate employment and thus a worker’s belief about an employer are constantly evolving. Since black workers are more selective on the jobs they accept with white supervisors, it is possible that long-standing black worker-white supervisor matches may be more stable; their historical stability is evidence that they are not prejudiced.<sup>38</sup> We thus focus on short-term stability, where our model more clearly holds. Specifically, we define a job as stable if it lasts more than one year. We drop any jobs which we observe for less than one year and do not observe an end date. Note that since our sample ends three years after the NLSY stops asking the supervisor race question, missing observations are due only to attrition, not right-censoring. Given that our workers are in their early-career, job durations are relatively short. Only 57% of our sample of 14,125 jobs last more than one year.

We estimate a linear probability model,

$$Z_i = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \varepsilon_i \quad (18)$$

where  $Z_i$  is an indicator for whether job  $i$  lasted more than one year and  $X_i$  is a vector of job- and worker-specific controls.<sup>39</sup> Again, while we 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 differently.<sup>40</sup> Our model predicts that  $\gamma_1 > 0$  and  $\gamma_3 < 0$ . Blacks have less stable employment with white supervisors as these firms are more likely to take prejudiced action against them.

We show the results of this estimation in Table 6. The results support our model. In column (1), with only a basic set of worker controls, we observe that black workers with white supervisors are 8.1 percentage points less likely to remain employed after one year than whites with white supervisors. While all workers have more job stability at black supervisor establishments, black workers gain 4.9 percentage points more than whites. Both of our main results are statistically significant. These results are robust to including state and start year fixed effects in column 2. Industry, occupation, and employer characteristic controls, which we include in column (3), can explain all of the increased job stability for white workers with black supervisors. However, our estimate for the stability gain for black supervisors actually increases in magnitude.<sup>41</sup> Our results remain consistent once accounting

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<sup>38</sup>It would, thus, not be appropriate to estimate a proportional hazard model in this case, as the hazard function would depend on worker and supervisor race.

<sup>39</sup>Our results are robust to alternatively estimating a logit or probit model.

<sup>40</sup>This will also capture the fact that our measure of having a black supervisor is correlated with job duration by construction.

<sup>41</sup>Workers sometimes report changes in occupation and industry during a job spell. We use fixed effects

for differences in cognitive test scores in column (4). With the full set of controls, our cross-sectional results imply that black workers with white supervisors are 6.9 percentage points less likely to remain employed after 1 year than white workers. While supervisor race does not impact the job stability of whites, black workers at black supervisor establishments are 6.1 percentage points more likely to remain employed at the same establishment after 1 year than black workers with white supervisors.<sup>42</sup>

We include worker fixed effects in columns (5)-(7). The effect of supervisor race is thus identified off of differences in job stability within workers on job spells with different raced supervisors. Given that only roughly 20% of our workers worked at both a black supervisor and white supervisor establishment, our estimates are substantially less precise than in the pooled cross-section approach. We do not see strong evidence for our model in the basic specification or including state and year fixed effects. However, once we include occupation, industry, and employer characteristic controls in column (7) our point estimate is of similar magnitude to what we observed in the pooled cross-sections, although it is not statistically significant at conventional levels.

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 match quality as employment opportunities decrease. Following the same strategy as before, in Table 7 we estimate,

$$Z_i = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \gamma_4 p_s + \gamma_5 b_i^w p_s + \gamma_6 b_i^e p_s + \gamma_7 b_i^w b_i^e p_s + \varepsilon_{is} \quad (19)$$

where our predictions are  $\gamma_5 < 0$  and  $\gamma_5 + \gamma_7 < 0$ . We find some support for the second hypothesis in the pooled cross-section. While the effect is small and statistically insignificant when we include only a basic set of controls, the magnitude increases substantially when we add in industry, occupation, and employer characteristics in column (3). The result becomes statistically significant once we include a quartic in ASVAB score in column (4). Our estimates suggest that increasing the level of prejudice by one standard deviation, which amounts to moving from New England to the West North Central division of the Midwest, would lead to a 4 percentage point decrease in the probability that black workers with black supervisors would remain in their job for at least one year. We find little support for the first

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for the first occupation and industry which they report.

<sup>42</sup>Note also that our model predicts that black workers with black supervisors should have lower job stability than white workers. In each of our specifications, black workers with black supervisors have lower job stability than white workers with black supervisors, although this difference is never statistically significant.

hypothesis. The estimated effect of prejudice on black-worker white supervisor job stability is never significant and always close to zero.

We observe stronger support for our model once we include worker fixed effects. All of our estimates for  $\gamma_5 + \gamma_7$  are larger in magnitude than the comparable cross-sectional regression. The result is statistically significant when including census division and start year fixed effects in column (6). We lose statistical significance when we include industry, occupation, and employer controls in column (7) but this is primarily due to precision; our point estimate is above that which we estimated with statistical significance in the pooled cross-sections. We also see some support for our first hypothesis. With a full set of controls, we estimate that the stability of black worker-white supervisor matches decreases by 2.1 percentage points with a 1 standard deviation increase in prejudice. However, these estimates are very imprecise.

To check the robustness of our results to different definitions of job stability, we estimate (18) and (19) for every value of job duration between 60 and 1080 days, in 30 day intervals. We display the point estimates of interest for the cross-sectional specification with a full set of controls in Figures 2 and 3, respectively.<sup>43</sup> While not always significant, the point estimates are correct signed for almost every definition.

### 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 simply 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. Nonetheless, in Appendix C.1, we investigate the robustness of our results under three scenarios that can partially account for this problem: 1) using only pre-2009 data, thus eliminating selected data at the end of the sample when the supervisor race question is no longer asked, 2) identifying a job's supervisor race based on the first reported supervisor, which eliminates the constructed correlation between job stability and supervisor race but increases measurement error and the reporting bias towards white supervisors, and 3) directly controlling for the completed length of the job spell. The results of each of these strategies are consistent with our main findings.

Our constructed measure of prejudice provides an interval-scaled measure of employer prejudice provided that the fraction of individuals who give a prejudiced response to each of

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<sup>43</sup>To produce a confidence interval for  $\gamma_5 + \gamma_7$ , we estimate a regression including a Black X White Supervisor and Black X Black Supervisor interaction (rather than a Black indicator and Black X Black Supervisor interaction), and use the standard error from the latter estimate.



the questions we use is linearly related to the fraction of prejudiced employers in a state.<sup>44</sup> We could alternatively measure prejudice using only a single question which would be correct under the weaker assumption that that question is linearly related to the fraction of prejudiced employers. However, the measurement error problem will be more severe, suggesting that the results will be further attenuated. In Appendix C.2, we estimate our main results under 9 different measures of prejudice from the GSS, including the individual questions that make up our factor analysis. Regardless of the question we use, our point estimates maintain the correct sign, and most are statistically significant.<sup>45</sup> This suggests that our model would be confirmed by nearly any way we construct a prejudice measure from the underlying GSS data.

It is possible that the lower job stability we observe for black workers at white supervisor firms is in fact a positive if, for instance, these firms provide better networks and workers are able to quickly find higher wage opportunities outside the firm. To test this, we estimated the impact of supervisor race on the wages of the next job a worker accepts. We find no significant relationship, suggesting this is not the case.<sup>46</sup>

#### 4.4 Alternative Explanations

While we posit the source of prejudice in our model is employers, many of our results would follow through from a model in which workers had a taste for same-race management. If racial tastes drive worker decisions, it could be problematic for our identification strategy. The estimated effect of being at a black supervisor establishment on white worker wages would reflect both unobservable establishment-level differences and a premium that must be paid to whites to overcome their distaste. It is not clear that such a model would imply that the gap in wages by supervisor race for black workers would be increasing in prejudice. Likewise, if black workers had higher job stability with black supervisor establishments because of a positive taste, it would seem to us that this job stability should be increasing in prejudice, rather than decreasing, as the unprejudiced job opportunities outside the firm diminish. Nonetheless, we do not rule out that it may be possible to construct a model based on worker tastes which allows this seemingly contradictory conclusion.

If workers tastes are important, however, it should also be that the actual race of the supervisor matters within a job spell. If a black worker is moved from a black supervisor

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<sup>44</sup>We note that having an interval-scaled measure of prejudice is important, as it is nearly impossible to make cross-group comparisons with ordinal data (Bond and Lang, 2013a; 2014).

