Prejudice and Racial Matches in Employment

Bond, Timothy N. and Lehmann, Jee-Yeon K.

Purdue University, Analysis Group, Inc.

28 October 2015

Prejudice and Racial Matches in Employment*

Timothy N. Bond† Jee-Yeon K. Lehmann‡

August 30, 2016

Abstract

We develop a job search model in which some employers hold unobservable racial prejudice toward black workers. Prejudiced employers may refuse to hire black workers and may terminate them based on their prejudice. Workers do not observe employer prejudice, but instead observe a signal of prejudice status, the presence of a black supervisor. We show that 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 racial differences in observed wages and job stability across supervisor races and variations in local prejudice levels. We find empirical support for our predictions using unique longitudinal data with information on the worker's supervisor race matched with state-level measures of prejudice.

*We are grateful to Peter Arcidiacono, Katherine Eriksson, Cynthia Gramm, Kevin Lang, Steven Lehrer, David Neumark, Melinda Petre, Anson Soderbery, and conference and seminar participants at Purdue University, Queen's University, the University of California, Davis, the Twentieth SOLE Meetings / Fourth SOLE/EALE World Conference, the 6th Annual European Search and Matching Network Annual Conference, the Spring 2016 Midwest Macro Meetings, the 91st Annual Western Economic Association International Conference, and the Fifteenth IZA/SOLE Transatlantic Meeting for their helpful comments, and the Bureau of Labor Statistics and the General Social Survey for providing us with the confidential data used in this project. Funding for this project was made possible in part by grant number 1H79AE000100-1 to the UC Davis Center for Poverty Research from the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Analysis (ASPE), which was awarded by the Substance Abuse and Mental Health Services Administration (SAMHSA). The views expressed are those of the authors and do not necessarily reflect the official policies of the Department of Health and Human Services. Some of the data used in are derived from Sensitive Data Files of the GSS, obtained under special contractual arrangements designed to protect the anonymity of the respondents. These data are not available from the authors. Persons interested in obtaining GSS Sensitive Data Files should contact the GSS at GSS@NORC.org. This research was conducted with restricted access to the Bureau of Labor Statistics (BLS) data. The views expressed here do not necessarily reflect the views of the BLS. We thank Paul Thomas, Mary Kate Batistich, and Jacob Elich for their excellent research assistance. Any mistakes are our own.

†Corresponding author; Department of Economics, Krannert School of Management, Purdue University; email: tnbond@purdue.edu.

‡Analysis Group, Inc., Boston, MA; email: jee-yeon.lehmann@analysisgroup.com. The views presented are those of the authors and do not necessarily reflect those of Analysis Group, Inc. or its clients.

1 Introduction

In this paper, we develop a new model of job search in which black workers respond to imperfect signals of employer prejudice prevailing in the local labor market and derive empirically testable predictions on racial differences in wages and job stability. Using a unique dataset matching local prejudice levels to information on workers' wages, employment history, and the race of their supervisors, we find empirical support for the model and its predictions. Our findings provide new insight into the observed black-white differences in wages and unemployment in the U.S.[1]

Our work builds on the taste-based discrimination framework that dates back 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 has shown, however, that racial 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 in the labor market lowers the arrival rate of job offers to blacks. Because search is costly, black workers are thus 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 than the wage gap (e.g., Stratton 1993, Johnson and Neal 1998, Ritter and Taylor 2011; Lang and Lehmann 2012). The existence of such large, unexplained black-white differentials in employment indicates that disentangling factors contributing to racially varying frictions in the labor market is important for better understanding the persistence of racial inequalities in labor market outcomes.

Our model introduces an additional friction: information about whether a prospective employer is prejudiced. In our random search model, worker's productivity on the job (or

[1]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, Bjerk 2006, and Black et al. 2006).

match quality) is initially unobserved by both worker and firm. However, upon meeting, 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. If the match is poor, it is terminated and the worker returns to unemployment. Employer 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 have biased retention policies in which blacks are laid-off at higher rates than white workers even if the match is revealed to be highly productive. When workers meet an employer during their job search, they do not observe whether the employer is prejudiced.[2] However, they do observe the presence of a black supervisor at the firm, which serves as a signal of the employer's prejudice status.

Given these sources of information frictions and features of employer prejudice, our model predicts that black workers are willing to accept lower wages from firms with black supervisors, because black workers have greater confidence that they will not be terminated. 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 prejudice-based termination.

From this intuitive result, we derive 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 their lower wages with longer employment spells. In other words, although black workers are willing to accept "riskier" jobs with worse match quality signals from firms with black supervisors, the jobs they accept will provide them with 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, the average wage and job stability of black workers in jobs with black supervisors will decrease, and black workers' wage gap between jobs with black and white supervisors will increase.

We test these predictions using the National Longitudinal Survey of Youth 1997 cohort

[2]There are many reasons to think that receiving 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 could 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). Lehmann (2011) finds that law firms use affirmative action in hiring but not in task assignment; as a consequence they hire blacks at higher rates, but assign them to tasks that do not build human capital, and therefore promote them to partner at lower rates than whites.

(NLSY97) and the General Social Survey (GSS) and find empirical support for them. 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 examine wages and employment patterns for black and white workers across jobs with different supervisor races or local prejudice.

Likely due to limited data on supervisor race and prejudice levels, there have been only a few studies 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 predictions of the canonical Becker model. Using measures of prejudice from the GSS, they find empirical support for the prediction that prejudice levels of the "marginally prejudiced" firm in the state can explain wage differences between black and white workers.[3] 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. 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 from these studies in several important aspects. First, our model focuses on the role of imperfect information about employer prejudice in job search and labor market outcomes. Second, rather than equating 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, we assume that all employers observe the match quality signal of workers with equal precision. Finally, our model yields unique predictions on racial differences in wages and job stability across employers and labor markets with varying levels of prejudice.

The remainder of our paper is organized as follows. In Section 2, we introduce our model of search with unobservable employer prejudice and match quality 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.

[3]Charles and Guryan (2011) extend 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.

2 Model of Search and Racial Matches in Employment

In this section, we outline a tractable model of search and racial matches in employment to illustrate our ideas formally and to motivate our empirical work.

In summary, prejudiced firms are biased at both hiring and retention stages: they are less likely to make job offers to black workers and are also less likely to retain black workers after hiring. The presence of prejudice firms, therefore, decreases job arrival rates for black workers, which makes them less selective in accepting employment opportunities in general. The expected lower retention rates decrease the option value of jobs that come from potentially prejudiced firms. Workers cannot observe precisely which firms are prejudiced, but they do observe an imperfect but informative signal that indicates some firms are unprejudiced. In practice, the signal of employer prejudice could take many forms. In our model and in the data, the signal is assumed to be the presence of a black supervisor at the firm. Given that black workers face higher termination risk from firms without black supervisors, these jobs hold lower option value for them. Thus, black workers are more selective about accepting jobs at firms without black supervisors. Our theoretical model below formalizes this intuition, and we derive empirically testable predictions on wages and job stability.

2.1 Primitives

We begin with a two-period model with two groups of agents: workers and firms.

Workers: Workers differ in their race (black or white), but are otherwise identical. They are risk neutral and do not discount the future.

Firms: Firms are either prejudiced or unprejudiced, with $p \in (0,1)$ representing the fraction of prejudiced firms in the economy. We take this distribution and the associated hiring and retention practices of firms as exogenous. Although we believe that understanding how a firm chooses its hiring and retention policies is an important and understudied factor in contributing to labor market racial disparities, our data are not suited for analyzing the determination of such firm behavior.

A prejudiced firm employs a biased hiring and retention process:

- When it meets a black worker, it declines to make him a job offer with probability $s \in (0,1)$.

- When it employs a black worker, it terminates him after each period with probability s.

A fraction $b \in (0,1)$ of non-prejudiced firms have a black supervisor, which indicates that they are not prejudiced with certainty. As such, prejudiced firms do not have black supervisors.

Given these primitives, using Bayes' Rule, we can calculate the probability of that a firm is prejudiced given that it only has white supervisors:

$$\text{Prob}(\text{prejudiced}|\text{white supervisor}) = \frac{p}{p + (1-p)(1-b)}. \tag{1}$$

The probability that a white supervisor-only firm is prejudiced given that it has made an offer to a black worker is then:

$$\pi \equiv \text{Prob}(\text{prejudiced}|\text{white supervisor, offer to black}) = \frac{p(1-s)}{p(1-s) + (1-p)(1-b)}. \tag{2}$$

Match-Specific Productivity and Wages: Worker's productivity is entirely match-specific and is either good or bad. Good matches produce ω and bad matches produce 0. Upon meeting, the worker and firm commonly observe a signal q, which represents the probability that the match quality is good. This signal is distributed according to a continuous and twice-differentiable pdf $f(q)$ over $[0,1]$ throughout the population of potential matches. When necessary to facilitate empirically testable predictions, we will assume that q is uniform. After the worker is employed for one period, the match quality is revealed to both workers and firms. We assume that wages are always equal to the (expected) marginal product. This assumption is not strictly necessary. What we require is that firms are not able to signal their prejudice status through their wage offer.[4]

Model Timing: We outline the timing of our model graphically in Figure 1. In period 1, each worker is matched with a firm. If the firm makes an offer to the worker and the worker accepts, the worker earns $q\omega$. Otherwise, the worker remains unemployed and earns h, the

[4] While this requirement may have its limitations, this wage structure has been imposed previously in search settings with evolving information (e.g. Fryer, Pager, and Spenkuch, 2013). We note that a wage-setting policy which revealed a firm's prejudice status would almost certainly involve firms posting wages that were different for blacks and whites for the same job, which is illegal under United States law. However, in many non-cooperative bargaining settings, individuals can learn about information initially known only by the other party through, for example, strategic delays, strikes, etc. (Kennan and Wilson, 1993). Of course, these issues could be avoided if we assumed that firms did not know that they were prejudiced at the time of the wage offer, but we do not want to rely on such a strong assumption here.

value of home production, with $\omega > h > 0$. In period 2, unemployed workers are matched with a firm. Again, if they receive an offer and accept they earn $q\omega$, otherwise they remain unemployed and earn h. After this matching has occurred, firms and employed workers learn the quality of their match from the previous period. If the match is revealed to be bad, the worker is dismissed (or the worker leaves voluntarily), and he returns to unemployment to earn h. If the match is revealed to good, the worker is retained, and she earns ω with the exception of some black workers who are dismissed with probability of s by prejudiced firms. In other words, the implicit cost of accepting a job offer in period 1 is that the worker loses the opportunity to search for a job in period 2 if the match terminates.