<sup>45</sup>8 out of 9 measures produce a statistically significant negative relationship between black worker-black supervisor wages and prejudice. This number is 5 out of 9 for the supervisor race wage gap, and 4 out of 9 for the relationship between prejudice and black worker-black supervisor job stability.

<sup>46</sup>These results are available upon request.

to a white supervisor, they should require a wage increase to compensate them for their distaste. As we observe 1,303 job spells in which a worker’s supervisor changes race, we can test this in the data. We do this in Table 8 by including job fixed effects.<sup>47</sup> We find no evidence to support the idea that tastes for supervisor race within a job are important. Our point estimate for the effect on a black worker of switching to a black supervisor, is negative, but small and statistically insignificant. The estimate for white workers is almost exactly zero, suggesting that our identification strategy is not confounded by white worker tastes. In columns (3) and (4), we include an interaction between supervisor race and prejudice. While the point estimates suggest that tastes for supervisors may be important within a job for white workers in high prejudice areas, they are imprecisely estimated and statistically indistinguishable from zero.<sup>48</sup>

In addition, our empirical findings cannot be easily explained by conventional statistical discrimination models.<sup>49</sup> If firms with a strong black leadership presence are better at evaluating minority candidates, black workers may end up experiencing a lower turnover rate in these firms. However, the same differences in observability of skill or match quality would also suggest that highly-skilled black workers would be reluctant to apply to white supervisor firms. Such reluctance would lead to a negative selection of black workers into these jobs, and thus, lower wages for black workers in firms with white supervisors. Moreover, in order for a statistical model to generate both higher wages and higher turnover at white supervisor firms, it must be that black workers in these jobs have both higher average productivity (higher wages) and a higher variance of productivity (more bad matches and terminations) than workers at black supervisor jobs. In Figure 4, we plot the densities of ASVAB percentile scores for each worker-supervisor job pairing and demonstrate that we do not observe such patterns in our data. While the average percentile scores of black workers at white supervisor firms are higher, the variance of the distribution is identical and there is little discernible difference in the shape of the density curves.<sup>50</sup> Hence, although statisti-

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<sup>47</sup>Note that our overall sample size is reduced by one-third, since here we do not measure supervisor race at the job-spell level. This reflects years in which we do not observe the race of the supervisor, or that the worker has a non-black, non-white supervisor.

<sup>48</sup>We also note that, given the way our prejudice variable is scaled, the point estimates suggest that white workers have a taste for *opposite* race supervisors everywhere in the United States outside of the South.

<sup>49</sup>Of course if idiosyncratic match quality is important for productivity, as it is in our model, white supervisor firms may believe that black workers who apply to these jobs must be better matches as they would otherwise be unwilling to take on the risk associated with a possibly prejudice firm, and thus they statistically discriminate in their favor. At its core, we view this scenario as equivalent to the model we present in this paper.

<sup>50</sup>It is also unclear why prejudice would matter in a model in which wage disparities are entirely statistical. This could be the case if, for instance, black workers were on average lower skilled in areas of high prejudice. While the average ASVAB percentile score is lower in high-prejudice states, we do not see evidence that it is disproportionately lower for blacks.

cal discrimination remains an important explanation for racial wage disparities in the labor market, it does not appear to offer an explanation for our findings on wages and job stability.

## 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 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.

Our paper has important implications for both firm and government policy. Black workers respond to observable indicators of prejudice when making job decisions. In our model, workers always earn their marginal product so firms earn zero profits. However, if firms are able to extract a surplus from employees, non-prejudiced employers will find it beneficial to invest in policies, for example affirmative action, that signal their lack of prejudice to black workers. In contrast, a national affirmative action policy could have unintended negative consequences for black welfare. If the policy does not directly remedy firm prejudice, requiring firms to adopt the same hiring and promotion strategies decreases the level of information on prejudice these provide to the market. As a result, black workers will be more willing to accept poor quality jobs at the few firms they can ascertain with certainty are unprejudiced.

Although measured racial prejudice in the United States has declined substantially over the last half century, our paper demonstrates that the remaining prejudice, and the incomplete information on which firms possess this prejudice, can still have significant negative effects on black employment outcomes. Even when prejudice is not pervasive, the threat of prejudice, and the inability to identify employers who possess it, causes black workers to select into worse job opportunities with the unprejudiced employers they can identify.

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# A Theoretical Appendix

## A.1 Proofs of Main Results

This appendix proves the main results of our paper. As we show in the text, blacks and whites follow the same search strategy for period 3 jobs, and black reservation wages are independent of supervisor race. Thus, the outcomes for whites, blacks with black supervisors, and blacks with white supervisors are always identical. We therefore will focus our proofs on search strategies for period 2 jobs.

### A.1.1 Proof of Proposition 1

*Proof.* Average period 2 wages for black workers with supervisor race  $j$  are simply  $\omega E[q|q \geq q_2^{r bj}]$ . Applying the truncated uniform distribution, the average wage of workers with black supervisors is

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

and likewise for black workers with white supervisors,

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

Since  $q_1^{rbb} < q_2^{rbb}$ ,  $q_2^{\bar{b}b} < q_2^{\bar{b}w}$ . □

### A.1.2 Proof of Proposition 2

*Proof.* The period 2 average wage for black workers with black supervisors is

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

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

$$\frac{\partial q^{rbb}}{\partial p} = \frac{s [h - \frac{1}{2\omega}(\omega^2 + h^2)]}{2\omega - h} = -\frac{s}{2\omega} \frac{(\omega - h)^2}{2\omega - h}$$

which is strictly less than zero since  $\omega > h$ . □

### A.1.3 Proof of Proposition 3

*Proof.* From the uniform assumption, the difference in average wages is

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

Taking the derivative of this expression with respect to prejudice,

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

where,

$$\begin{aligned}\frac{\partial q_2^{rbw}}{\partial p} &= \frac{\frac{\partial \pi}{\partial p} s(\omega - h) [psh + \frac{1-ps}{2\omega}(\omega^2 + h^2)]}{[(2\omega - h) - \pi s(\omega - h)]^2} - \frac{\frac{s}{2\omega}(\omega - h)^2}{[(2\omega - h) - \pi s(\omega - h)]} \\ \frac{\partial q_2^{rbb}}{\partial p} &= -\frac{\frac{s}{2\omega}(\omega - h)^2}{2\omega - h} \\ \frac{\partial \pi}{\partial p} &= \frac{(1-s)(1-b)}{[(1-b)(1-p) + p(1-s)]^2}\end{aligned}$$

This expression simplifies to

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

where,

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

Note that since  $\omega > h \geq 0$  and  $b < 1, p < 1, s < 1$ ,  $\Omega_2$  and  $\Lambda_3$  are both strictly positive. By inspection,  $\Lambda_4$  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.1.4 Proof of Proposition 4

*Proof.* A job with match signal  $q$  and a black supervisor lasts two periods 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 last longer provided

$$\frac{1 + q_2^{rbb}}{2} \geq \frac{1 + q_2^{rbw}}{2}(1 - \pi s)$$

substituting for the reservation wages and multiplying 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

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

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

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

$\square$



### A.1.5 Proof of Proposition 5

*Proof.* The probability of a job accepted with a black supervisor lasting two periods is the probability that this job is a good match. Given the uniform distribution of job offers, this amounts to

$$\frac{1 + q_2^{rbb}}{2}$$

In Proposition 2, we showed that  $\frac{\partial q_2^{rbb}}{\partial p} < 0$ , which proves the proposition.  $\square$

### A.1.6 Proof of Proposition 6

*Proof.* The probability of a job accepted with a white supervisor lasting two periods is the probability that this job is a good match multiplied by the probability that the worker will not be terminated by prejudice. Given the uniform distribution of job offers, this amounts to

$$\frac{1 + q_2^{rbw}}{2}(1 - \pi s)$$

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

$$\frac{1}{2} \left[ -\frac{\partial \pi}{\partial p} s + \frac{\partial q_2^{rbw}(1 - \pi s)}{\partial p} \right]$$

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  $\frac{\partial \pi}{\partial p} > 0$ . 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  $\frac{\partial \pi}{\partial p} > 0$ , this could only happen when  $q_2^{rbw}$  increases in  $p$  (which is possible). However, this would imply that both  $q_2^{rbw}$  and  $(1 - \pi s)q_2^{rbw}$  has increased, and thus the total value of employment at the reservation match quality  $V_2^{bw}(q_2^{rbb})$  has also increased. But,  $V_2^{bw}(q_2^{rbb}) = U_2^b$ . Taking the derivative of (8),

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

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

### A.1.7 Proof of Proposition 7

*Proof.* The difference in period 2 mean wages is simply  $\frac{1}{2}(q_2^{rw} - q_2^{rbb})$ . As show in the text  $q_2^{rw} > q_2^{rbb}$ , thus white wages will be higher.  $\square$

### A.1.8 Proof of Proposition 8

*Proof.* The difference in stability for white workers with white supervisors and black workers with black supervisors is

$$\frac{1}{2}(q_2^{rw} - q_2^{rbb})$$

which is positive as  $q_2^{rw} > q_2^{rbb}$ . Likewise since white supervisor jobs are always less stable for black workers than black supervisor jobs (Proposition 4), 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.  $\square$

## A.2 General Distributions of Match Quality Signal

In this section, we explore the robustness of our results to general distributions of job match-quality. We show that all but one of our results hold for any log-concave probability distribution. For this single remaining case, we discuss conditions under which it would hold.