2.2 White Workers

We first analyze the behavior of white workers. As whites do not face prejudice, they act as our baseline case against which we can compare the impact of prejudice on black workers. Working backwards from the end of period 2, we know that a worker who enters period 2 unemployed and remains unemployed receives h, while a worker who accepts an offer in period 2 with match quality q earns $q\omega$. It then follows that the worker will accept any offer for period 2 employment with a match quality greater than q_2^{rw}, where

$$q_2^{rw} = \frac{h}{\omega}. \tag{3}$$

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

If a white worker enters period 2 unemployed, she receives an offer with probability 1. Thus, their value of unemployment in period 2 is

$$U_2^w = \omega \left[1 - F(q_2^{rw})\right] E(q|q \geq q_2^{rw}) + F(q_2^{rw})h. \tag{4}$$

Substituting for q_2^{rw}, equation (4) simplifies to

$$\begin{aligned} U_2^w &= h + \int_{\frac{h}{\omega}}^{1} q'\omega - h dF(q') \\ &= h + \omega \int_{\frac{h}{\omega}}^{1} 1 - F(q')dq'. \end{aligned} \tag{5}$$

If a white worker accepts an offer in period 1, he receives his expected marginal product, and advances to period 2 employed. Then, if the match is revealed to be good, he receives ω, which occurs with probability q. If the match is bad, it is terminated and he earns h.

Recall that workers who accept an offer in period 1 are not able to search in period 2 if they lose their job. Therefore, the value of a job offer in period 1 with a match quality signal q is

$$\begin{aligned} V_1^w(q) &= q\omega + q\omega + (1-q)h \\ &= 2q\omega + (1-q)h. \end{aligned} \tag{6}$$

If a worker does not accept an offer in period 1, she receives h, advances to period 2, and receives U_2^w. Therefore, it follows that she will accept any offer such that $V_1^w(q) \geq h + U_2^w$. This occurs when

$$q \geq \frac{1}{2\omega - h}\left(h + \omega \int_{\frac{h}{\omega}}^{1} 1 - F(q')dq'\right) \equiv q_1^{rw}, \tag{7}$$

which represents the zero prejudice baseline reservation match quality signal for accepting a job offer in period 1.

2.3 Black Workers

We now turn to the strategy of black workers. As with white workers, black workers who enter period 2 unemployed receive $q\omega$ if they accept a job with probability q of being a good match, and h if they remain unemployed. Thus, they follow an identical reservation q strategy to that of white workers:

$$q_2^{rb} = \frac{h}{\omega}. \tag{8}$$

Note that prejudice does not enter the decision here, because the time horizon of model is finite. As there is no period 3, there are no concerns about involuntary termination.

However, prejudice does affect the job acceptance decision in period 1. Suppose that a black worker enters period 2 unemployed. With probability p, she will encounter a prejudiced firm, and with probability s, a prejudiced firm will refuse to offer her employment.[5] Thus, the value of unemployment is

$$U_2^b = \omega(1-ps)\left[1 - F(q_2^{rb})\right] E(q|q \geq q_2^{rb}) + \left[ps + (1-ps)F(q_2^{rb})\right] h \tag{9}$$

[5]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.

Substituting for q_2^{rb}, equation (9) simplifies to

$$\begin{aligned} U_2^b &= h + (1-ps)\int_{\frac{h}{\omega}}^{1} q'\omega - h dF(q') \\ &= h + \omega(1-ps)\int_{\frac{h}{\omega}}^{1} 1 - F(q')dq'. \end{aligned} \tag{10}$$

Note that due to the probability of ps that they will not receive a job offer, black workers have a lower value of unemployment than whites.

In period 1, black workers may receive a job offer from either a black supervisor firm or a white supervisor firm. The former firms are unprejudiced with certainty, and therefore any separations from this job which would occur in period 2 are voluntary. Thus the value of a job offer from a black supervisor firm is

$$\begin{aligned} V_1^{bb}(q) &= q\omega + q\omega + (1-q)h \\ &= 2q\omega + (1-q)h, \end{aligned} \tag{11}$$

where the superscript refers to the value black workers derive from jobs with black supervisors. Note that this value function is identical to that of white workers. Both white and black workers with black supervisors experience no prejudice-based termination risk. If a black worker receives a job offer from a black supervisor firm, he will accept if and only if $V_1^{bb}(q) \geq U_2^b + h$, which occurs when

$$q \geq \frac{1}{2\omega - h}\left(h + \omega(1-ps)\int_{\frac{h}{\omega}}^{1} 1 - F(q')dq'\right) \equiv q_1^{rbb}, \tag{12}$$

where q_1^{rbb} represents the period 1 black worker reservation match probability for black supervisor jobs. 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 entering period 2 unemployed.

This is not the case for job offers from white supervisor firms. Because some white supervisor firms are prejudiced, and prejudiced firms sometimes make employment offers to black workers, there is a probability π (derived in equation (2)) that if a black worker accepts an offer from a white supervisor firm, they will have a prejudiced employer. If their employer is prejudiced, they will be terminated in period 2 with probability s and be forced return to home production. Thus, the expected value of these jobs is

$$\begin{aligned} V_1^{bw}(q) &= q\omega + q(1-\pi s)\omega + [(1-q) + q\pi s]\, h \\ &= (2-\pi s)q\omega + [1 - q(1-\pi s)]\, h. \end{aligned} \tag{13}$$

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, because there is a πs probability that they will lose a good 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 $V_1^{bw}(q) \geq U_2^b + h$, which occurs whenever

$$q \geq \frac{1}{(2\omega - h) - \pi s(\omega - h)} \left(h + \omega(1-ps) \int_{\frac{h}{\omega}}^{1} 1 - F(q')dq' \right) \equiv q_1^{rbw}. \tag{14}$$

Note that since $\omega > h$, $q_1^{rbw} > q_1^{rbb}$. Relative to jobs with black supervisors, black workers have a higher reservation match quality signal q for jobs with white supervisors. This is because jobs with white supervisors hold lower option value for black workers. As they have πs 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 the match quality signals 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's race in period 2 when accepting job offers given the finite time horizon.

2.4.1 Predictions on Wages

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.*[6]

As we have shown in Section 2.3, black workers have a higher reservation match quality signal q for jobs with white supervisors than black supervisors, as there is a greater threat of termination from white supervisor firms. Thus, the accepted wages for black workers with white supervisors is drawn from a strictly higher distribution than the accepted 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 to make job offers to black workers. The reduction in job arrivals rates decreases the value of unemployment for black workers, and hence, black workers lower their reservation match quality signal for jobs with black supervisors. As the lower limit of match quality signals associated with accepted jobs with black supervisors decreases, the average wage of black workers decreases as well.

Proposition 3. *Assume that q is distributed uniformly over $[0, 1]$. 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 supervisor firms is not too pervasive. A sufficient condition for this property to hold is $(1-b)(1-2ps) > p^2 s(b-s)$.*[7]

Proposition 3 is perhaps our model's most surprising wage result. When the fraction of prejudiced firms increases in the labor market, the wage gap between workers with black supervisors and workers with white supervisors actually *increases*. The intuition for this result is the following. As prejudice increases, the value of unemployment decreases, which

[6] Proofs of this proposition and all other results can be found in Appendix A.

[7] For Proposition 3 and others which require q to be uniformly distributed, we first prove our result at the reservation match quality, and then must make a distributional assumption to ensure that the change in reservation match qualities affects the average wages in the same way. Although the exact condition will vary with the distribution of match quality, we will be able to prove a similar result under other distributional assumptions, so long as the distribution does not have too much curvature in the range around the reservation values. Problematic cases would arise if there is a large mass in the area round the white supervisor reservation match quality, and none around the black supervisor match quality. Then, black workers will indeed become relatively less selective in the job offers they take from black supervisors, but given there are few new black supervisor jobs with poor match quality that workers accept, the average accepted wage is unchanged.

induces black workers to become less selective on the jobs they accept. For black supervisor jobs, this response simply requires a reduction in q_1^{rbb}. However, increase in the number of prejudiced firms also increases the probability that white supervisor firms are prejudiced, which increases the prejudiced-based termination risk and decreases the value of white supervisor jobs, even holding q_1^{rbw} constant. Thus, an equal reduction in reservation job *value* due to an increase in prejudice levels will generally involve a larger decrease in q_1^{rbb} than q_1^{rbw}.

One exception to the result described in Proposition 3 is when workers are fairly certain that white supervisor firms are prejudiced (i.e., π 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 accepting the job. Regardless of the 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 match quality signal, large downward adjustments in the reservation match quality signal for white supervisors are required when prejudice changes slightly. However, the parameters required for this proposition to fail are unrealistic in our current society. Proposition 3 would hold even if 75% of firms were prejudiced and 50% of unprejudiced firms employed a black supervisor, which are well above estimates from this current paper and other studies.[8]

2.4.2 Predictions on Job Stability

Our model also generates predictions on job stability.

Proposition 4. *Assume that q is distributed uniformly over $[0, 1]$. 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

[8]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 question 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.

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 supervisor firms (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 greater number of bad matches and turnover.

Proposition 6. *Assume that q is distributed uniformly over* $[0, 1]$. *Conditional on starting potential experience, the stability of black workers' matches with white supervisor firms (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 in turn, increases the termination risk at these jobs. Although black workers can compensate for this risk increase by becoming more selective on the quality of jobs they accept, prejudice increases also decrease the value of unemployment. Thus, black workers are unwilling to increase their reservation match quality sufficiently to completely offset this increase in termination risk.