Consider the model outlined in Section 2, but that instead the distribution of match quality probability is  $f(q)$ , where  $f(q)$  is a continuous, twice-differentiable, log-concave probability distribution.<sup>51</sup> As the timing structure remains unchanged, each worker's reservation strategy for period 3 employment remains unchanged. Likewise, the value of employment in period 2 remains unchanged as this depends only on  $q$  and  $h$ .

The value of unemployment in period 2 for a white worker becomes,

$$U_2^w = h + \int_{\frac{h}{\omega}}^1 q' \omega - h dF(q') + h \quad (20)$$

The first part of this expression is the utility of household production from being unemployed in period 2. The second part is the expected gain of unemployment in period 3 from receiving a job offer. The third part of the expression is the value of unemployment in period 3 ( $h$ ) which represents the utility received whenever the worker receives a job offer below his reservation value ( $\frac{h}{\omega}$ ). This simplifies using integration by parts to

$$U_2^w = 2h + \omega \int_{\frac{h}{\omega}}^1 1 - F(q') dq' \quad (21)$$

By equating (21) with the value of period 2 employment (8), we can solve for a white worker's initial reservation wage policy,

$$q_2^{rw} = (2\omega - h)^{-1} (h + \omega \int_{\frac{h}{\omega}}^1 1 - F(q') dq') \quad (22)$$

The value of unemployment in period 2 for black workers differs in that  $ps$  of the time they will match with a prejudiced employer who does not offer them a position. Thus, the value of unemployment can be written as

$$U_2^b = 2h + (1 - ps)\omega \int_{\frac{h}{\omega}}^1 q' \omega - h dF(q') \quad (23)$$

which simplifies by integration by parts to,

$$U_2^b = 2h + (1 - ps)\omega \int_{\frac{h}{\omega}}^1 1 - F(q') dq' \quad (24)$$

Black workers are concerned about supervisor race as firms with black supervisors implicitly offer them higher job stability and more option value. Equating the value of period 2 employment at a black supervisor firm (9) with equation (24) yields the black worker-black supervisor reservation wage,

$$q_2^{rbb} = (2\omega - h)^{-1} \left[ h + (1 - ps)\omega \int_{\frac{h}{\omega}}^1 1 - F(q') dq' \right] \quad (25)$$

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<sup>51</sup>It is common in search theoretic models to assume that wage distributions are log-concave as this assures that increases in the distribution of wages lead to increases in the actual observed wages, holding constant a reservation wage. See, for example, Rogerson, Shimer, and Wright (2005).

We can do likewise for the value of white supervisor employment,

$$q_2^{rbw} = [(2\omega - h) - \pi s(\omega - h)]^{-1} \left[ h + (1 - ps)\omega \int_{\frac{h}{\omega}}^1 1 - F(q')dq' \right] \quad (26)$$

We now prove our main results in this setting. Again, as all workers have identical reservation strategies for period 3 employment, we prove our results only for period 2.

### A.2.1 Propositions 1 and 4

**Proposition.** *Conditional on tenure and potential experience, black workers with white supervisors earn (weakly) higher wages and have (weakly) lower job stability than black workers with black supervisors*

*Proof.* First note that  $q_2^{rbw} > q_2^{rbb}$  since  $\pi s > 0$ . Thus the expressions have the same numerator, but  $q_2^{rbb}$  has a larger denominator. Since the observed wages in period 2 are simply the expected value of the distribution truncated at the reservation wage, the distributions are independent of supervisor race, and white supervisor jobs have a higher truncation point, the distribution of white supervisor job wages first order stochastically dominates that of black supervisor job wages and thus has a higher mean.

The probability for a job with match quality  $q$  and a black supervisor remaining in period 3 is simply  $q$ . For a same quality job with a white supervisor, this probability is  $(1 - \pi s)q$ . Thus the distribution of stability probabilities for white supervisor jobs is simply the distribution for black supervisor jobs shifted down by a proportion. Denote  $\tilde{q}$  as the probability of remaining in a position in period 3. Since  $f(q)$  is log-concave,  $E[\tilde{q}|\tilde{q} > \tilde{q}_r]$  is higher for black supervisor jobs than white supervisor jobs (Burdett, 1981). In words, if the reservation match is equally stable for black supervisor jobs and white supervisor jobs, then the average job stability among accepted jobs will be higher for black supervisor jobs than white supervisor jobs. Since  $q_2^{rbw} > q_2^{rbb}$ ,  $V_2^{bw}(q_2^{rbw})$  can only be equal to  $V_2^{bb}(q_2^{rbb})$  if  $q_2^{rbw} > (1 - \pi s)q_2^{rbb}$ . As average match quality is an increasing function of reservation match stability, the average stability of white supervisor jobs must be less than that of black supervisor jobs.  $\square$

### A.2.2 Propositions 2, 5, and 6

**Proposition.** *Conditional on tenure and potential experience, black workers with black supervisors' wages and job stability are (weakly) decreasing in prejudice. Black workers with white supervisors' job stability is (weakly) decreasing in prejudice.*

*Proof.* Black workers' wage and job stability are monotonic functions of their reservation wage, thus it is sufficient to differentiate (25) with respect to  $p$ ,

$$\frac{\partial q_2^{rbb}}{\partial p} = \frac{-s\omega \int_{\frac{h}{\omega}}^1 1 - F(q')dq'}{(2\omega - h)}$$

which is strictly less than zero.

White supervisor job stability is also a monotonic function of the job stability of the reservation match. As  $U_2^b$  is strictly decreasing in prejudice,  $V_2^{bw}$  must be decreasing at the reservation match, and this can only occur if the reservation match becomes less stable (see proof of Proposition 6).  $\square$

### A.2.3 Propositions 7 and 8

**Proposition.** *Conditional on tenure and potential experience, black workers with black supervisors' have (weakly) lower wages and (weakly) less job stability than white workers. Black workers with white supervisors' have (weakly) less job stability than white workers.*

*Proof.* Comparing (22) to (25), note that white workers have a higher reservation match quality than black workers with black supervisors. Since the expected wages and job stabilities are monotonic functions of the reservation match quality, the first two parts of the proposition holds. The third part of the proposition follows from the proof in section A.2.2, since black workers have lower job stability with white supervisors than black supervisors.  $\square$

### A.2.4 Proposition 3

Proposition 3 does not directly translate to general match quality distributions. This result depends on the curvature of the distribution. Here we show a condition under which the change in the average wage between white supervisors and black supervisors moves in the same direction as the change in the reservation wage.

**Proposition.** *So long as  $\frac{f(q_2^{rbw}) \int_{q_2^{rbw}}^1 q' f(q') dq' - f'(q_2^{rbw}) [1 - F(q_2^{rbw})]}{[1 - F(q_2^{rbw})]^2} - \frac{f(q_2^{rbb}) \int_{q_2^{rbb}}^1 q' f(q') dq' - f'(q_2^{rbb}) [1 - F(q_2^{rbb})]}{[1 - F(q_2^{rbb})]^2} > 0$ , the difference in average wages of black workers with black supervisors and black workers with white supervisors is increasing in prejudice, conditional on tenure and experience, whenever the difference in reservation wages is increasing in prejudice.*

*Proof.* The difference in average wages for black workers with white supervisors and black workers with black supervisors is

$$\omega \left[ \frac{\int_{q_2^{rbw}}^1 q' dF(q')}{1 - F(q_2^{rbw})} - \frac{\int_{q_2^{rbb}}^1 q' dF(q')}{1 - F(q_2^{rbb})} \right]$$

taking the derivative with respect to  $p$ ,

$$\omega \left[ \Theta_1 \frac{\partial q_2^{rbw}}{\partial p} - \Theta_2 \frac{\partial q_2^{rbb}}{\partial p} \right]$$

where,

$$\Theta_1 \equiv \frac{f(q_2^{rbw}) \int_{q_2^{rbw}}^1 q' f(q') dq' - q_2^{rbw} f(q_2^{rbw}) [1 - F(q_2^{rbw})]}{[1 - F(q_2^{rbw})]^2}$$

$$\Theta_2 \equiv \frac{f(q_2^{rbb}) \int_{q_2^{rbb}}^1 q' f(q') dq' - q_2^{rbb} f(q_2^{rbb}) [1 - F(q_2^{rbb})]}{[1 - F(q_2^{rbb})]^2}$$

Thus, whenever  $\frac{\partial q_2^{rbw}}{\partial p} > \frac{\partial q_2^{rbb}}{\partial p}$ , the expression will also be positive if  $\frac{f(q_2^{rbw}) \int_{q_2^{rbw}}^1 q' f(q') dq' - q_2^{rbw} f(q_2^{rbw}) [1 - F(q_2^{rbw})]}{[1 - F(q_2^{rbw})]^2} - \frac{f(q_2^{rbb}) \int_{q_2^{rbb}}^1 q' f(q') dq' - q_2^{rbb} f(q_2^{rbb}) [1 - F(q_2^{rbb})]}{[1 - F(q_2^{rbb})]^2} > 0$   $\square$

In the main text we show a sufficient condition for the difference in reservation wages to be increasing in prejudice. This specific condition will depend on the distribution of match qualities, however the intuition will generally match that in the main text. To see this, note that at equilibrium,  $V_2^{bw}(q_2^{rbw}) = V_2^{bb}(q_2^{rbb}) = U_2^b$  and thus any (negative) change in the value of unemployment must cause an equal change to the value of reservation employment with both supervisor types. Thus,

$$\frac{\partial U_2^b}{\partial p} = (2\omega - h) \frac{\partial q_2^{rbb}}{\partial p}$$

and,

$$\frac{\partial U_2^b}{\partial p} = [(2\omega - h) - \pi s(\omega - h)] \frac{\partial q_2^{rbw}}{\partial p} - s(\omega - h) q_2^{rbw} \frac{\partial \pi}{\partial p}$$

Note the difference between these two expressions. The first expression shows that decreasing  $q_2^{rbw}$  can have a smaller effect on the value of unemployment than  $q_2^{rbb}$  because prejudice ( $\pi s$ ) decreases the value of high-quality jobs to black workers. However, prejudice also has a direct negative effect on the value of job opportunities with white supervisors represented by the second expression. This means that  $q_2^{rbw}$  has to adjust less than  $q_2^{rbb}$  to an increase in prejudice. The former effect is strongest when  $\pi$  is high.

## 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’ or ‘No.’ We coded ‘Yes’ answers as prejudiced responses. The question was asked in every survey from 1998-2010.

#### B.1.2 No Discrimination

The variable RACDIF1 asks, “On average African Americans have worse jobs, income, and housing than white people. Do you think these differences are mainly due to discrimination?” Respondents could choose ‘Yes’ or ‘No.’ We coded ‘Yes’ answers as prejudiced responses. This question was asked in every survey from 1998-2010.

#### B.1.3 Oppose Marriage

The variable MARBLK asks, “How about having a close relative or family member marry a black person? Would you be very in favor of it happening, somewhat in favor, neither in favor nor opposed to it happening, somewhat opposed or very opposed to it happening?” Respondents could choose ‘Strongly Favor,’ ‘Favor,’ ‘Neither favor nor oppose,’ ‘Oppose,’ or ‘Strongly Oppose.’ We coded ‘Strongly Oppose’ answers as prejudiced responses. The question was asked in every survey from 1998-2010.

#### B.1.4 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,’ or ‘Neither.’ We coded the first response as prejudiced. This question was asked in every survey from 2004-2010.

#### B.1.5 Lazy

The variable WORKBLKS asks, “I’m going to show you a seven-point scale on which the characteristics of [Blacks] can be rated... A score of 1 means that you think almost all of the people in the group are [hard-working]. A score of 7 means that you think almost everyone in the group are [lazy]. A score of 4

means that you think that the group is not towards one end or another, and of course you may choose any number in between that comes closest to where you think people in the group stand.” Respondents can choose a number between 1-7. We coded answers of 5 or greater as prejudiced responses. This question was asked in every survey from 1998-2010.

### **B.1.6 Favor Anti-Miscegenation Laws**

The variable RACMAR asks, “Do you think there should be laws against marriages between African-Americans and whites?” Respondents could choose ‘Yes’ or ‘No.’ We coded ‘Yes’ answers as prejudiced responses. This question was asked in each survey from 1998-2002.

### **B.1.7 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’ or ‘No.’ We coded ‘No’ responses as prejudiced responses. The question was asked in the 2008 and 2010 surveys.

### **B.1.8 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’ or ‘No.’ We coded ‘Yes’ answers as prejudiced responses. The question was asked in each survey from 1998-2010.

### **B.1.9 Smart**

The variable INTLBLKS asks, “I’m going to show you a seven-point scale on which the characteristics of [Blacks] can be rated... A score of 1 means that you think almost all of the people in the group are [unintelligent]. A score of 7 means that you think almost everyone in the group are [intelligent]. A score of 4 means that you think that the group is not towards one end or another, and of course you may choose any number in between that comes closest to where you think people in the group stand.” Respondents can choose a number between 1-7. We coded answers of 3 or less as prejudiced responses. This question was asked in every survey from 1998-2010.

## **C Empirical Appendix**

### **C.1 Supervisor Race and Job Stability Correlation**

In Table C1 we test the sensitivity of our wage results to three specifications in which this bias may be less severe. In columns (1) and (2), we use only pre-2009 data to both construct our measure of supervisor race and in estimation of the worked fixed effect specification with a full set of controls. This removes a potential correlation between supervisor race and job quality for later jobs due to the NSLY removing the supervisor race question from post-2009 surveys. All of our main wage results are robust. In columns (3) and (4), we use only the race of the first reported supervisor of the job spell to classify the establishment. This removes the potential bias, but increases measurement error which should attenuate our results. The results are again largely supportive. While the effect of having a black supervisor on wages, and the impact of prejudice on the “supervisor race wage gap” is not statistically significant, they retain the correct sign, and are of similar magnitude to previous estimates. We see strong evidence that black workers with black supervisors’ wages decrease in prejudice. In columns (5) and (6), we control for the total length of the job spell directly. While this should eliminate the concerns about the bias of our supervisor race measure, it is an over-control in the

sense that well matched jobs will necessarily be both high wage and more stable. Nonetheless, all of our models predictions hold under these specifications.

In Table C2, we repeat the first two exercises on our job stability results. The results are again largely robust. The effect of having a black supervisor on job stability is positive and significant under both approaches. The effect of prejudice on black worker - black supervisor job stability is negative and significant using only pre-2009 data. When we measure supervisor race using only the race of the first reported supervisor, the effect is not statistically significant, though still negative and of similar magnitude to previous results.

## C.2 Alternative Measures of Prejudice

To test the sensitivity of our results to the individual components of our prejudice measure, in the first five columns of Table C3 we estimate our fixed effect wage specification using the individual questions as measures of prejudice directly. The columns use, in order, opposition to open housing laws, do not believe blacks lag whites due to discrimination, believe that blacks lag whites due to lack of will, oppose the marriage of a close relative to a black individual, and believe that blacks are lazy. The responses are scaled to be mean 0, standard deviation 1 across states, to ease comparison with the factor analysis results. Reassuringly, the choice of question does not appear to be of great importance for our result. Black worker-black supervisor wages are decreasing in prejudice for all of the questions we use to construct our measure, and significantly so for all but the lazy question. The “supervisor race wage gap” for black workers is increasing in prejudice for every question as well, and statistically significant for three out of the five questions.

In columns (6) through (9) we measure prejudice through four additional questions we did not use, due to smaller samples and less dispersion in the data: support for anti-miscegenation laws, refusal to vote for black presidential candidates, belief that blacks lag whites due to inborn disability, and a belief that blacks are not intelligent. These questions yield similar conclusions. Our result on the supervisor race wage gap is significant for 2 out of these 4 variables, while our result for black supervisor-black worker wages is statistically significant for all four.