2.5 Comparative Statics: Worker Race

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

Proposition 7. *Conditional on tenure and potential experience, black workers in jobs with black supervisors have (weakly) lower wages and (weakly) less job stability than white workers.*

As shown in Section 2.3, black workers have lower reservation match quality signals for jobs with black supervisors than white workers, and thus, the distribution of accepted black worker-black supervisor match qualities is strictly lower. This fact directly implies that black workers in jobs with black supervisors will have both lower wages and less job stability than whites.

Note that black workers in jobs with *white supervisors* will not necessarily have lower wages than whites. The relative wages of black and white workers in white supervisor jobs will depend 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 very informative of employer prejudice, and therefore, 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 job matches, but these jobs would pay higher wages conditional on tenure than those earned by a typical white worker. However, because of the impact of prejudice on termination probability, the reservation job will always be *less stable.*

Proposition 8. *Assume that q is distributed uniformly over $[0, 1]$. Conditional on starting potential experience, black workers have on average (weakly) less job stability than white workers regardless of supervisor race.*

When black workers have a lower reservation match quality with white supervisors than whites, it of course follows that their job stability will be lower. It is also true even when black workers have a higher reservation match quality than white workers. The reservation match quality is the signal at which the worker is just indifferent between accepting the job and being unemployed. Since the value of being unemployed is lower for blacks, their value of employment at the reservation match quality must also be lower; if $q_1^{rbw} > q_1^{rw}$, it must be the case that $q_1^{rbw}(1 - \pi s) < q_1^{rw}$. Our model thus generates the empirical prediction that black workers have less job stability than whites.

3 Data: NLSY97 and GSS

We test these predictions from our model using data from the National Longitudinal Survey of Youth 1997 (NLSY97) and the General Social Survey (GSS).

3.1 National Longitudinal Survey of Youth 1997

The NLSY97 surveys a sample of individuals who were aged 12 to 17 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 can measure the duration of employment for jobs which were terminated within the follow-up periods of the sample. Importantly for our purposes, the NLSY97 also includes of information on the race of the individual's supervisor (self-reported) for each job until the 2009 wave of the survey. This variable allows us to estimate the effect of supervisor race on wages and job stability and to test the predictions from our model.

3.2 General Social Survey

The GSS is a biannual survey of social attitudes conducted on a nationally representative sample in the United States.[9] Included in this survey are various questions assessing individuals' racial attitudes with which we can measure local levels of prejudice. We combine cross-sectional samples from the 1996-2010 waves of the GSS and calculate the fraction of white individuals who hold certain race-associated beliefs at the state-level.

3.3 Measure of Prejudice

Prejudice in our model is specifically defined as a distaste for black workers that is strong enough to induce the employer to 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. Thus, we view responses to each of these questions related to racial attitudes 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 $m_{jk}, j \in \{1, ..J\}$ as J measures of prejudice in the GSS, then we can relate these measures by[10]

$$m_{jk} = \alpha_j p_k + \epsilon_{jk} \tag{15}$$

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.[11]

We restrict our attention to questions that we felt best measure racial animus rather than political sentiments.[12] From this subset, we select a diverse set of four questions for

[9] The Survey was conducted every year from 1972 to 1994 (except in 1979, 1981, and 1992). Since then, it has been conducted biannually.

[10] One way to interpret this relation would be that α_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}.

[11] 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 is 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 is the relevant measure for the predictions of Becker's frictionless model. 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.

[12] 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 attitude towards free speech. We also did not consider any of the numerous questions that relate to attitudes on affirmative action, which may provoke responses based on one's political ideology.

m_j, each of which was asked in every wave of the survey from 1996-2010: 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, and 4) whether they believe racial disparities are due to "inborn disability."[13] In practice, the choice of questions is of little consequence to our results.[14] There is substantial variation across states in the propensity to respond positively to each of these questions; when we estimate a regression of individual responses to each question on a set of state of residence indicators, we can strongly reject the equality of the coefficients on these indicators in every case.

We calculate the fraction of prejudiced responses for each question at the state-level. We exclude a small number of states for which we do not have at least 30 respondents on each question. This exclusion leaves us with measures of prejudice for 43 states, calculated off of an average of 208 individuals in each state. To avoid confounding our measures with time trends in prejudice, we adjust each state's yearly prejudice rates using a common national time trend.[15] We then use these measures to estimate the factor model.[16] Following convention, we normalize our prejudice measure to be mean 0 and standard deviation 1 across states.[17]

In Table 1, we report (un-weighted) averages for these racial attitudes and our prejudice measure by census division.[18] Prejudice appears to be highest in the South (divisions 5-7), particularly in the East South Central (division 6) 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 prejudice, although the ordering depends on the question. Our prejudice measure matches the conclusions one would draw from the underlying questions, with the highest prejudice levels in the South and the lowest prejudice levels in New England and the West. We also observe substantial variation in prejudice levels

[13]For a detailed description of these questions, see the Appendix B.

[14]See Appendix C.2 for results from a large set of alternative measures of prejudice from the GSS.

[15]We first calculate the fraction in each state who respond affirmatively to each question in each wave of the survey. We than 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.

[16]The factor loadings are lack of will (.92), no discrimination (.78), oppose marriage of close family member (.84), and inborn differences (.55).

[17]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 differences 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.

[18]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.

within each census division; the standard deviation of state-level prejudice measure is less than 0.5 in only two of the nine divisions. To provide a context for interpreting these prejudice magnitudes, a one standard deviation increase in the prejudice measure corresponds roughly to moving from the Mountain states (Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, and Wyoming) to the East North Central (Indiana, Illinois, Michigan, Ohio, and Wisconsin).

3.4 Supervisor Race, Wages, and Job Spells

We use the geocode files to match these prejudice measures with the individuals in the NSLY97 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.[19] 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.[20] Because our measure is forward-looking, this measure presents a problem for jobs the surveys after 2008 that do not include the supervisor race question. We, therefore, exclude these years from our analysis.

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.[21] We drop individuals who report less than 9 years of education and keep only white and black individuals to focus our attention on the black-white wage and employment gap. Likewise, we 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 27,660 job-year

[19]For instance, in our data, 4% of white workers work under 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 under a black supervisor.

[20]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 time to infer the composition of the firm's hierarchy. As we will discuss later, these limitations should only be a problem for our analysis 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 suffer from potential correlation between the bias and job spell duration.

[21]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 are reported as having started before age 14 even if they pass our hours restrictions, as these likely represent data errors that can distort our tenure measure.

observations, 27,185 of which are in states where we have a 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.[22] Thus, we can 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 and Battery (ASVAB), and have a higher implied female labor force participation rate.[23] 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 54% of black workers. Black workers live, on average, in areas with higher rates of prejudice.[24] While the difference in responses on each individual question is small, it amounts to a 0.47 standard deviation difference in overall prejudice. This is roughly equivalent to the difference in prejudice between the East North Central and the South Atlantic (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia.)

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 77% 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 0.42 standard deviation higher level of prejudice.

4 Empirical 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

[22]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.

[23]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.

[24]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.

estimates a pooled regression model of

$$\log W_i = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \varepsilon_i, \tag{16}$$

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 ε_i is the econometric error term. The coefficient γ_1 represents the conditional black-white wage gap among white supervisors. The coefficient γ_2 represents the conditional difference in wages between workers with black supervisors and white supervisors for white workers. The coefficient γ_3 represents the conditional difference in the "supervisor wage gap" for black workers relative to whites.

There are inevitably unobservable differences between establishments that employ black supervisors and those that do not, and these differences will likely be correlated with wage. Although we have several 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 unobservable establishment differences on wages will be accounted for by γ_2.[25] Our model's first prediction (Proposition 1) 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.[26] 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 5.1 percent less in firms observed with black supervisors (relative to whites) than 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

[25]One concern is that γ_2 could be picking up white workers' 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.

[26]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.

he is a member of a union, and whether he has employer sponsored health insurance.[27] 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). Inclusion of the full set of controls reduces the racial wage gap at white supervisor establishments by roughly 60%. However, although we lose statistical significance, the wage differences for black workers across supervisor race is only slightly reduced.[28] Our point estimates suggest that the racial wage gap at white supervisor establishments is around 4.9%, but approximately 9.0% at black supervisor establishments.

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

$$\log W_{it} = \beta X_{it} + \gamma_2 b^e_{it} + \gamma_3 b^w_i b^e_{it} + \omega_i + \varepsilon_{it}, \tag{17}$$

where X_{it} is a vector of time-varying controls, and ω_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.[29] The trade-off is that we have less power for estimation: only 1,285 of our 1,863 black workers, and 783 of our 3,532 white 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 (5) which includes quartics in tenure and potential experience, we observe that relative to whites, blacks see a 5.2 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 (6), and state, year, industry, and occupation fixed effects, as well as our employer characteristics, in column (7). In each of these specifications, γ_3, the

[27] 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.

[28] We lose a non-trivial portion of the sample in this specification due to missing ASVAB scores. There is little difference in our point estimates when we re-estimate columns (1)-(3) excluding those with a missing ASVAB.

[29] 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 fact, 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.

coefficient on the Black Worker-Black Supervisor interaction, remains negative, statistically significant, and of similar magnitude to the analogous pooled results.

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

$$\log W_{is} = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \gamma_4 p_s + \gamma_5 b_i^w p_s + \gamma_6 b_i^e p_s + \gamma_7 b_i^w b_i^e p_s + \varepsilon_{is}, \tag{18}$$

where p_s is the prejudice level in state s. As prejudice is normalized to be mean zero, γ_1, γ_2, and γ_3 represent the same statistics as in (16) for the mean state. The coefficient γ_4 represents the rate at which white workers wages with white supervisors changes with a one standard deviation increase the fraction of prejudiced individuals in a worker's state, while γ_5 represents the differential effect for black workers with white supervisors. The parameter γ_6 represents the rate at which white workers wages with black supervisors change relative to white workers with white supervisors as prejudice increases. Finally, γ_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 differential effects on black and white workers, they should be accounted for by γ_4 and γ_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 (Proposition 3). Second, $\gamma_5 + \gamma_7 < 0$; black workers with black supervisors in more prejudiced areas earn less than those in less prejudiced areas (Proposition 2).