In Table C4, we repeat this exercise using the cross-sectional specification on job stability. Again, the results are largely consistent across questions. We see that job stability is decreasing in prejudice for black workers with black supervisors regardless of how we measure prejudice. While the result is not statistically significant for the questions not used in our baseline measure, the magnitudes are only slightly smaller.

Taken together, while we cannot be certain under which questions our assumptions are satisfied, given the general consistency of results, the results of Tables C3 and C4 suggest that if our assumptions hold for any question in the GSS than our theory would likely be confirmed by a precise measure of state-wide rates of employment prejudice. Moreover, nearly any way in which we construct a measure of prejudice from the General Social Survey will yield results supportive of our model.

Figure 1: Model Timing Structure

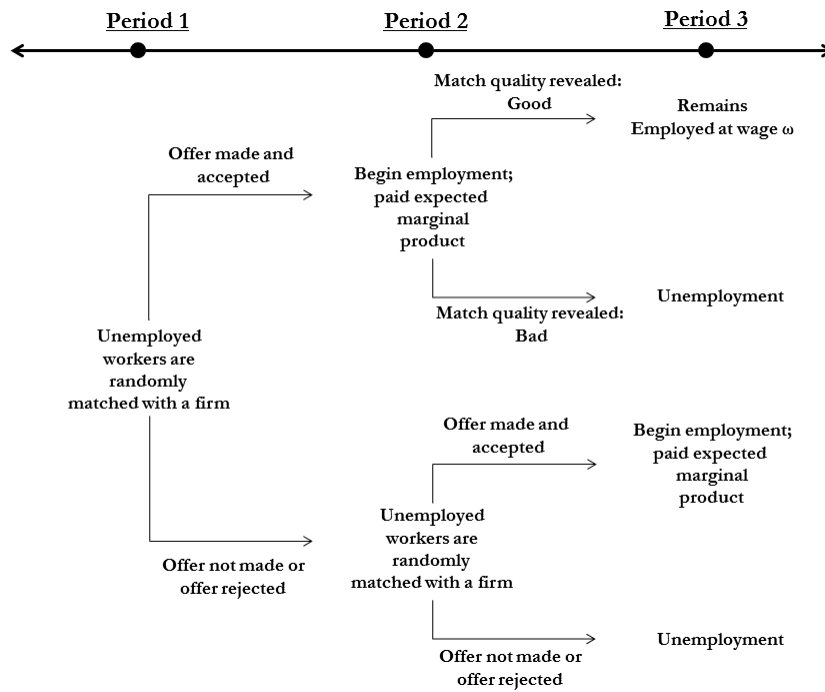
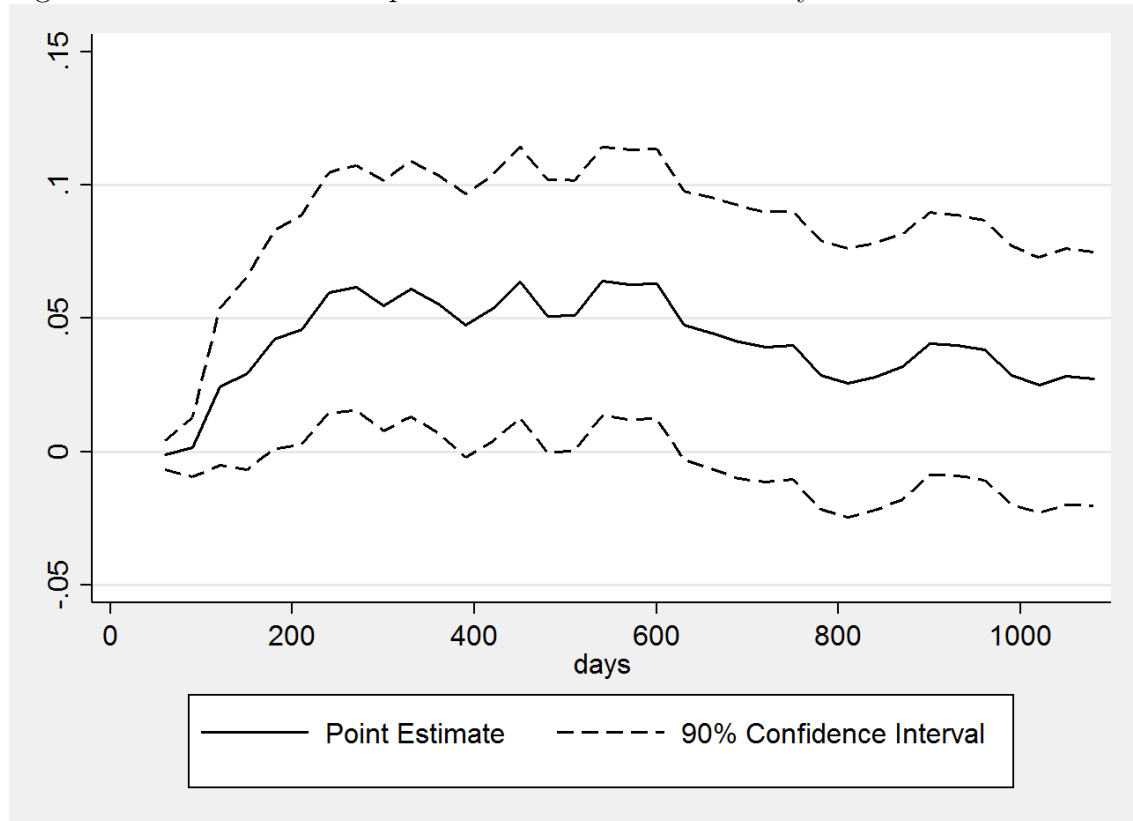


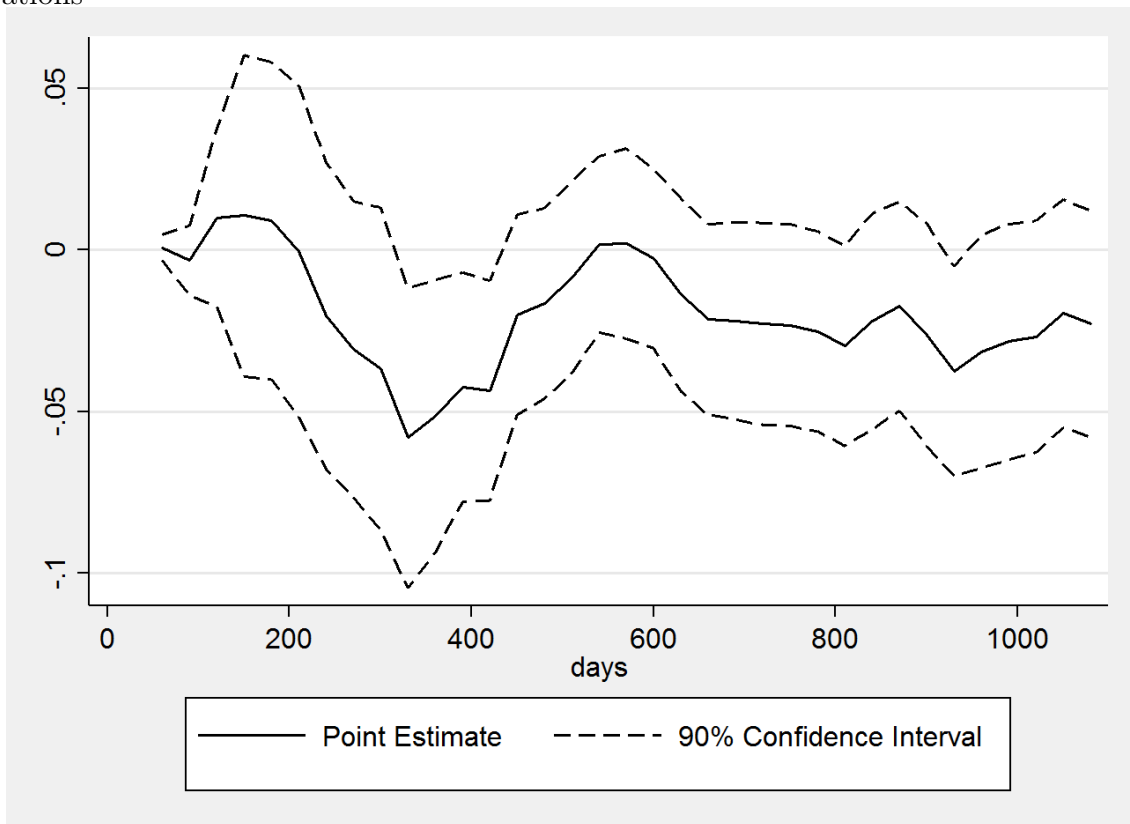


Figure 2: Effect of Black Supervisor on Black Job Stability - Alternative Durations



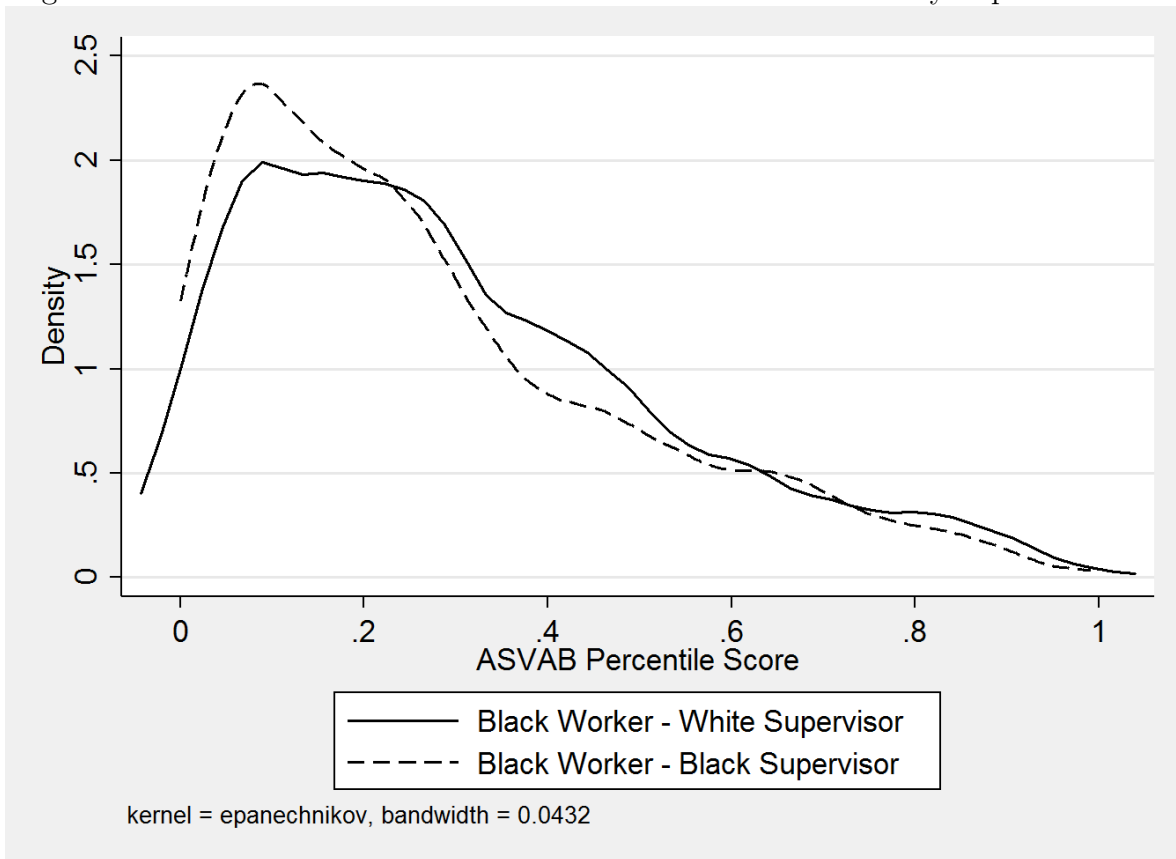
Point estimates and 95% confidence interval for estimate of  $\gamma_5 + \gamma_7$  under different job length definitions of job stability. Points were estimated at 30 day intervals. Regressions included controls for gender, education, industry and occupation fixed effects, whether the employer offered health insurance, whether the employer offered any benefits, union membership, and quartic terms in starting potential experience and ASVAB percentile score.

Figure 3: Effect of Prejudice Black Supervisor-Black Worker Job Stability - Alternative Durations



Point estimates and 95% confidence interval for estimate of  $\gamma_5 + \gamma_7$  under different job length definitions of job stability. Points were estimated at 30 day intervals. Regressions included controls for gender, education, industry and occupation fixed effects, whether the employer offered health insurance, whether the employer offered any benefits, union membership, and quartic terms in starting potential experience and ASVAB percentile score.

Figure 4: Distribution of Black Worker ASVAB Percentile Scores by Supervisor Race



Kernel density estimates of ASVAB percentile scores for black workers by supervisor race.

Table 1: White Prejudice by Census Division

	Census Division								
	Northeast		Midwest		5	South		West	
	1	2	3	4		6	7	8	9
Lack Will	0.43	0.48	0.54	0.49	0.58	0.64	0.58	0.44	0.43
No Discrimination	0.64	0.67	0.73	0.68	0.78	0.81	0.78	0.64	0.65
Oppose Marriage	0.16	0.22	0.25	0.25	0.33	0.48	0.35	0.18	0.16
Against Housing Laws	0.45	0.45	0.42	0.62	0.50	0.58	0.54	0.42	0.44
Lazy	0.32	0.38	0.37	0.38	0.43	0.48	0.44	0.32	0.33
Prejudice	-1.00	-0.42	-0.12	-0.06	0.67	1.43	0.78	-0.96	-0.94
	(0.55)	(0.43)	(0.30)	(0.59)	(0.94)	(0.56)	(0.69)	(0.48)	(0.12)
Observations	626	1754	2403	996	2378	830	1202	1032	1706

De-trended fraction of individuals in each region for the combined 1998-2010 wave of the General Social Survey who reported each belief. Prejudice is first factor from principal factor analysis, normalized to be mean 0 and standard deviation 1 across states. Standard deviations in parenthesis. See Appendix B for details of the data construction.

Table 2: Descriptive Statistics - Worker Race

	(1)	(2)	(3)
	Total	White	Black
Log Wage	7.24 (0.46)	7.30 (0.46)	7.12 (0.43)
Education	13.54 (2.44)	13.69 (2.48)	13.21 (2.32)
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)
Tenure	2.62 (2.23)	2.70 (2.26)	2.44 (2.15)
ASVAB	0.48 (0.28)	0.55 (0.27)	0.31 (0.24)
Black Supervisor	0.22 (0.42)	0.08 (0.27)	0.53 (0.50)
Against Housing Laws	0.47 (0.09)	0.47 (0.09)	0.48 (0.10)
No Discrimination	0.72 (0.08)	0.71 (0.07)	0.75 (0.08)
Against Marriage	0.27 (0.11)	0.25 (0.10)	0.31 (0.13)
Lack Will	0.52 (0.08)	0.51 (0.08)	0.56 (0.09)
Lazy	0.39 (0.06)	0.38 (0.06)	0.41 (0.07)
Prejudice	-0.02 (0.84)	-0.15 (0.79)	0.26 (0.86)
Observations	34123	22732	11391

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)
	White	Black
Log Wage	7.26	7.16
	(0.45)	(0.45)
Education	13.62	13.24
	(2.46)	(2.36)
Female	0.46	0.51
	(0.50)	(0.50)
Potential Experience	4.73	5.05
	(3.16)	(3.22)
Tenure	2.57	2.77
	(2.19)	(2.32)
ASVAB	0.51	0.36
	(0.28)	(0.27)
Black	0.20	0.76
	(0.40)	(0.43)
Against Housing Laws	0.47	0.48
	(0.09)	(0.09)
No Discrimination	0.71	0.75
	(0.07)	(0.08)
Against Marriage	0.26	0.31
	(0.11)	(0.13)
Lack Will	0.51	0.56
	(0.08)	(0.09)
Lazy	0.38	0.41
	(0.06)	(0.07)
Prejudice	-0.09	0.23
	(0.82)	(0.85)
Observations	26636	7487