We estimate equation (18) in Table 5.[30] 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. 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.

[30]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.

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 observe that prejudice has a negative but statistically insignificant impact on the wages of black workers with white supervisors. This result is not inconsistent with our model; because black workers respond to an increase in prejudice by becoming more selective on the job offers they accept from white supervisor firms, the predicted overall effect on wages is ambiguous. Importantly, as our model predicts, wages for black workers at black supervisor jobs ($\gamma_5+\gamma_7$) are decreasing in prejudice. We also observe some evidence that the "supervisor race gap" (γ_7) is increasing, although this effect is not statistically significant. To control for the geographic concentration of prejudiced beliefs in part, we add in fixed effects for the nine 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.[31] These controls have little impact on our results, as does adding industry, occupation, and employer controls in column (3). Including a quartic in ASVAB reduces the magnitude of both results; $\gamma_5 + \gamma_7$ loses statistical significance and γ_7 becomes positive but approximately 0.

We include worker fixed effects in columns (5) through (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 5% 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, much larger than estimated in the pooled cross-section, and statistically significant at the 10% level. This result too is robust to additional controls in columns (6) and (7).[32] Our estimates suggest

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

[32] 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

that a one standard deviation increase in prejudice, which roughly corresponds to moving from the Mountain division to the East North Central, leads to a 8% 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 (Proposition 4). 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 model, employment durations last at most two periods, and there 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 may be 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.[33] Therefore, we focus on short-run job stability, where our model is more applicable. 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 (due to either attrition or because the job lasted beyond the 2008 survey); this amounts to less than 9% of our sample. Given that our workers are in their early-career, job durations are relatively short. Only 55% of our sample of 13,306 jobs last more than one year.

We estimate a linear probability model,

$$Z_i = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \varepsilon_i \tag{19}$$

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.[34] Again, while we expect that unobservable firm characteristics which may influence job stability are correlated with the likelihood of employing a black

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.

[33]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.

[34]Results from probit and logit models are similar.

supervisor, these will be captured by γ_2 provided they do not affect black and white workers differently.[35] 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 4.2 percentage points in job stability 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 almost 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.[36] Our results remain consistent once accounting 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 7.1 percentage points less likely to remain employed after 1 year than white workers. However, black workers with black supervisors gain 5.7 percentage points more in job stability than similar whites when working at a black supervisor establishment.

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 38% 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 see little evidence for our model in the basic specification or including state and year fixed effects. Once we include occupation, industry, and employer characteristic controls in column (7) our point estimate is of only slightly smaller magnitude to what we observed in the pooled cross-sections, although it is not statistically significant.

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 (Proposition 8). Jobs with black supervisors become less stable because blacks lower their reservation match quality as employment opportunities decrease

[35] This will also capture the fact that our measure of having a black supervisor is correlated with job duration by construction.

[36] Workers sometimes report changes in occupation and industry during a job spell. We use fixed effects for the first occupation and industry which they report.

(Proposition 7). Following the same strategy as before, in Table 7 we estimate,

$$Z_i = \beta X_i + \gamma_1 b_i^w + \gamma_2 b_i^e + \gamma_3 b_i^w b_i^e + \gamma_4 p_s + \gamma_5 b_i^w p_s + \gamma_6 b_i^e p_s + \gamma_7 b_i^w b_i^e p_s + \varepsilon_{is} \qquad (20)$$

where our predictions are $\gamma_5 < 0$ and $\gamma_5 + \gamma_7 < 0$. We find support for the second hypothesis in the pooled cross-section. Once we control for industry, occupation, and employer characteristics in column (3), we see a strong and statistically significant negative effect of prejudice on the stability of black worker-black supervisor matches. Including controls for ASVAB scores in column (4) does not substantially affect this result. Our estimates suggest that increasing the level of prejudice by one standard deviation, which amounts to moving from the Mountain division to the East North Central, would lead to a 5.7 percentage point decrease in the probability that black workers with black supervisors would remain in their job for at least one year (relative to whites). When we include worker fixed effects in columns (5)-(7) we lose statistical significance but actually see a non-trivial increase in the magnitude of the effect. We find little support for the first hypothesis. The estimated effect of prejudice on black-worker white supervisor job stability ranges from zero to small and positive, and is never significant.

To check the robustness of our results to different definitions of job stability, we estimate (19) and (20) for every value of job duration between 60 and 720 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.[37] While not always statistically significant at conventional levels, the point estimates have the correct sign 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 to 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 directly controlling for the completed length of the job spell. These results are consistent with our

[37] 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.

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 the questions we use is linearly related to the fraction of prejudiced employers in a state.[38] 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 many are statistically significant.[39] 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.[40]

4.4 Alternative Explanations

While we posit the source of prejudice in our model is employers, many of our results can be derived from a model in which workers had a taste for same-race management. If racial tastes drive worker decisions, then such conditions can pose problems for our identification strategy. The estimated effect of working 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. However, 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 the worker's taste for same-race supervisors, it would seem to us that job stability at these firms should be increasing in prejudice, rather than decreasing, as the unprejudiced job opportunities outside the firm diminish. Nonetheless, we

[38] 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).

[39] 6 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 2 out of 9 for the relationship between prejudice and black worker-black supervisor job stability.

[40] These results are available upon request.

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 to a white supervisor, they should require a wage increase to compensate them for their distaste. As we observe 610 job spells in which a worker's supervisor changes race, we can test this in the data. We conduct this test in Table 8 by including job fixed effects.[41] 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.[42]

In addition, our empirical findings cannot be easily explained by conventional statistical discrimination models.[43] 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; workers with positive difficult-to-observables should select into employers who are best able to observe these factors. 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.[44] Moreover, 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

[41]Note that our overall sample size is reduced by 15%, 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.

[42]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.

[43]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.

[44]See Hensvik (2014) who presents evidence consistent with this phenomenon for women in organizations with a large share of female managers.

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.[45] Hence, although statistical 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. Workers instead observe a signal of an employer's prejudice status, the presence of a black supervisor. Since prejudiced employers have a biased retention policy, these jobs present less option value to black workers. Thus, they have lower reservation wages (or match quality signal) 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 results show that asymmetric information regarding employer prejudice can have important labor market consequences, which suggests that firms that are not prejudiced should be willing to invest in communicating this information to prospective black employees. Because of data limitations, we were only able to look at one possible signal, which we assumed was exogenous. The optimal adoption of signals, such as affirmative action in promotion and hiring, remains an open question. Developing models of firm organizational practices under asymmetric information about prejudice and identifying data which could test these models presents an important direction for future research.

[45] 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.

Although measured racial prejudice in the United States has declined substantially over the last few decades, our paper demonstrates that the remaining prejudice and uncertainty about which firms hold these racial prejudices, 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.

References

[1] Aizer, Anna and Flavio Cunha. 2012. "The Production of Child Human Capital: Endowments, Investments, and Fertility." NBER Working Paper No. 18429

[2] Arrow, Kenneth J. 1972. "Models of Job Discrimination." in Anthony H. Pascal (ed.), *Racial Discrimination in Economic Life*. Lexington, MA: D.C. Heath.

[3] Bacolod, Marigee, Bernardo S. Blum, and William C. Strange. 2009. "Skills in the City." *Journal of Urban Economics*, 65 (2): 136-153.

[4] Becker, Gary S. 1971. *The Economics of Discrimination*, Second edition. Chicago and London: University of Chicago Press.

[5] Bertrand, Marianne, Dolly Chugh and Sendhil Mullainathan. 2005. "Implicit Discrimination." *American Economic Review*, 95 (2): 94-98.

[6] Black, Dan A. 1995. "Discrimination in an Equilibrium Search Model." *Journal of Labor Economics*. 13 (2): 309-333.

[7] Black, Dan A., Amelia Haviland, Seth Sanders, and Lowell Taylor. 2006. "Why Do Minority Men Earn Less? A Study of Wage Differentials Among the Highly Educated." *Review of Economics and Statistics*, 88 (2): 300-313.

[8] Black, Dan A., and Jeffrey A. Smith. 2006. "Estimating the Returns to College Quality with Multiple Proxies for Quality." *Journal of Labor Economics*, 24 (3): 701-728.

[9] Bjerk, David. "The Differing Nature of Black-White Wage Inequality Across Occupational Sectors." *Journal of Human Resources*, 27 (2): 398-434.

[10] Bond, Timothy N. and Kevin Lang. 2013. "The Evolution of the Black-White Test Score Gap in Grades K-3: The Fragility of Results." *Review of Economics and Statistics,* 95 (5): 1468-1479.

[11] Bond, Timothy N. and Kevin Lang. 2014. "The Sad Truth about Happiness Scales." NBER Working Paper No. 19950.

[12] Bowlus, Audra J. and Zvi Eckstein. 2002. "Discrimination and Skill Differences in an Equilibrium Search Model." *International Economic Review*, 43 (4): 1309-1345.

[13] Carneiro, Pedro, James J. Heckman, and Dimitriy V. Masterov. 2005. "Labor Market Discrimination and Racial Differences in Premarket Factors." *Journal of Law and Economics*, 48 (1): 1-39.

[14] Carruthers, Celeste K. and Marianna H. Wanamaker. 2013. "Separate and Unequal in the Labor Market: School Quality and the Black-White Wage Gap." unpublished.

[15] Charles, Kerwin Kofi and Jonathan Guryan. 2008. "Prejudice and Wages: An Empirical Assessment of Becker's *The Economics of Discrimination*." *Journal of Political Economy*, 116 (5): 773-809.

[16] Charles, Kerwin Kofi and Jonathan Guryan. 2011. "Studying Discrimination: Fundamental Challenges and Recent Progress." *Annual Review of Economics*, (3): 479-511.

[17] Cunha, Flavio and James J. Heckman. 2008. "Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Journal of Human Resources,* 43 (4): 738-782.

[18] Cunha, Flavio, James J. Heckman, and Susanne M. Schennach. 2010. "Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Econometrica*, 78 (3): 889-391.