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
Black	-0.116*** (0.013)	-0.106*** (0.013)	-0.088*** (0.011)	-0.047*** (0.013)			
Black Supervisor	0.028 (0.023)	0.029 (0.023)	0.014 (0.020)	0.009 (0.022)	0.033 (0.021)	0.029 (0.021)	0.014 (0.019)
Black X Black Supervisor	-0.059** (0.028)	-0.058** (0.027)	-0.047** (0.023)	-0.046* (0.026)	-0.055** (0.025)	-0.051** (0.026)	-0.043* (0.023)
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	No	No	No	No	Yes	Yes	Yes
ASVAB Quartic	No	No	No	Yes	No	No	No
Employer Characteristics	No	No	Yes	Yes	No	No	Yes
Occupation FE	No	No	Yes	Yes	No	No	Yes
Industry FE	No	No	Yes	Yes	No	No	Yes
State FE	No	Yes	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	Yes	No	Yes	Yes
Observations	34123	34076	33519	27841	34123	34076	33519

Robust standard errors in parenthesis clustered at the individual level. Worker characteristics in columns (1)-(4) include controls for education, a gender dummy, and quartic terms in potential experience and tenure. Worker characteristics in columns (5)-(7) include quartic 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: Prejudice and and Wages

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
Black	-0.092*** (0.019)	-0.097*** (0.018)	-0.079*** (0.016)	-0.035* (0.018)			
Black Supervisor	0.041** (0.018)	0.034* (0.018)	0.014 (0.017)	0.008 (0.019)	0.035 (0.024)	0.031 (0.023)	0.010 (0.022)
Black X Black Supervisor	-0.060** (0.024)	-0.056** (0.023)	-0.039* (0.022)	-0.038 (0.023)	-0.052 (0.035)	-0.047 (0.034)	-0.030 (0.029)
Prejudice	-0.059*** (0.016)	-0.063** (0.028)	-0.051** (0.023)	-0.055** (0.023)	0.002 (0.014)	-0.027 (0.022)	-0.017 (0.021)
Prejudice X Black ( $\gamma_5$ )	-0.006 (0.021)	-0.004 (0.022)	-0.008 (0.019)	-0.015 (0.022)	-0.073** (0.030)	-0.067** (0.029)	-0.055* (0.030)
Prejudice X Black Supervisor	0.013 (0.023)	0.017 (0.025)	0.003 (0.022)	-0.006 (0.023)	0.042* (0.025)	0.042* (0.025)	0.039* (0.022)
Prejudice X Black X Black Supervisor ( $\gamma_7$ )	-0.018 (0.032)	-0.020 (0.031)	-0.017 (0.029)	-0.012 (0.030)	-0.052 (0.035)	-0.054 (0.035)	-0.059* (0.030)
$\gamma_5 + \gamma_7$	-0.024	-0.025	-0.025	-0.027	-0.125***	-0.120***	-0.114**
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker Fixed Effects	No	No	No	No	Yes	Yes	Yes
ASVAB Quartic	No	No	No	Yes	No	No	No
Employer Characteristics	No	No	Yes	Yes	No	No	Yes
Occupation FE	No	No	Yes	Yes	No	No	Yes
Industry FE	No	No	Yes	Yes	No	No	Yes
Census Division FE	No	Yes	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	Yes	No	Yes	Yes
Observations	31442	31442	30916	25642	31442	31442	30916

Robust standard errors clustered at the state level in parenthesis. Worker characteristics in columns (1)-(4) include controls for education, a gender dummy, and quartic terms in potential experience and tenure. Worker characteristics in column (5)-(7) include quartic terms in potential experience and tenure. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Significance stars on  $\gamma_5 + \gamma_7$  represent  $p$ -level on test of  $\gamma_5 + \gamma_7 = 0$ . \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$



Table 6: Racial Employment Matches and Job Stability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Stable	Stable	Stable	Stable	Stable	Stable	Stable
Black	-0.081*** (0.012)	-0.076*** (0.013)	-0.079*** (0.012)	-0.069*** (0.014)			
Black Supervisor	0.054*** (0.020)	0.053*** (0.020)	0.011 (0.018)	0.007 (0.020)	0.075** (0.033)	0.071** (0.033)	0.026 (0.032)
Black X Black Supervisor	0.049** (0.024)	0.047* (0.024)	0.068*** (0.022)	0.061** (0.025)	0.011 (0.040)	0.012 (0.040)	0.044 (0.039)
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	No	No	No	No	Yes	Yes	Yes
ASVAB Quartic	No	No	No	Yes	No	No	No
Employer Characteristics	No	No	Yes	Yes	No	No	Yes
Occupation FE	No	No	Yes	Yes	No	No	Yes
Industry FE	No	No	Yes	Yes	No	No	Yes
State FE	No	Yes	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	Yes	No	Yes	Yes
Observations	14125	14078	13740	11284	14125	14078	13740

Robust standard errors clustered at the individual level in parenthesis. “Stable” is defined as a job lasting more than 1 year. Worker characteristics in columns (1)-(4) include controls for education, a gender dummy, and a quartic term in starting potential experience. Worker characteristics in columns (5)-(7) include a quartic term in starting potential experience. 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 Job Stability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Stable	Stable	Stable	Stable	Stable	Stable	Stable
Black	-0.078***	-0.078***	-0.080***	-0.069***			
	(0.014)	(0.014)	(0.012)	(0.015)			
Black Supervisor	0.047***	0.046***	0.004	-0.001	0.073***	0.068***	0.023
	(0.014)	(0.015)	(0.015)	(0.018)	(0.020)	(0.023)	(0.026)
Black X Black Supervisor	0.057***	0.051***	0.073***	0.070***	0.016	0.014	0.049
	(0.016)	(0.018)	(0.018)	(0.023)	(0.033)	(0.031)	(0.032)
Prejudice	-0.007	-0.001	0.004	0.005	-0.032	0.009	0.004
	(0.008)	(0.011)	(0.013)	(0.014)	(0.024)	(0.029)	(0.026)
Prejudice X Black ( $\gamma_5$ )	-0.008	-0.004	-0.005	0.002	-0.026	-0.044	-0.021
	(0.016)	(0.015)	(0.017)	(0.022)	(0.045)	(0.044)	(0.044)
Prejudice X Black Supervisor	0.011	0.018	0.026	0.037	0.041	0.039	0.027
	(0.020)	(0.021)	(0.022)	(0.023)	(0.025)	(0.026)	(0.028)
Prejudice X Black X Black Supervisor ( $\gamma_7$ )	-0.005	-0.012	-0.028	-0.042	-0.042	-0.033	-0.026
	(0.028)	(0.029)	(0.031)	(0.034)	(0.036)	(0.035)	(0.036)
$\gamma_5 + \gamma_7$	-0.014	-0.015	-0.032	-0.040*	-0.067	-0.077*	-0.047
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	No	No	No	No	Yes	Yes	Yes
ASVAB Quartic	No	No	No	Yes	No	No	No
Employer Characteristics	No	No	Yes	Yes	No	No	Yes
Occupation FE	No	No	Yes	Yes	No	No	Yes
Industry FE	No	No	Yes	Yes	No	No	Yes
Census Division FE	No	Yes	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	Yes	No	Yes	Yes
Observations	13000	12981	12669	10394	13000	12981	12669

Robust standard errors in parenthesis clustered at the individual level. “Stable” is defined as a job lasting more than 1 year. Worker characteristics in columns (1)-(4) include a gender dummy, and quartic terms in starting potential experience. Worker characteristics in column (5)-(7) include a quartic term in starting potential experience. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Significance stars on  $\gamma_5 + \gamma_7$  represent  $p$ -level on test of  $\gamma_5 + \gamma_7 = 0$ . \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$

Table 8: Within Job Spell Supervisor Race Effects

	(1)	(2)	(3)	(4)
	Log Wage	Log Wage	Log Wage	Log Wage
Black Supervisor	-0.000 (0.033)	-0.002 (0.031)	-0.004 (0.032)	-0.005 (0.030)
Black X Black Supervisor	-0.015 (0.041)	-0.015 (0.039)	-0.013 (0.040)	-0.014 (0.038)
Prejudice X Black Supervisor			0.058 (0.054)	0.062 (0.054)
Prejudice X Black X Black Supervisor			-0.051 (0.061)	-0.053 (0.060)
Job FE	Yes	Yes	Yes	Yes
Worker Characteristics	No	Yes	No	Yes
Occupation FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Observations	23843	23657	21914	21734

Robust standard errors clustered at the state level in parenthesis. Worker characteristics include quartic 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 C1: Robustness to Supervisor Measure - Wages