[19] Fadlon, Yariv. 2015. "Statistical Discrimination and the Implications of Employer-Employee Racial Matches." *Journal of Labor Research*. 36 (2): 232-248.

[20] Fryer, Jr. Roland G., Paul S. Heaton, Steven D. Levitt, and Kevin M. Murphy. 2013. "Measuring Crack Cocaine and its Impact." *Economic Inquiry*. 51 (3): 1651-1681.

[21] Fryer, Jr., Roland G., Devah Pager, and Jorg L. Spenkuch. 2013. "Racial Disparities in Job Finding and Offered Wages." *Journal of Law and Economics*. 56 (3): 633-689.

[22] Giuliano, Laura, David I. Levine, and Jonathan Leonard. 2009. "Manager Race and the Race of New Hires." *Journal of Labor Economics*, 27 (4): 589-631.

[23] Giuliano, Laura, David I. Levine, and Jonathan Leonard. 2011. "Racial Bias in the Manager-Employee Relationship: An Analysis of Quits, Dismissals, and Promotions at a Large Retail Firm." *Journal of Human Resources*, 46 (1): 26-52.

[24] Hensvik, Lena E. 2014. "Manager Impartiality: Worker-Firm Matching and the Gender Wage Gap." *Industrial & Labor Relations Review*, 67 (2): 395-421.

[25] Johnson, William R. and Derek Neal. 1998. "Basic Skills and the Black-White Earnings Gap." In Christopher Jencks and Meredith Phillips (eds.), *The Black-White Test Score Gap*. Washington, DC: Brookings Institution Press.

[26] Kennan, John and Robert Wilson. 1993. "Bargaining with Private Information." *Journal of Economic Literature*. 31 (1): 45-104.

[27] Lang, Kevin and Jee-Yeon K. Lehmann. 2011. "Racial Discrimination in the Labor Market: Theory and Empirics." *Journal of Economic Literature*, 50 (4): 959-1006.

[28] Lang, Kevin and Michael Manove. 2011. "Education and Labor-Market Discrimination." *American Economic Review*, 101 (4): 1467-1496.

[29] Lehmann, Jee-Yeon. 2011. "Job Assignment and Promotion under Statistical Discrimination: Evidence from the Early Careers of Lawyers." unpublished.

[30] Neal, Derek A. and William R. Johnson. 1996. "The Role of Premarket Factors in Black-White Wage Differences." *Journal of Political Economy*, 104 (5): 869-895.

[31] Neal, Derek. 2004. "The Measured Black-White Wage Gap among Women Is Too Small." *Journal of Political Economy*, 112 (1): S1-S28.

[32] Ritter, Joseph A. and Lowell J. Taylor. 2011. "Racial Disparity in Unemployment." *Review of Economics and Statistics*, 93 (1): 30-42.

[33] Rooth, Dan-Olof. 2010. "Automatic Associations and Discrimination in Hiring: Real World Evidence." *Labour Economics*. 17 (3): 523-534.

[34] Rosen, Asa. 1997. "An Equilibrium Search-Matching Model of Discrimination." *European Economic Review*, 41 (8): 1589-1613.

[35] Sarzosa, Miguel. 2015. "The Dynamic Consequences of Bullying on Skill Accumulation." unpublished.

[36] Stratton, Leslie S. 1993. "Racial Differences in Men's Unemployment." *Industrial and Labor Relations Review*, 46 (3): 451-63.

[37] Ziegert, Jonathan C., and Paul J. Hanges. 2005. "Employment Discrimination: The Role of Implicit Attitudes, Motivation, and a Climate for Racial Bias." *Journal of Applied Psychology*, 90 (3): 553-562.

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 2 jobs, and period 2 black reservation wages are independent of supervisor race. Further, as there are only two types of jobs and all bad matches that were accepted in period 1 are terminated voluntarily in period 2, all jobs that we observe in period 2 that began in period 1 have the same wage. Thus, the outcomes for whites, blacks with black supervisors, and blacks with white supervisors in period 2 are always identical. We therefore will focus our proofs on search strategies for period 1 jobs.

A.1.1 Proof of Proposition 1

Proof. First note that $q_1^{rbw} > q_1^{rbb}$ since $\pi s > 0$. Thus the expressions have the same numerator, but q_1^{rbb} has a larger denominator. Since the observed wages in period 1 are simply the expected value of the distribution truncated at the reservation wage, the distributions are identical across 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. $\square$

A.1.2 Proof of Proposition 2

Proof. Differentiating (12) with respect to p,

$$\frac{\partial q_1^{rbb}}{\partial p} = \frac{-s\omega \int_{\frac{h}{\omega}}^{1} 1 - F(q')dq'}{(2\omega - h)},$$

which is strictly less than zero. As the reservation wage is decreasing in prejudice, the distribution of wages can be stochastically ordered. $\square$

A.1.3 Proof of Proposition 3

Proof. Applying the uniform distribution, we can write the reservation wages for each supervisor race category as

$$\begin{aligned} q_1^{rbb} &= \frac{1}{2\omega - h}\left[h + \frac{1}{2}\omega(1 - ps)(1 - \frac{h}{\omega})^2\right] \\ q_1^{rbw} &= \frac{1}{(2\omega - h) - \pi s(\omega - h)}\left[h + \frac{1}{2}\omega(1 - ps)(1 - \frac{h}{\omega})^2\right], \end{aligned}$$

It then follows from uniformity that the difference in average wages is

$$\bar{q_1^{bw}} - \bar{q_1^{bb}} = \frac{\omega + q_1^{rbw}}{2} - \frac{\omega + q_1^{rbb}}{2} = \frac{1}{2}(q_1^{rbw} - q_1^{rbb}).$$

Taking the derivative of this expression with respect to prejudice,

$$\frac{\partial(\bar{q_1^{bw}} - \bar{q_1^{bb}})}{\partial p} = \frac{1}{2}(\frac{\partial q_1^{rbw}}{\partial p} - \frac{\partial q_1^{rbb}}{\partial p}),$$

where,

$$
\begin{aligned}
\frac{\partial q_1^{rbw}}{\partial p} &= \frac{\frac{\partial \pi}{\partial p} s(\omega - h)\left[h + \frac{1}{2}\omega(1-ps)(1-\frac{h}{\omega})^2\right]}{\left[(2\omega - h) - \pi s(\omega - h)\right]^2} - \frac{s\omega(1-\frac{h}{\omega})^2}{2\left[(2\omega - h) - \pi s(\omega - h)\right]} \\
\frac{\partial q_1^{rbb}}{\partial p} &= -\frac{s\omega(1-\frac{h}{\omega})^2}{2(2\omega - h)} \\
\frac{\partial \pi}{\partial p} &= \frac{(1-s)(1-b)}{\left[(1-b)(1-p) + p(1-s)\right]^2}.
\end{aligned}
$$

This expression simplifies to

$$\frac{\partial(q_1^{\bar{b}w} - q_1^{\bar{b}\bar{b}})}{\partial p} = \frac{1}{2}\Omega_2\left[\Lambda_3 + \Lambda_4\right],$$

where,

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

Note that since $\omega > h \geq 0$ and $b < 1, p < 1, s < 1$,Ω_2 and Λ_3 are both strictly positive. By inspection, Λ_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. □

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 $(1-q)(1-\pi s)$. Imposing the uniform distribution and integrating over the distribution of accepted jobs, black supervisor jobs last longer provided

$$\frac{1 + q_1^{rbb}}{2} \geq \frac{1 + q_1^{rbw}}{2}(1 - \pi s),$$

substituting for the reservation wages (derived for the uniform distribution in the proof of proposition 3) and multiplying both sides by 2,

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

which simplifies to

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

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. Black workers' job stabilities are monotonic functions of their reservation wage, thus it is sufficient to differentiate (12) with respect to p,

$$\frac{\partial q_1^{rbb}}{\partial p} = \frac{-s\omega \int_{\frac{h}{\omega}}^{1} 1 - F(q')dq'}{(2\omega - h)},$$

which is strictly less than zero. $\square$

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 a 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

$$\frac{1 + q_1^{rbw}}{2}(1 - \pi s).$$

Taking the derivative of this expression with respect to p,

$$\frac{1}{2}\left[-\frac{\partial \pi}{\partial p}s + \frac{\partial q_1^{rbw}(1 - \pi s)}{\partial p}\right].$$

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_1^{rbw} increases in p (which is possible). However, this would imply that both q_1^{rbw} and $(1-\pi s)q_1^{rbw}$ has increased, and thus the total value of employment at the reservation match quality $V_1^{bw}(q_1^{rbb})$ has also increased. But, $V_1^{bw}(q_1^{rbb}) = h + U_2^b$. Taking the derivative of (10),

$$\frac{\partial U_2^b}{\partial p} = -s \int_{\frac{h}{\omega}}^{1} 1 - F(q')dq'$$

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

A.1.7 Proof of Proposition 7

Proof. Comparing (7) to (12), note that white workers have a higher reservation match quality than black workers with black supervisors. Since $f(q)$ does not vary across race, the distribution of accepted match qualities for white workers will stochastically dominate that for black workers with black supervisors. As q directly determines both wages and job stabilities, whites will have higher wages and more stable jobs than blacks with black supervisors. $\square$

A.1.8 Proof of Proposition 8

Proof. Under the uniform distribution, white supervisor jobs are always less stable for black workers than black supervisor jobs (Proposition 4). Since black workers with black supervisors have less job stability than whites (Proposition 7) it then follows that black workers with white supervisors will also have less job stability. $\square$

B Data Appendix

B.1 GSS Prejudice Measures

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

B.1.1 Lack Will

The variable RACDIF4 asks, "On the average African Americans have worse jobs, income, and housing than white people. Do you think these differences are because most African Americans just don't have the motivation or willpower to pull themselves up out of poverty?" Respondents could choose 'Yes' or 'No.' We coded 'Yes' answers as prejudiced responses. The question was asked in every survey from 1996-2010.

B.1.2 No Discrimination

The variable RACDIF1 asks, "On the 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 1996-2010.

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 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 1996-2010.

B.1.5 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 the 1996 survey, and again from 2004-2010.

B.1.6 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 6 or greater as prejudiced responses. This question was asked in every survey from 1996-2010.

B.1.7 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 1996-2002.

B.1.8 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 1996, 2008 and 2010 surveys.

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 2 or less as prejudiced responses. This question was asked in every survey from 1996-2010.

C Empirical Appendix

C.1 Supervisor Race and Job Stability Correlation

In Table C1 we test the sensitivity of our wage and job stability results to specifications in which this bias may be less severe. In columns (1) and (2), we control for the total length of the job spell in a regression on wages. 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 model's predictions hold under these specifications. In columns (3) and (4), we estimate wage regressions which 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. While our coefficients of interest are not statistically significant, they maintain the correct sign. Columns (5) and (6) repeat (3) and (4), but instead looking at job stability. The estimated magnitudes are similar to those in our main specification.

C.2 Alternative Measures of Prejudice

To test the sensitivity of our results to the individual components of our prejudice measure, in the first four columns of Table C2 we estimate our fixed effect wage specification using the individual questions as measures of prejudice directly. The columns use, in order, believe that blacks lag whites due to lack of will, do not believe blacks lag whites due to discrimination, oppose the marriage of a close relative to a black individual, and believe that blacks lag whites due to inborn disability . 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 two out of the four questions. The "supervisor race wage gap" for black workers is increasing in prejudice for every question as well, and statistically significant for all but the "no discrimination" question.

In columns (5) through (9) we measure prejudice through five additional questions we did not use, due to smaller samples, difficulty in interpreting the question, and less dispersion in the data: opposition to open housing laws, belief that blacks are lazy, support for anti-miscegenation laws, refusal to vote for black presidential candidates, 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 5 variables, while our result for black supervisor-black worker wages is statistically significant for four.

In Table C3, we repeat this exercise using the cross-sectional specification on job stability. While our results are weaker than for wages, they always maintain the correct sign. Although black worker-black supervisor job stability is only statistically significantly decreasing in prejudice for the "no discrimination" and marriage questions, we see similar magnitudes for the questions on "lack of will," belief that blacks are lazy, and support for anti-miscegenation laws.

Taken together, while we cannot be certain under which questions our assumptions are satisfied, given the general consistency of results, the results of Tables C2 and C3 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

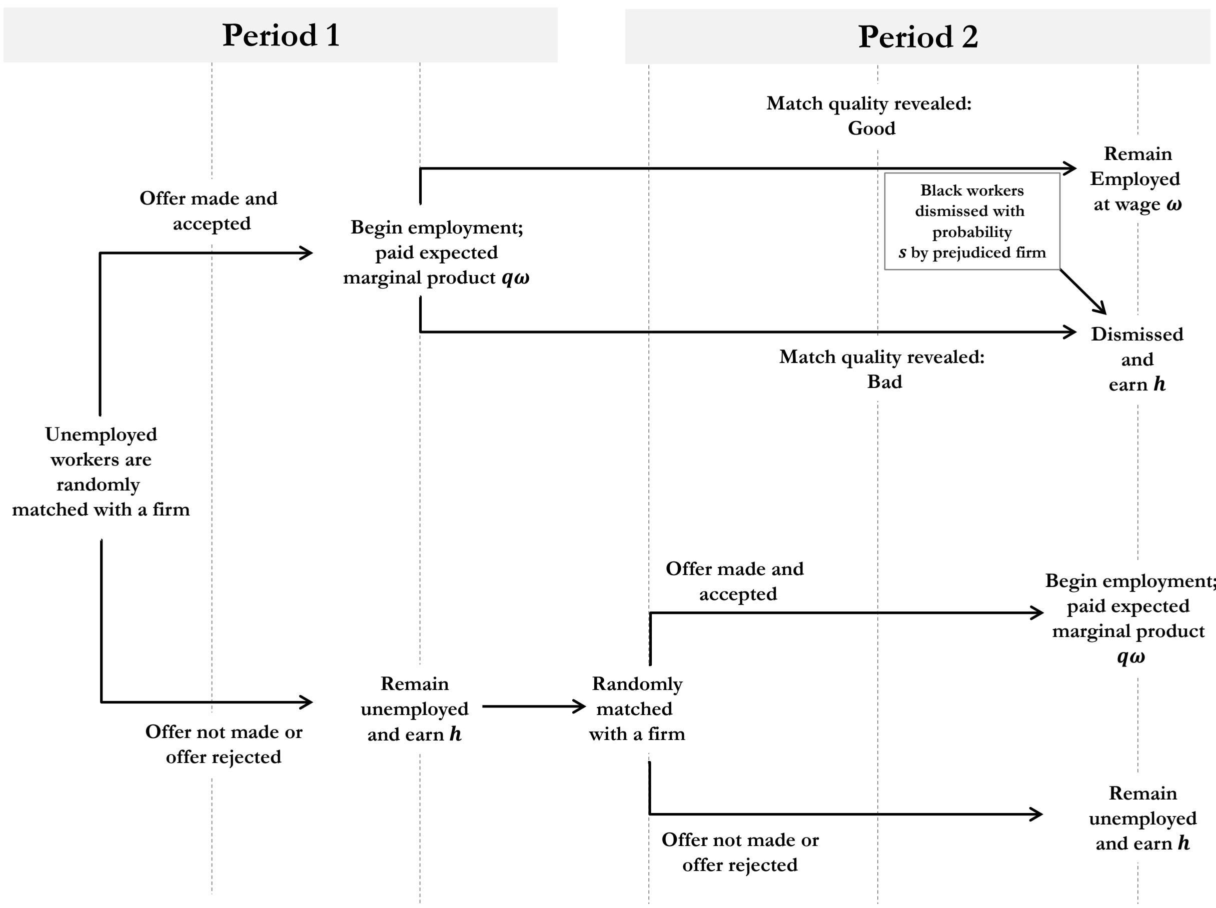
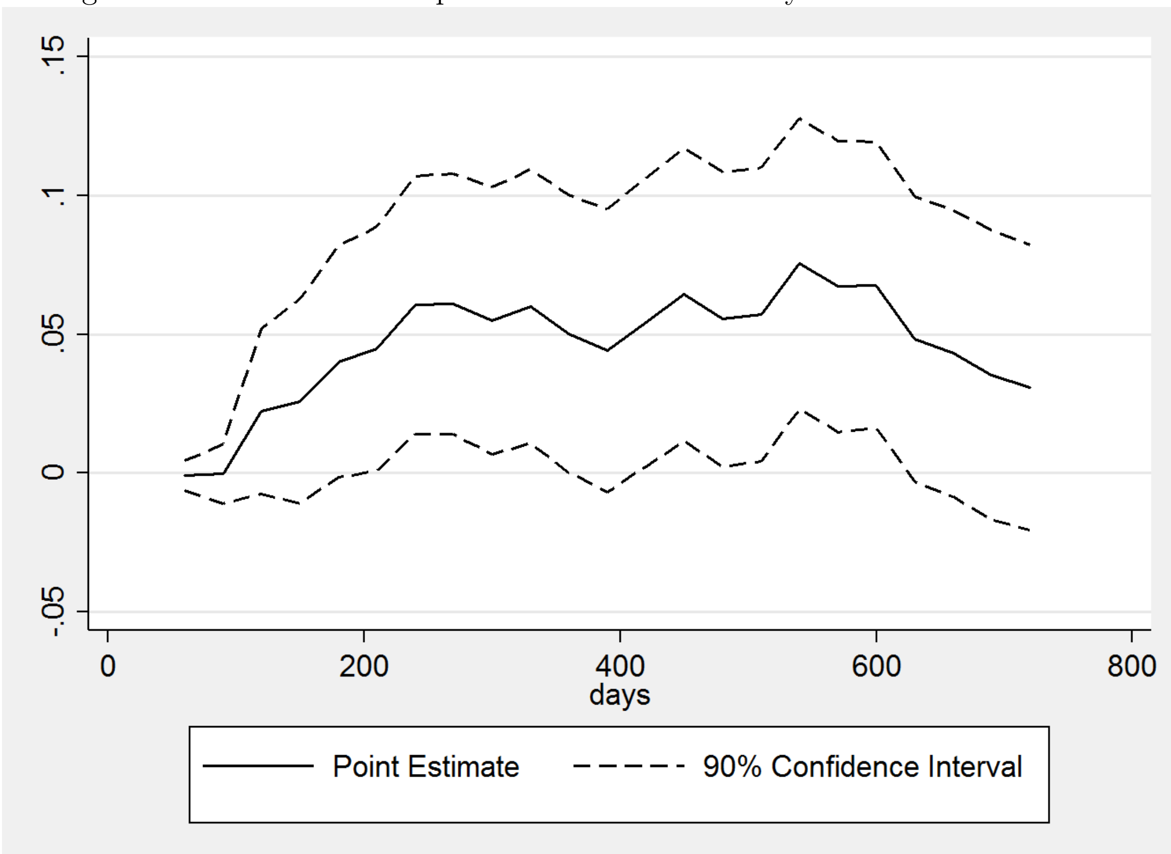
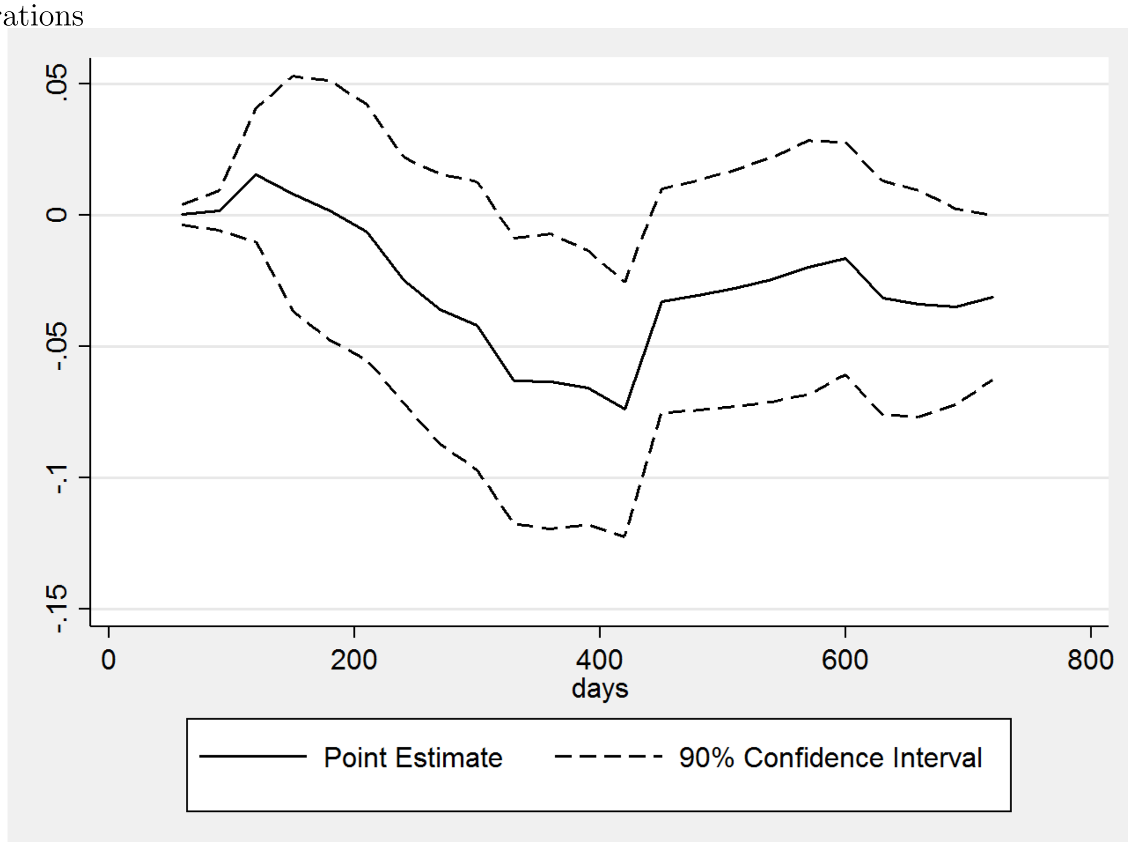


Figure 2: Effect of Black Supervisor on Black Stability - Alternative Durations



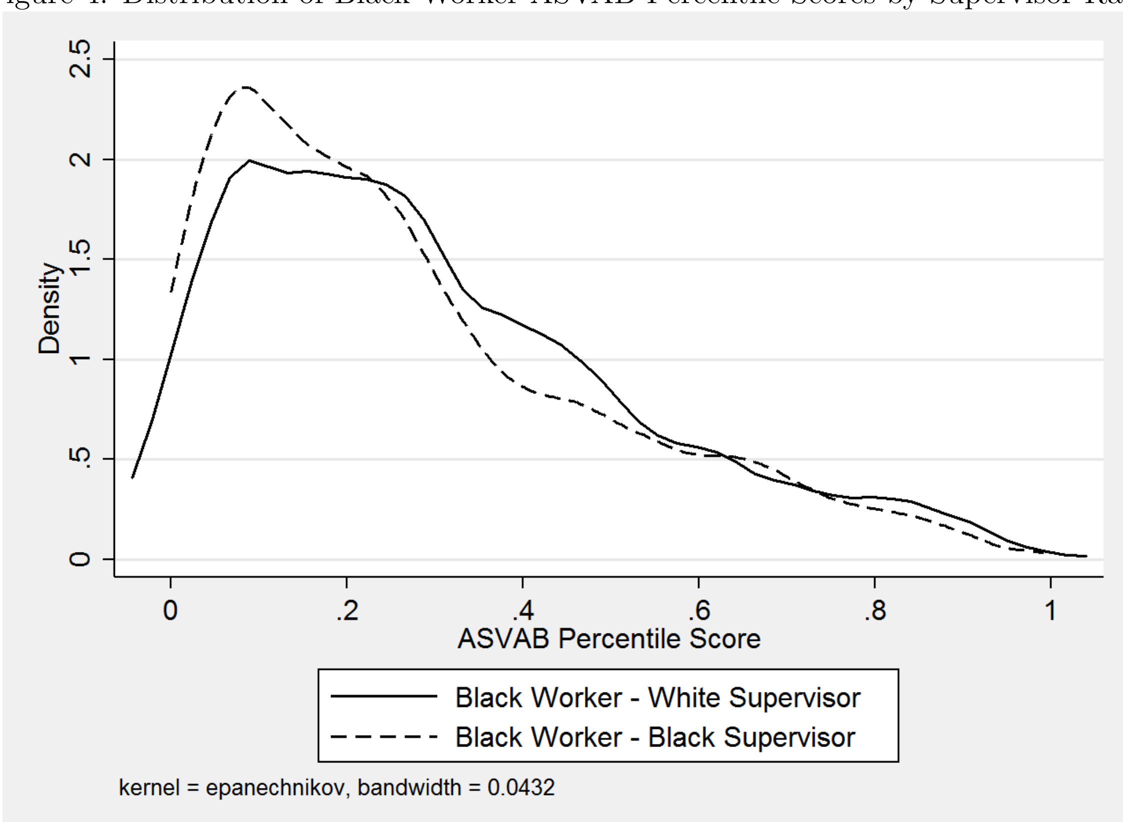
Point estimates and 90% confidence interval for estimate of $\gamma_5 + \gamma_7$ under different job length definitions of job stability. Points were estimated at 30 day intervals. Regressions included controls for gender, education, industry and occupation fixed effects, whether the employer offered 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 90% 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			South		West	
	1	2	3	4	5	6	7	8	9
Lack Will	0.38	0.46	0.51	0.40	0.55	0.63	0.57	0.41	0.40
No Discrimination	0.59	0.65	0.69	0.64	0.73	0.79	0.77	0.61	0.65
Oppose Marriage	0.12	0.19	0.21	0.19	0.27	0.44	0.32	0.15	0.11
Inborn Differences	0.07	0.14	0.11	0.08	0.10	0.11	0.11	0.06	0.07
Prejudice	-1.08	-0.11	0.20	-0.67	0.69	1.75	1.06	-0.82	-0.87
	(0.63)	(0.52)	(0.38)	(0.76)	(0.76)	(0.45)	(0.76)	(0.50)	(0.19)
Observations	393	1023	1412	619	1355	501	736	622	988

Average of de-trended fraction of individuals in each state by division for the combined 1996-2010 waves 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) Total	(2) White	(3) Black
Log Wage	7.17	7.23	7.07
	(0.44)	(0.44)	(0.40)
Education	13.26	13.40	12.99
	(2.32)	(2.36)	(2.22)
Female	0.46	0.44	0.50
	(0.50)	(0.50)	(0.50)
Potential Experience	3.96	3.79	4.32
	(2.73)	(2.67)	(2.80)
Tenure	2.01	2.09	1.86
	(1.72)	(1.77)	(1.61)
ASVAB	0.46	0.54	0.30
	(0.28)	(0.27)	(0.23)
Black Supervisor	0.23	0.08	0.54
	(0.42)	(0.27)	(0.50)
Lack Will	0.50	0.48	0.53
	(0.08)	(0.08)	(0.08)
No Discrimination	0.69	0.67	0.72
	(0.07)	(0.07)	(0.08)
Against Marriage	0.24	0.22	0.27
	(0.09)	(0.09)	(0.10)
Inborn Differences	0.10	0.10	0.10
	(0.03)	(0.03)	(0.03)
Prejudice	0.19	0.04	0.51
	(0.82)	(0.78)	(0.80)
Observations	27660	18251	9409

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) White	(2) Black
Log Wage	7.19	7.11
	(0.44)	(0.43)
Education	13.33	13.05
	(2.34)	(2.26)
Female	0.45	0.50
	(0.50)	(0.50)
Potential Experience	3.89	4.22
	(2.71)	(2.76)
Tenure	1.97	2.15
	(1.70)	(1.78)
ASVAB	0.50	0.35
	(0.27)	(0.27)
Black	0.20	0.77
	(0.40)	(0.42)
Lack Will	0.49	0.53
	(0.08)	(0.08)
No Discrimination	0.68	0.72
	(0.07)	(0.08)
Against Marriage	0.23	0.27
	(0.09)	(0.10)
Inborn Differences	0.10	0.10
	(0.03)	(0.03)
Prejudice	0.10	0.52
	(0.80)	(0.81)
Observations	21505	6155

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) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage	(5) Log Wage	(6) Log Wage	(7) Log Wage
Black	-0.119***	-0.107***	-0.086***	-0.049***			
	(0.012)	(0.012)	(0.011)	(0.012)			
Black Supervisor	0.027	0.029	0.017	0.008	0.031	0.029	0.015
	(0.023)	(0.023)	(0.019)	(0.022)	(0.022)	(0.022)	(0.020)
Black X Black Supervisor	-0.051*	-0.052**	-0.046**	-0.041	-0.052**	-0.049*	-0.042*
	(0.027)	(0.026)	(0.022)	(0.026)	(0.026)	(0.026)	(0.024)
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	27660	27616	27118	22445	27660	27616	27118

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. Employer characteristics include controls for log establishment size, a dummy for if this variables was top-coded, and indicators for whether the worker was a union member, whether the employer offered health insurance, and whether the employer offered any benefits. *$p < .1$, ** $p < .05$, *** $p < .01$

Table 5: Prejudice and and Wages

	(1) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage	(5) Log Wage	(6) Log Wage	(7) Log Wage
Black	-0.089***	-0.093***	-0.075***	-0.033*			
	(0.021)	(0.020)	(0.017)	(0.019)			
Black Supervisor	0.033	0.027	0.017	0.010	0.010	0.007	-0.004
	(0.021)	(0.020)	(0.017)	(0.021)	(0.025)	(0.024)	(0.024)
Black X Black Supervisor	-0.039	-0.038	-0.031	-0.033	-0.030	-0.026	-0.016
	(0.029)	(0.025)	(0.024)	(0.028)	(0.037)	(0.037)	(0.032)
Prejudice	-0.049***	-0.038*	-0.033*	-0.035*	-0.008	-0.031	-0.027
	(0.015)	(0.022)	(0.019)	(0.019)	(0.017)	(0.025)	(0.023)
Prejudice X Black (γ_5)	-0.034	-0.032	-0.032	-0.044*	-0.048	-0.035	-0.016
	(0.024)	(0.024)	(0.020)	(0.023)	(0.035)	(0.033)	(0.031)
Prejudice X Black Supervisor	0.018	0.022	0.007	-0.006	0.062**	0.063**	0.050**
	(0.026)	(0.026)	(0.022)	(0.023)	(0.027)	(0.027)	(0.023)
Prejudice X Black X Black Supervisor (γ_7)	-0.023	-0.023	-0.018	0.006	-0.067*	-0.068*	-0.064**
	(0.039)	(0.034)	(0.032)	(0.033)	(0.038)	(0.038)	(0.031)
$\gamma_5 + \gamma_7$	-0.057*	-0.055**	-0.050**	-0.038	-0.115**	-0.103**	-0.080*
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	27185	27185	26700	22128	27185	27185	26700

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. Employer characteristics include controls for log establishment size, a dummy for if this variables was top-coded, and indicators for whether the worker was a union member, whether the employer offered health insurance, and whether the employer offered any benefits. 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) Stable	(2) Stable	(3) Stable	(4) Stable	(5) Stable	(6) Stable	(7) Stable
Black	-0.082***	-0.080***	-0.081***	-0.071***			
	(0.012)	(0.013)	(0.012)	(0.015)			
Black Supervisor	0.063***	0.059***	0.018	0.015	0.089***	0.084**	0.041
	(0.020)	(0.020)	(0.019)	(0.021)	(0.034)	(0.035)	(0.033)
Black X Black Supervisor	0.042*	0.045*	0.063***	0.057**	-0.004	0.000	0.030
	(0.025)	(0.025)	(0.023)	(0.026)	(0.042)	(0.042)	(0.041)
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	13306	13262	12933	10613	13306	13262	12933

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. Employer characteristics include controls for log establishment size, a dummy for if this variables was top-coded, and indicators for whether the worker was a union member, whether the employer offered health insurance, and whether the employer offered any benefits. *$p < .1$,*$p < .1$, ** $p < .05$, *** $p < .01$

Table 7: Prejudice and Job Stability

	(1) Stable	(2) Stable	(3) Stable	(4) Stable	(5) Stable	(6) Stable	(7) Stable
Black	-0.079***	-0.081***	-0.082***	-0.074***			
	(0.016)	(0.015)	(0.014)	(0.016)			
Black Supervisor	0.057***	0.049***	0.005	0.001	0.071***	0.065**	0.022
	(0.017)	(0.017)	(0.016)	(0.019)	(0.026)	(0.027)	(0.028)
Black X Black Supervisor	0.052***	0.052**	0.077***	0.072***	0.029	0.025	0.062
	(0.019)	(0.020)	(0.017)	(0.023)	(0.042)	(0.039)	(0.038)
Prejudice	-0.005	-0.004	-0.004	-0.004	-0.038*	-0.028	-0.020
	(0.007)	(0.008)	(0.010)	(0.012)	(0.022)	(0.029)	(0.029)
Prejudice X Black (γ_5)	-0.004	0.001	-0.001	0.005	0.019	0.009	0.026
	(0.020)	(0.018)	(0.018)	(0.020)	(0.042)	(0.036)	(0.038)
Prejudice X Black Supervisor	0.031	0.039	0.054**	0.060**	0.075**	0.071**	0.069**
	(0.024)	(0.024)	(0.023)	(0.027)	(0.032)	(0.034)	(0.034)
Prejudice X Black X Black Supervisor (γ_7)	-0.036	-0.041	-0.060*	-0.062	-0.103**	-0.088*	-0.098*
	(0.035)	(0.034)	(0.032)	(0.039)	(0.049)	(0.049)	(0.052)
$\gamma_5 + \gamma_7$	-0.0400	-0.0404	-0.0607**	-0.0568*	-0.0836	-0.0795	-0.0727
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	13062	13043	12724	10450	13062	13043	12724

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. Employer characteristics include controls for log establishment size, a dummy for if this variables was top-coded, and indicators for whether the worker was a union member, whether the employer offered health insurance, and whether the employer offered any benefits. 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) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage
Black Supervisor	-0.000	-0.002	-0.015	-0.019
	(0.033)	(0.031)	(0.031)	(0.027)
Black X Black Supervisor	-0.015	-0.015	0.001	0.003
	(0.041)	(0.039)	(0.039)	(0.036)
Prejudice X Black Supervisor			0.044	0.051
			(0.042)	(0.042)
Prejudice X Black X Black Supervisor			-0.046	-0.053
			(0.051)	(0.049)
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	23433	23251

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

	(1)	(2)	(3)	(4)	(5)	(6)
	Duration Control			First Supervisor Race		
	Log Wage	Log Wage	Log Wage	Log Wage	Stable	Stable
Black Supervisor	0.008	-0.009	0.000	-0.011	-0.035	-0.046
	(0.020)	(0.023)	(0.024)	(0.027)	(0.038)	(0.040)
Black X Black Supervisor	-0.041*	-0.017	-0.029	-0.012	0.031	0.073
	(0.024)	(0.032)	(0.028)	(0.037)	(0.046)	(0.045)
Prejudice		-0.025		-0.020		-0.030
		(0.022)		(0.023)		(0.031)
Prejudice X Black (γ_5)		-0.020		-0.028		0.043
		(0.030)		(0.033)		(0.040)
Prejudice X Black Supervisor		0.045*		0.038		0.060
		(0.022)		(0.030)		(0.046)
Prejudice X Black X Black Supervisor (γ_7)		-0.058*		-0.051		-0.119*
		(0.030)		(0.037)		(0.067)
$\gamma_5 + \gamma_7$		-0.0774*		-0.0786		-0.0767
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Worker Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Employer Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Job Duration	Yes	Yes	No	No	No	No
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	27118	26700	26295	25896	12610	12409

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). "Stable" is defined as a job lasting more than on year. Column (1) and (2) control for quartic in total job duration. Columns (3), (4), (5), and (6) define a job spell as having a black supervisor if the first reported supervisor is black. 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 Different Prejudice Measures - Wages

	(1) Lack Will	(2) No Disc	(3) Marriage	(4) Inborn	(5) No Open	(6) Lazy	(7) Misceg	(8) President	(9) Smart
Prejudice	-0.018	0.012	-0.048**	-0.010	0.007	0.011	-0.026	0.013	0.021
	(0.020)	(0.022)	(0.023)	(0.016)	(0.015)	(0.017)	(0.020)	(0.013)	(0.014)
Prejudice X Black (γ_5)	-0.011	-0.042	-0.015	0.021	-0.044*	-0.001	-0.009	-0.050**	-0.039**
	(0.029)	(0.027)	(0.030)	(0.020)	(0.024)	(0.023)	(0.032)	(0.019)	(0.019)
Prejudice X Black Supervisor	0.055**	0.000	0.040**	0.057***	0.033	0.042	0.043**	0.041**	0.034
	(0.027)	(0.023)	(0.019)	(0.015)	(0.025)	(0.027)	(0.016)	(0.019)	(0.022)
Prejudice X Black X Black Supervisor (γ_7)	-0.068*	-0.008	-0.059**	-0.046*	-0.060*	-0.045	-0.066***	-0.031	-0.028
	(0.037)	(0.027)	(0.027)	(0.025)	(0.035)	(0.034)	(0.024)	(0.031)	(0.030)
$\gamma_5 + \gamma_7$	-0.079*	-0.050	-0.074*	-0.026	-0.104**	-0.046	-0.078**	-0.082*	-0.067**
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	26700	26700	26700	26700	24227	26700	26249	22496	26700

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) Believe blacks lag whites due to lack of will, (2) Do not believe blacks lag whites due to discrimination, (3) Oppose the marriage of a close relative to black individual, (4) Believe blacks lag whites due to inborn disability, (5) Oppose open housing laws, (6) Believe that blacks are lazy, (7) In favor of anti-miscegenation laws, (8) Would not vote for a black presidential candidate, (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 C3: Robustness to Different Prejudice Measures - Stability

	(1) Lack Will	(2) No Disc	(3) Marriage	(4) Inborn	(5) No Open	(6) Lazy	(7) Misceg	(8) President	(9) Smart
Prejudice	-0.006	0.016	-0.015	0.007	0.008	0.001	-0.014	-0.017**	-0.003
	(0.009)	(0.012)	(0.012)	(0.010)	(0.009)	(0.008)	(0.012)	(0.007)	(0.007)
Prejudice X Black (γ_5)	0.006	0.001	0.008	-0.015	-0.011	-0.000	0.000	0.019	-0.012
	(0.020)	(0.018)	(0.020)	(0.012)	(0.017)	(0.018)	(0.020)	(0.014)	(0.014)
Prejudice X Black Supervisor	0.052*	0.035	0.063**	0.042*	0.018	0.059**	0.055**	0.027	0.035
	(0.030)	(0.028)	(0.024)	(0.022)	(0.023)	(0.026)	(0.024)	(0.029)	(0.023)
Prejudice X Black X Black Supervisor (γ_7)	-0.055	-0.051	-0.063*	-0.012	-0.019	-0.049	-0.042	-0.039	-0.012
	(0.041)	(0.035)	(0.037)	(0.028)	(0.029)	(0.039)	(0.037)	(0.028)	(0.030)
$\gamma_5 + \gamma_7$	-0.049	-0.050*	-0.055**	-0.028	-0.030	-0.049	-0.042	-0.020	-0.025
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	10450	10450	10450	10450	9497	10450	10279	8835	10450

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) Believe blacks lag whites due to lack of will, (2) Do not believe blacks lag whites due to discrimination, (3) Oppose the marriage of a close relative to black individual, (4) Believe blacks lag whites due to inborn disability, (5) Oppose open housing laws, (6) Believe that blacks are lazy, (7) In favor of anti-miscegenation laws, (8) Would not vote for a black presidential candidate, (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 $\gamma_5 + \gamma_7 = 0$. *$p < .1$, ** $p < .05$, *** $p < .01$