	(1)	(2)	(3)	(4)	(5)	(6)
	<u>Pre-2009</u>		<u>First Supervisor Race</u>		<u>Duration Control</u>	
	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage	Log Wage
Black Supervisor	0.015	0.010	0.004	0.005	0.008	0.005
	(0.020)	(0.022)	(0.022)	(0.026)	(0.019)	(0.022)
Black X Black Supervisor	-0.043*	-0.031	-0.036	-0.031	-0.042*	-0.030
	(0.024)	(0.030)	(0.025)	(0.036)	(0.023)	(0.029)
Prejudice		-0.003		-0.011		-0.019
		(0.021)		(0.020)		(0.019)
Prejudice X Black ( $\gamma_5$ )		-0.046		-0.069**		-0.055*
		(0.032)		(0.033)		(0.029)
Prejudice X Black Supervisor		0.044*		0.025		0.039*
		(0.022)		(0.030)		(0.020)
Prejudice X Black X Black Supervisor ( $\gamma_7$ )		-0.058*		-0.043		-0.060**
		(0.030)		(0.037)		(0.029)
$\gamma_5 + \gamma_7$		-0.104**		-0.112**		-0.115**
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	Yes	Yes	Yes	Yes	Yes	Yes
Employer Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Job Duration Quartic	No	No	No	No	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	No	Yes	No	Yes	No
Census Division FE	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27152	25025	32558	29995	33553	30947

Robust standard errors in parenthesis. Standard errors clustered at the individual level in columns (1), (3), and (5), and clustered at the state level in columns (2), (4), and (6). Column (1) and (2) use only observations before 2009 for both constructing the supervisor race measure and estimating the equation. Columns (3) and (4) define a job spell as having a black supervisor if the first reported supervisor is black. Columns (5) and (6) control for a quartic in total job duration. Worker characteristics include a quartic term in starting potential experience. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Significance stars on  $\gamma_5 + \gamma_7$  represent  $p$ -level on test of  $\gamma_5 + \gamma_7 = 0$ . \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Table C2: Robustness to Supervisor Measure - Job Stability

	(1)	(2)	(3)	(4)
	Pre-2009		First Supervisor Race	
	Stable	Stable	Stable	Stable
Black	-0.080*** (0.012)	-0.079*** (0.011)	-0.059*** (0.012)	-0.062*** (0.011)
Black Supervisor	0.017 (0.019)	0.011 (0.015)	-0.066*** (0.022)	-0.068*** (0.022)
Black X Black Supervisor	0.065*** (0.023)	0.072*** (0.016)	0.088*** (0.026)	0.094*** (0.023)
Prejudice		0.006 (0.014)		-0.001 (0.013)
Prejudice X Black ( $\gamma_5$ )		-0.011 (0.017)		0.003 (0.016)
Prejudice X Black Supervisor		0.037 (0.023)		0.032 (0.032)
Prejudice X Black X Black Supervisor ( $\gamma_7$ )		-0.037 (0.029)		-0.040 (0.044)
$\gamma_5 + \gamma_7$		-0.0476*		-0.0371
Worker Characteristics	Yes	Yes	Yes	Yes
Employer Characteristics	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
State FE	Yes	No	Yes	No
Census Division FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	12963	11962	13439	12380

Robust standard errors in parenthesis. Standard errors clustered at the individual level in columns (1) and (3), and clustered at the state level in columns (2) and (4). Column (1) and (2) use only observations before 2008 for both constructing the supervisor race measure and estimating the equation. Columns (3) and (4) define a job spell as having a black supervisor if the first reported supervisor is black. Worker characteristics include a gender dummy, and a quartic term in starting potential experience. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Significance stars on  $\gamma_5 + \gamma_7$  represent  $p$ -level on test of  $\gamma_5 + \gamma_7 = 0$ . \* $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Table C3: Robustness to Different Prejudice Measures - Wages

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	No Open	No Disc	Lack Will	Marriage	Lazy	Misceg	President	Inborn	Smart
Prejudice	0.015 (0.021)	0.003 (0.018)	-0.021 (0.019)	-0.053* (0.026)	-0.022 (0.018)	-0.022 (0.016)	0.015 (0.014)	0.012 (0.018)	-0.003 (0.015)
Prejudice X Black ( $\gamma_5$ )	-0.073*** (0.026)	-0.043* (0.025)	-0.022 (0.026)	-0.021 (0.030)	-0.002 (0.027)	-0.030 (0.031)	-0.088*** (0.018)	-0.016 (0.024)	-0.014 (0.021)
Prejudice X Black Supervisor	0.032 (0.025)	0.003 (0.021)	0.047** (0.023)	0.034* (0.018)	0.039 (0.026)	0.043** (0.019)	0.038** (0.017)	0.053*** (0.018)	0.037* (0.019)
Prejudice X Black X Black Supervisor ( $\gamma_7$ )	-0.058** (0.028)	-0.015 (0.025)	-0.064** (0.029)	-0.048* (0.024)	-0.048 (0.031)	-0.056** (0.027)	-0.036 (0.030)	-0.053** (0.021)	-0.034 (0.022)
$\gamma_5 + \gamma_7$	-0.131***	-0.058*	-0.086**	-0.069*	-0.049	-0.086**	-0.124***	-0.069**	-0.048*
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Employer Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census Division FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30916	33209	33209	33006	33209	32458	26085	33209	33209

Standard errors clustered at the state-level in parenthesis. Each column represents prejudice being measured as the fraction in the state who report the prejudiced belief listed on the top. These are as follows: (1) Oppose open housing laws (2) Do not believe blacks lag whites due to discrimination (3) Believe blacks lag whites due to lack of will (4) Oppose the marriage of a close relative to black individual (5) Believe that blacks are lazy (6) In favor of anti-miscegenation laws (7) Would not vote for a black presidential candidate (8) Believe blacks lag whites due to inborn disability (9) Believe that blacks are not intelligent. Worker characteristics include a quartic in starting potential experience. All columns control for race, supervisor race, and the interaction between race and supervisor race. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Significance stars on  $\gamma_5 + \gamma_7$  represent  $p$ -level on test of  $\gamma_5 + \gamma_7 = 0$ . \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$

Table C4: Robustness to Different Prejudice Measures - Stability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	No Open	No Disc	Lack Will	Marriage	Lazy	Misceg	President	Inborn	Smart
Prejudice	0.031*** (0.011)	0.006 (0.011)	-0.004 (0.012)	-0.024* (0.012)	0.003 (0.012)	-0.012 (0.011)	-0.010 (0.012)	0.006 (0.012)	0.003 (0.009)
Prejudice X Black ( $\gamma_5$ )	-0.009 (0.019)	0.011 (0.014)	0.000 (0.018)	0.007 (0.019)	0.016 (0.020)	0.004 (0.018)	0.002 (0.011)	0.012 (0.022)	-0.014 (0.015)
Prejudice X Black Supervisor	0.013 (0.026)	0.032 (0.021)	0.046* (0.023)	0.036 (0.028)	0.052** (0.023)	0.046* (0.026)	0.017 (0.017)	0.027 (0.027)	0.039 (0.026)
Prejudice X Black X Black Supervisor ( $\gamma_7$ )	-0.036 (0.032)	-0.050** (0.024)	-0.043 (0.032)	-0.034 (0.038)	-0.064* (0.032)	-0.040 (0.036)	-0.035 (0.024)	-0.032 (0.026)	-0.025 (0.033)
$\gamma_5 + \gamma_7$	-0.045* (0.011)	-0.039** (0.011)	-0.043* (0.012)	-0.028 (0.012)	-0.048* (0.012)	-0.036 (0.011)	-0.034 (0.012)	-0.020 (0.012)	-0.039 (0.009)
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ASVAB Quartic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Employer Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census Division FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10394	11173	11173	11092	11173	10913	8662	11173	11173

Standard errors clustered at the state-level in parenthesis. Each column represents prejudice being measured as the fraction in the state who report the prejudiced belief listed on the top. These are as follows: (1) Oppose open housing laws (2) Do not believe blacks lag whites due to discrimination (3) Believe blacks lag whites due to lack of will (4) Oppose the marriage of a close relative to black individual (5) Believe that blacks are lazy (6) In favor of anti-miscegenation laws (7) Would not vote for a black presidential candidate (8) Believe blacks lag whites due to inborn disability (9) Believe that blacks are not intelligent. Worker characteristics include a quartic in starting potential experience. All columns control for race, supervisor race, and the interaction between race and supervisor race. Industry FE are 2-digit (2002) NAICS codes. Occupation FE are 2-digit (2002) SOC codes. Significance stars on  $\gamma_5 + \gamma_7$  represent  $p$ -level on test of  $\gamma_5 + \gamma_7 = 0$ . \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .