Prejudice and the Economics of Discrimination

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Abstract

This paper re-examines the role of employer prejudice in discrimination against racial minorities. We show that the widely accepted theoretical result from Becker (1957) that competition ultimately forces prejudiced employers to shut down hinges on the implicit, peculiar assumption that a prejudiced employer's tastes are not taken with him to any other role he might occupy in the labor market. Arguing instead that racial prejudice is likely portable across roles, so that a prejudiced employer who shuts down and takes a new job would be a prejudiced worker at that job, we show that whether prejudiced employers shut down in the long-run depends on the expected racial composition of their co-workers at other firms. Discrimination can therefore survive if something prevents firms from segregating perfectly by race – a result we illustrate with the example of imperfect substitution in production. We argue that Becker's *employee* discrimination model should be viewed as a general model of discrimination, with the roles of employers and employees determined endogenously. The second part of the paper presents empirical evidence on racial prejudice and its relationship to black-white wage gaps across regions of the U.S, something not previously done in the large discrimination literature. We discuss trends and cross-sectional patterns in racial prejudice using data from the General Social Survey. We then show that surviving employers are *not* less prejudiced than the average worker, as the standard reading of employer discrimination models would suggest. Second, using data from the Current Population Survey from 1973 to 2002, we show that the black-white wage gap is greatest in the most prejudiced regions of the U.S, and that it has increased most in regions with the smallest reductions in prejudice. Finally, we show that, as predicted by Becker (1957), black-white wage gaps are more closely related to the prejudice of the "marginal discriminator" than to the average prejudice in an area.

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1. Introduction

Becker's (1957) "The Economics of Discrimination" launched the formal analysis of labor market discrimination among economists, and provided a framework that has profoundly influenced all subsequent work on the subject. Becker's analysis focused on the relationship between racial prejudice among whites and discrimination against racial minorities in a competitive model. In contrast to much of the contemporaneous literature, Becker formalized the definition of racial preferences, depicting them as an aversion to cross-racial interaction. In a series of models, he analyzed the effect of the possession of such preferences among customers, co-workers and employers.

In the short-run version of the employer discrimination model, racial prejudice causes some employers to regard black workers as more expensive than they truly are. Despite being equally productive, the model shows that blacks might nonetheless receive lower wages in equilibrium. In the long run, however, as new, unprejudiced employers enter the market, the resulting competitive pressure forces erstwhile discriminating employers to shut down and leave the market. The notion that employer, taste-based discrimination cannot survive in the long run was further fleshed out by Arrow (1972), who memorably remarked that the employer discrimination model "predicts the absence of the phenomenon it was designed to explain."[1] Faced with this apparent limitation of taste-based models of employer discrimination, most recent theoretical work on discrimination has tended to ignore the role of prejudicial tastes among employers entirely as a source of racial wage gaps, emphasizing instead considerations like imperfect information in statistical discrimination models (Aigner and Cain (1977), Altonji and Pierret (2001)), imperfect competition in dual labor market and local monopsony models (Doeringer and Piore (1971), Black (1995)), and racial difference in productivity (Neal and Johnson (1996)).[2]

But is the widely-held view that discrimination based on employer racial distaste cannot survive in the long run warranted? And, is the corresponding research focus on alternative explanations to the virtual exclusion of analyses of racial prejudice justified? Casual empiricism suggests that prejudicial feelings of the most odious sort were a feature of the American landscape for many scores of years, and logic dictates that these views have had *something* to do with racial discrimination against minorities. Given this, plus the profound influence of Becker's conceptualization of prejudice, this paper re-examines the possible role of employer racial prejudice as a source of racial discrimination. We conclude that the commonly accepted idea that prejudice-based discrimination cannot survive in competitive markets is not theoretically true under a reasonable modification of the assumption about how prejudice likely operates. Further, we present substantial empirical evidence showing that racial prejudice, and especially employer racial prejudice, appears to matter empirically for racial wage gaps, contrary to the null under which most economists now operate.

Our analysis is broken into two parts. The first re-examines prejudicial tastes in a model of competitive equilibrium. This theoretical part of our analysis differs from Becker's original

[1] Arrow (1972), p. 192.

[2] Some recent empirical work offers tantalizing evidence that racial prejudice might matter for racial wage determination. For example, in an interesting and widely-known paper, Bertrand and Mullanaithan (****) find that resumes with black sounding names sent to potential employers received fewer call backs than did other resumes. Although statistical discrimination might account for these results as suggested by later results on naming conventions studied by Fryer and Levitt (****), the fact that so many personal traits of likely interest to employers are explicitly controlled for on the false resumes leaves open the possibility that some other force, possibly racial prejudice, might be at work.

model and the analyses that followed in two simple but subtle ways. First, we treat the terms "employer" and "co-worker" as referring less to distinct market actors than to particular *roles* played in the labor market. By implicitly treating employers and co-workers as different actors, Becker's analysis assumes that the employer who shuts down his firm simply becomes a worker, concerned only about the wage he receives. In effect, Becker's analysis assumes that having feelings of racial animus are *role dependent*. By contrast, our analysis presumes that the prejudiced employer who shuts down his firm in the face of competition carries any racial animus he possesses into any other labor market role he plays. That is, a prejudiced employer who shuts down becomes, in our framework, a *prejudiced* worker, concerned both about the wages he receives and the race of his new co-workers.

We show that the very reasonable assumption that an individual's racial prejudices are independent of the particular role he plays in the labor market dramatically changes the conclusions about when or whether prejudiced employers shut down their firms in the face of long-run competition. We show, in particular, that a prejudice-based model yields a long-run equilibrium in which discrimination is *not* necessarily driven out of the market. Because a prejudiced employer must consider the counterfactual racial composition of his co-workers when deciding whether to shut down his firm, the persistence of racial wage differences due to discrimination depends on the market's ability to segregate workers by race. Any hindrance to segregation may lead to long-run differences in wages attributable to prejudice. We formally show this result using the example of imperfect substitutability in production by skill level. Finally, since our analysis endogenizes an individual's decision to be a worker or an employer, it makes clear that employer and employee discrimination which have hitherto been analyzed in two separate models can, and should, be treated in a single framework.

Having re-established a potential important theoretical role for racial prejudice in a standard competitive model of wage determination, the second part of our paper turns to an exercise never before conducted in the large literature on discrimination – formally assessing the empirical relationship between prejudice among whites and the racial wage gap. To measure prejudice, we use the rich information on racial sentiments available in multiple waves of data from the General Social Survey (GSS). We summarize racial prejudice among whites as a whole, and among white employers and high-skilled workers separately. After showing broad patterns of racial prejudice across regions, and summarizing how they have changed over time, we test one strong implication of the view that competition forces discriminatory employers to shut down: surviving employers should have less prejudice than the average white worker. In fact, we show that employers are more not less prejudiced than average. This finding suggests that discriminatory employers are not forced to shut down in the face of competition.

We next formally assess the association between these prejudicial feelings and the wages of blacks and whites across different regions in the U.S. To conduct this part of our analysis, we merge data from the GSS with individual level data from the Current Population Survey (CPS). We perform a series of regressions relating individual wages to various measures of prejudice among whites in the Census division. Generally, we find that the racial wage gap tends to be largest in Census divisions where average reported prejudice among whites is highest. Though slightly less robust, we also find that black wages have decreased most in those divisions with the smallest reductions in racial animus over the past thirty years. These relationships are found whether average prejudice in the division is measured among whites overall, among white employers, or among high-skilled workers specifically. The standard prejudice discrimination model suggests that it is not the prejudice among all whites or among all white employers which determines the racial wage gap, but rather the prejudice of the employer who is indifferent

between hiring a black and a white worker in equilibrium. We use a simple theoretically-based argument, combined with information about the incidence of blacks in the division, to identify the (prejudice of) the marginal discriminator in the data. The results are quite striking and surprisingly robust, given the obvious measurement error inherent in identifying the marginal discriminator. Just as the model would predict, we show that the overall wage penalty experienced by blacks is largest where this marginal employer is more racially prejudiced. Despite the strong correlation between the various community prejudice measures studied, we show that in a "horse-race" of the various measures, most of the associations above load onto the marginal discriminator term rather than the average prejudice measures.

The absence of an instrument for prejudice in the regression analysis prevents us from arguing that the various associations we document are causal. However, the rich set of covariates for which we are able to control using the CPS data means that we are able to exclude some of the most obvious alternative explanations for the patterns we document – such as the notion that the most racist places in the country are also places were black are less skilled, at least along the dimension of years of completed schooling. And, we estimate broadly similar results, though slightly less robust, when we conduct analyses examining changes within a Census division over time. Furthermore, the "horse-race" specifications show that black relative wages are lower in Census divisions where the marginal discriminator is more prejudiced, even controlling for measures of average prejudice in the division. And using the measure of marginal discriminator implied by the model, black relative wages have increased most in the Census divisions where the prejudice of the marginal discriminator has declined most, even controlling for changes in measures of average prejudice in the division.

On the whole, the results are broadly suggestive of an important role for racial prejudice among whites in explaining racial wage differences. The combination of these empirical results with the theoretical results from the first part of the paper showing that employer prejudice can theoretically lead to long run wage differences for blacks argues strongly for a reconsideration of the notion that racial prejudice has little to do with explaining observed wage and income differences by race.

The remainder of the paper proceeds as follows. The next section briefly reviews the short and long run equilibria in Becker's employer racial distaste model. In Section 3 we present an analysis in which prejudices are treated as role independent, so that racial prejudices of an employer is taken with him to any other role he occupies in the market – including especially that of an employee at another firm. We present results assuming, in turn, perfect and imperfect substitutability of labor in production to illustrate how the latter assumption generates results different from the standard Becker analysis. In Section 4 we present empirical evidence of the distribution and evolution of racial prejudice among whites, the relative prejudice of employers, and the effect of community wide racial prejudice on the relative wage received by blacks. Section 5 concludes.

2. A Review of Becker's (Dis)Taste Models of Discrimination

Basic Setup

In the simplest version of the employer distaste model, Becker assumes that black (*B*) and white (*W*) workers are perfect substitutes in production. Becker's key assumption is that an employer's utility depends on both the profits he receives and on the number of blacks

he hires. Specifically, an employer *i* receives disutility d_i^{ER} from each black worker he employs. Let employer's utility, V_i, be given by

$$V_i = \pi_i - d_i^{ER} L_B . \quad (1)$$

In (1), $\pi_i = f\left(K, L_B + L_W\right) - rK - w_B L_B - w_W L_W$ is the employer's profit. The variables L_W and L_B refer to white and black labor; w_W and w_B denote black and white wages; *r* is the cost of capital; and $f(\cdot)$ is a production function that is constant returns to scale in capital and labor. We drop the *i* subscripts on the firm's choice of labor and capital for convenience. Prejudice d_i^{ER} is zero for unprejudiced persons and positive otherwise. Finally, we assume throughout that all employers are whites who do not differ in their productive capacity as workers.

Employment of white workers at all employers is determined by the familiar first-order condition, $\frac{\partial f}{\partial L} = w_W$. The first-order condition for black labor, $\frac{\partial f}{\partial L} = w_B + d_i^{ER}$, is different because of the discriminatory taste of the employer, and captures the essence of Becker's insight. To a prejudiced employer, hiring a black worker costs more than the wages he must pay that worker. Prejudice causes employers to behave *as if* black workers' monetary wages are higher than they actually are.

Since black and white workers are perfect substitutes in production and utility is linear in discriminatory distaste, each employer simply hires the type of labor that is "cheaper" to him. An employer therefore hires only white workers if and only if $w_W < w_B + d_i^{ER}$, and hires only black workers otherwise.

Short-run equilibrium

In the short-run, firm size, which we assume to be equal across firms, and the number of firms are both fixed since there is no entry of new potential employers. The distribution of discriminatory tastes among employers is therefore given in the short run. Equilibrium in the short run requires that no employer prefers to hire workers of a different race at market wages, no worker prefers to work at a different firm at market wages, and all workers are employed.[3]

Becker shows that, in equilibrium, the wage difference between blacks and whites is not determined by the average level of prejudice among all employers, but rather by the prejudice of the most prejudiced employer who hires blacks in equilibrium – the "marginal discriminator". Efficiency requires that blacks be sorted into higher cost – that is, more prejudiced – firms only after all jobs at less prejudiced firms have been filled. If there are enough employers with $d_i = 0$, all blacks will be employed by these firms. The marginal discriminator is unprejudiced in this case, and there is no equilibrium wage difference between blacks and whites. If, instead, the number of

[3] We assume inelastic labor supply for the time being for simplicity, but it is not necessary.

unprejudiced employers is small relative to the number of black workers, full employment requires that at least some blacks must work for prejudiced employers. Wages adjust as blacks are sorted to ever more prejudiced employers until the market clears and until the last person to hire blacks is indifferent between hiring a black and white worker. Equilibrium wages and prejudice of the marginal discriminator, $d_i^{ER*} > 0$, are given by $w_W = w_B + d_i^{ER*}$ such that all workers are employed, and each employer satisfies his demand for labor. Employers with prejudice higher than d_i^{ER*} hire only white workers, and blacks work for other employers. Given a sufficiently smooth distribution of d_i^{ER}'s, the marginal discriminator is just indifferent between hiring white and black workers.

Long-run equilibrium

In the long-run, employers can change size or shut down and new employers can enter the market. An employer chooses capital and labor to maximize utility subject to the constraint that his utility as an employer exceed that from his next best alternative were he to shut down. The original Becker analysis and all subsequent work make the reasonable assumption that this alternative activity is to sell his labor on the labor market and be an employee at another firm. Let the utility from this alternative be V_i^A, and suppose that the employer's wage in that alternative job is w_i^A. If $\tilde{\pi}_i$ represents the money profit associated with the optimal choices of labor and capital, and $\tilde{L}_B$ denotes the number of blacks the employer would choose to hire if he were to stay open, it follows that an employer shuts down his firm if

$$\tilde{\pi}_i - d_i^{ER}\tilde{L}_B \leq V_i^A. \tag{2}$$

The wage received in the alternative job is the same for all (white) employers. To see this, notice that the price at which an employer can sell his labor on the competitive market is simply a wage determined by the marginal product for someone of his type. As employers do not differ in productivity, each employer, were he to become a worker, receives some wage w^A which equals the marginal product for persons of that type.[4] Importantly, Becker's analysis assumes that the utility in the alternative job depends solely on the wage the person receives in that job. The shut-down decision for an employer is thus

$$\tilde{\pi}_i - d_i^{ER}\tilde{L}_B \leq w^A. \tag{3}$$

A perfectly elastic supply of unprejudiced employers guarantees that $\tilde{\pi} = w^A$, meaning that the shut down decision for an employer simplifies to

[4] An alternative would be to allow for differences in productivity among employers. This skill heterogeneity might be two-dimensional where one dimension, say entrepreneurial skill, makes workers relatively more productive as employers and the other makes them relatively more productive as workers. The resulting comparative advantage might lead to rents which employers could use to "purchase" discrimination. Though we think such a model is realistic, we choose not to introduce such heterogeneity here because we want to show that discrimination can survive competition with free entry of competitors. For a discussion of such a model, see e.g. Heckman (1998).

$$-d_i^{ER}\tilde{L}_B \leq 0\,. \tag{4}$$

Expression (4) shows the main implication of the long-run version of the employer discrimination model, and the one that has generated the most controversy. In the long run, free-entry and perfect competition along with constant returns to scale technology imply that no employer with the discriminatory tastes described by Becker can remain in business. It is costly to discriminate, and the market drives those with high costs out of business. Taste-based discrimination is eradicated by competition.

3. Role Dependent Preferences

In this section we show that the results about employer discrimination outlined above hinge crucially on an implicit assumption that is, in our view, unrealistic. We show that a slight modification in what is assumed about preferences changes the results from the employer discrimination model, and suggests a way to model employer and employee discrimination in a unified model rather than with two separate analyses that have been the norm in the preceding literature.

3.a. The Shut-down Decision Revisited

As we have noted, the standard analysis assumes that an employer's alternative option, were he to shut down his firm, is to become an employee at another firm. As in the previous literature, we assume that the wage the employer would receive at that alternative firm is w^A for all employers. However, unlike the earlier literature, we do not assume that the employer's utility in that alternative job is a function only of the wage. Instead, we assume that the prejudice that a person holds as an employer is carried with him if he were to be an employee in another firm. The assumption implicitly maintained in previous analysis is that preferences are "role-dependent", and in particular that they are present only when the person plays the role of "employer" and utterly absent when he plays any other role in the labor market. Formally, the variable d_i^{ER} in the previous section denoted the prejudice of an employer i. Now, we stress that d_i^{ER} is person $i's$ prejudice when he is an employer, and d_i^{EE} is his racial prejudice when he is an employee. Our assumption of portable racial prejudice implies that $d_i^{ER} = d_i^{EE}$. By contrast, the assumption implicitly maintained in Becker's analysis and in subsequent influential criticisms like that of Arrow is that for prejudiced individuals with $d_i^{ER} > 0$, $d_i^{EE} = 0$.

To see the implications of this reasoning, consider a reformulation of the long-run shut down decision presented in the earlier section. Recall, that the standard analysis says that an employer shuts down if

$$\tilde{\pi}_i - d_i^{ER}\tilde{L}_B \leq w^A\,. \tag{5}$$

If d_i^{ER} and d_i^{EE} represent, respectively, a person's racial prejudice when he is an employer and when he is an employee, and if L_B^A represents the number of black worker's at his likely alternative job, expression (5) is the special case of the condition

$$\tilde{\pi}_i - d_i^{ER}\tilde{L}_B \leq w_i^A - d_i^{EE}L_B^A \tag{6}$$

where $d_i^{EE} = 0$. The way that the previous literature specifies an employer's alternative utility in effect imposes the very strong assumption that a person's racial animus depend only on whether he is an employer; somehow, the same person cast in the role of employee has no animus about the blacks who are his co-workers.

The simplest specification of our assumption of role-independent preferences is to suppose that $d_i^{ER} = d_i^{EE} = d_i$. With this assumption, the long-run shut-down decision becomes

$$\tilde{\pi}_i - d_i\left(\tilde{L}_B - L_B^A\right) \leq w^A. \tag{7}$$

Expression (7) shows that the a prejudiced person who happens to be an employer considers how the racial makeup of his incumbent firm compares to that of the firm he would join as employee if he were to shut down and find a job. The model could be generalized to include uncertainty about the racial make up of the alternative firm.[5] Notice that, in general, the assumption of role independent preferences dramatically changes conclusions about whether prejudiced employers shut down in the long run.

For example, if the employer expects that the number of blacks co-workers at the job he would get if he shut down is likely to be the same as the number of blacks in his incumbent firm, or $\tilde{L}_B = L_B^A$, he is indifferent between shutting down and remaining open in the long run, even when his costs, net of prejudice, are higher than his competitors'. More generally, since his money income is the same everywhere, a rational prejudiced incumbent employer will only shut down if he expects that his likely alternative job will have *fewer* black workers than he has hired in his firm. Our analysis shows that prejudiced employers do not *necessarily* shut down in the long run, as argued in the previous literature; whether they do or not depends on how racially integrated firms are in the economy overall.

Expression (7) shows that when preferences are role independent, it is the condition $\tilde{L}_B \geq L_B^A$ that determines the shutdown decision. The previous literature reaches the conclusion that discriminators are inevitably driven out of the market by assuming implausibly that $d_i^{EE} = 0$. Our analysis shows that, in fact, discriminators are driven out of the market only if market conditions are such that every rational prejudiced employer can expect to find an alternative job in which fewer blacks are employed as workers. Indeed, when racial animus is portable across roles, prejudiced employers definitely leave

[5] This uncertainty might be driven, for example, by costly search or by turnover among future co-workers. In either case, the employer bases his expectation of V_i^A on the distribution of possible L_B^A.

the market in the long run only if the market is segregated enough by race to ensure that every prejudiced employer can find job at a firm at which blacks are not employed.

3.b. Unifying the Employer and Employee Discrimination Models

In addition to the employer discrimination model, Becker presents a separate analysis focusing on prejudice among employees, or co-workers. In the standard version of the employee discrimination model, some white workers are presumed to have distaste for interacting with black co-workers. White workers have utility given by

$$U_i = w_i - d_i^{EE} L_B \tag{8}$$

where w_i is the wage the worker receives at the job, L_B denotes the total number of black workers with whom he works, and the *EE* superscript indicates that *d* is the individual's taste as an employee about his fellow employees. Expression (8) formalizes Becker's notion that a prejudiced employee acts *as if* his wage is lower when he has black co-workers.

The key result from Becker's analysis of the employee discrimination model is that wage discrimination and occupational segregation are distinct and opposing forces. If black and white workers are perfect substitutes in production, firms can be perfectly segregated by race. In this fully segregated equilibrium, no individual must be compensated for working with someone he dislikes. Two separate labor markets form in equilibrium, with workers in each being paid their marginal product. As these are equal, there is no equilibrium wage difference. Wage differences arise in this model to the extent that black and white labor cannot be segregated in equilibrium. Any impediment to segregation may lead to a long-run black-white wage difference even in fully competitive markets. Imperfect substitutability of high- and low-skilled workers with different skill endowments across races is one such natural impediment. In general, however, under the perfect substitution assumption that is assumed in Becker's main analysis, the effect of prejudice held by co-workers is perfect segregation with no wage differences.

The reader will notice that the standard employee discrimination model leads to precisely the same analysis as does the employer discrimination model with portable racial prejudice. This suggests that with this more reasonable assumption of how prejudice operates, it is not useful to analyze the market effect of prejudice in the two distinct models of employer and employee discrimination as has generally been done in the discrimination literature. A worker's utility from working at a given firm is, by our reasoning, simply a function of his wage and of the racial makeup of the firm, and not at all of whether he plays the role of employer or employee at the firm. With role-independent racial preferences, any disutility he receives from cross-racial contact is unaffected by which of these two roles he plays at the firm. And, there is no reason to suppose that his wage is higher or lower simply because he is an employer rather than an employee. The employer at a firm differs from an employee mainly because the employer chooses the particular racial composition of the workers at the firm. No person would accept lower wages for the right to make this choice since he could, in a competitive economy, work at some other firm at which someone else has chosen the particular racial mix he himself would have chosen.

So long as there is no skill heterogeneity and thus no comparative advantage to being an employer, individuals must, in equilibrium, be indifferent between playing the role of employer or employee at a given firm, and also between playing either role in another firm with exactly the same racial makeup. The wage a prejudiced worker receives as either an employer or employee at firm with a given racial makeup must therefore be lower than the wage he receives in either role at a firm with a higher fraction of black workers as his disutility from cross-racial contact is larger in the latter case.

In sum, the assumption of preferences that are portable across roles leads to a formalization that is indistinguishable from what was called the "employee discrimination" model in Becker's analysis. Blacks and unprejudiced whites do not care about the racial makeup of their coworkers and are indifferent about the racial makeup of the firms to which they sort themselves as workers. Prejudiced whites by contrast dislike interacting with black co-workers and receive a higher wage for doing so whether as employees or as the particular sort of employee called an employer. The extent to which there is racial discrimination in equilibrium depends exclusively on the nature of production and on the distribution of racial prejudice among whites overall. In particular, even if some whites are prejudiced, there will be no racial discrimination in equilibrium if workers can costlessly be segregated by race in the production process. If perfect racial segregation is costly or otherwise difficult to achieve, some blacks may be forced to work with prejudiced whites, and blacks will receive a lower wage than whites in equilibrium. Efficiency guarantees that cross racial contact will occur between blacks and the least prejudiced whites first, with the most prejudiced whites being the most likely to work in segregated environments. The equilibrium wage gap should be determined not by the overall level of prejudice among whites but rather by the prejudice of a marginal discriminator who, given the number of blacks in the economy and the equilibrium wage, is just indifferent between working within an integrated environment and in a perfectly segregated firm.

3.c. The Example of Imperfect Substitutability

In this section we formally study the effect of imperfect substitutability of labor in production – the most likely reason why the labor market might not be racially segregated in equilibrium. There are other reasons why it might be difficult to segregate the market by race, such as costly search or the presence of racial employment quotas. We discuss imperfect competition both because the ease of exposition, and because this was an example discussed by Becker in his original discussion of co-worker discrimination.

We suppose that individuals are either black (B) or white (W), and possess either high (H) or low (L) skill. All firms have identical production functions which are constant returns to scale in capital, high-skilled labor and low-skilled labor. We assume that black and white labor of a given skill level are perfect substitutes, but that high and low skilled labor are imperfect substitutes for one another. Constant returns to scale allows us to, without loss of generality, consider a firm to be a single high-skilled worker

matched with some number of low-skilled workers. We treat this high-skilled worker as the firm's residual claimant.

In general, a high-skilled worker's utility is

$$U_i^H = \pi_i^H - d_i \times \left(L_B^L + L_B^H \right) \tag{9}$$

where $\pi_i^H = f\left(K, L_B^H + L_W^H, L_B^L + L_W^L\right) - rK - w_B^L L_B^L - w_W^L L_W^L$, d_i is individual *i*'s taste for discrimination and L_r^s denotes the total employment of workers from skill-class $s \in (H, L)$ and race $r \in (B, W)$ at individual *i*'s firm. Since we consider the case of a single high-skilled worker matched with some number of low-skilled workers, this utility function can be re-written

$$U_i^H = f\left(K, L_B^L + L_W^L\right) - rK - w_B^L L_B^L - w_W^L L_W^L - d_i \times L_B^L \tag{10}$$

where the high-skilled labor term is dropped from the production function because we have assumed it to be equal to one.

Short-Run Equilibrium

Firm size is fixed in the short-run. Thus, each high-skilled worker is paired with a fixed number of low-skilled workers. Although the set-up is similar to the short-run version of Becker's employer distaste model, with high-skilled workers serving the role of the employer and low-skilled workers serving the role of employees, we speak instead of high- and low-skilled workers forming teams to stress the fact that there is no structural importance to the role of employer.

The short-run equilibrium is reached as follows. Ordering high-skilled workers by their d_i, low-skilled blacks are allocated first to the least discriminatory high-skilled workers. The last high-skilled worker to be matched with low-skilled black workers is the marginal discriminator. In equilibrium, the black-white wage gap must be just high enough to compel the marginal discriminator to match with low-skilled blacks but not high enough to induce the next most discriminatory high-skilled worker to do the same. All high-skilled workers with d_i greater than that of the marginal discriminator pair with white low-skilled workers; all high-skilled workers with d_i lower than the marginal discriminator's pair with black low-skilled workers. No high-skilled worker prefers to replace his low-skilled workers with those of the other race, and no low-skilled worker prefers to change firms.

If there are not enough non-discriminatory high-skilled workers to match with every low-skilled black, there must be a low skilled racial wage gap in equilibrium, or $w_B^L < w_W^L$. At least one high-skilled prejudiced white must work with low-skilled blacks in this case, and he can be induced to do so rather than work with a white low-skilled workers only if black wages are lower. It is also obvious that there are in equilibrium no firms consisting of a high-skilled worker and both low-skilled blacks and discriminatory low-

skilled whites. In such firms, low-skilled whites would have to be compensated for working alongside blacks.[6]

Long-run equilibrium

In the long-run, the size of teams of high-skilled and low-skilled workers can vary. It is useful to speak as if the high-skilled worker chooses the number of low-skilled workers with whom to match. Since labor supply and racial preferences are portable from one job to the next, it is not useful to speak of a firm shutting down. With inelastic labor supply, in equilibrium each worker must work at some firm. A high-skilled worker who shuts down his firm must in equilibrium work at some other firm.

First-order conditions

To see the equilibrium matching of high- and low-skilled workers, consider first a non-discriminatory high-skilled worker assessing how many low-skilled workers to team up with. Since black wages are lower than white wages in equilibrium, and since he is indifferent about the race of the low skilled persons in his team, his problem is simply how many black low-skilled colleagues to have at the wage of w_B. The first-order condition for this problem is therefore the familiar

$$\frac{\partial f}{\partial L^L} = w_B^L. \tag{11}$$

Since high-and low-skilled labor are imperfect substitutes, $\frac{\partial f}{\partial L^L}$ is decreasing in L^L. Therefore, given w_B^L there is some optimal level L^{L^*}, which would be the optimal low-high skill ratio at every firm if there were no discriminatory tastes. We henceforth refer to L^{L^*} as the optimal skill ratio because it is the one that would maximize total physical production in the economy.

Now consider a high-skilled worker with $d_i > 0$. In order to achieve a low-high skill ratio of L^{L^*}, he must either suffer the disutility of working with black workers or hire low-skilled whites at the higher white low-skilled wages. Both of these options increase the effective low-skill wage, and thus lower a prejudiced high-skilled workers' demand for all low-skilled workers, relative to the optimal level L^{L^*}.

A prejudiced high-skilled worker's first-order condition is

$$\frac{\partial f}{\partial L_B^L} = w_B^L + d_i. \tag{12}$$

[6] It is possible that because of indivisibility and fixed firm size there would be one firm whose low-skilled workers are integrated.

If he chooses to work (form a team) with low-skilled blacks, he acts as if the black low-skill wage is higher than its nominal value because of his disutility of working alongside blacks. As a result, he chooses a skill ratio $L_B^{L^*}$ that is lower than the optimal skill ratio L^{L^*}.

If instead he chooses to work with white low-skilled workers, the first-order condition is

$$\frac{\partial f}{\partial L_W^L} = w_W^L. \tag{13}$$

Since $w_W^L \geq w_B^L$, the optimal $L_W^{L^*}$ is also lower than L^{L^*}. In equilibrium prejudiced high-skilled workers will form teams with low-skilled blacks if

$$w_B^L + d_i < w_W^L, \tag{14}$$

and with low-skilled whites otherwise.

Equilibrium wage setting

The equilibrium matching of high- and low-skilled workers is as follows. Black low-skilled workers are allocated first to un-prejudiced high-skilled workers. If there are enough un-prejudiced high-skilled workers to match with black low-skilled workers at this ratio then there need not be any wage difference. If however, there are more low-skilled black workers than can be absorbed by non-discriminatory high-skilled workers, some discriminators will be compelled to work with those for whom they harbor distaste.

Prejudiced high-skilled workers are induced to hire blacks by an equilibrium reduction in w_B^L relative to w_W^L. As low-skill wages of blacks fall relative to those of whites, adjustments on two margins serve to clear the market for low-skilled blacks. First, the reduction in w_B^L induces any given un-prejudiced high-skilled person to match with more low-skilled blacks. Second, the reduction in w_B^L relative to w_W^L induces increasingly more prejudiced high-skilled whites to match with low-skilled blacks instead of whites. The wage difference that clears the market for low-skilled blacks and whites is the long-run equilibrium low-skill racial wage gap. There is once again a marginal discriminator who is indifferent between matching with black and white low-skilled workers. All high-skilled workers with d_i greater than the marginal discriminator form firms and work white low-skilled workers; and high-skilled workers with d_i lower than the marginal discriminator's pair with black low-skilled workers. No high-skilled worker prefers to replace his paired low-skilled workers with those of the other race, and no low-skilled worker prefers to change firms.

If the ratio of low- to high-skilled workers is the same across race and all black high-skilled workers are non-discriminatory, the marginal discriminator is black and no racial difference in wages arises. In this case, segregation fully substitutes for market discrimination. Similarly, if the number of blacks relative to whites is very small, then even if there are relatively more low-skilled blacks than whites, the marginal employer of

low-skilled blacks is likely to be an unprejudiced white, meaning that there will be no long-run equilibrium wage gap. The situation is different if the number of blacks is relatively large and/or if the ratio of low to high-skilled workers is much higher among blacks than whites. In these cases, the marginal discriminator is likely to be a prejudiced high-skilled white, and there will be a long run racial difference in low-skilled wages. A large number of low-skilled blacks or a relatively large number of high-skilled discriminators means members of these two groups must be matched within firms. As a result there will be a persistent racial wage gap among the low skilled in a competitive market.

How do high-skilled workers fare because of the existence of prejudice? Notice that un-prejudiced high-skilled persons, both black and white, benefit from the existence of prejudiced high-skilled whites. The reduction in low-skilled black wages caused by the preferences of these workers leads unambiguously to increased earnings for high-skilled non-discriminators. As residual claimants to revenues from production, the cost savings goes directly to increase their earnings. In addition, the reduction in wages induces them to match with more low-skilled workers, increasing total production at the firm and further increasing their income.

For high-skilled whites who are prejudiced the situation is slightly more complicated. There are two groups of such workers to consider: those who match with low-skill blacks and those who match with low-skill whites. Consider the former group. These are prejudiced persons with $d_i < d^*$ (where d^* denotes the prejudice of the marginal discriminator). Because of their discriminatory tastes, they choose not to take full advantage of the decline in factor costs. The decline in their nominal costs causes an increase in their income, but they do not expand their interaction with low-skilled workers by as much as non-discriminatory whites, and may in fact reduce it. Net of their own discriminatory tastes, these workers may perceive low-skill wages to have increased or decreased as a result of market discrimination. If they perceive low-skill wages, net of their own discriminatory tastes, to have increased and in turn reduce their productive interaction with low-skilled workers, their income may decline.

To see why they may erroneously perceive low-skilled wages to have increased, consider the case where the entire low-skill wage gap is accounted for by a decline in low-skill black wages (i.e. low-skill white wages remain constant). Because the racial wage gap, and by assumption the decline in w_B^L, is equal to d^*, we can be sure that for all whites who match with blacks in equilibrium, $d_i + w_B^L < w_0^L$ (low-skill wages with no discrimination). Net of their discriminatory tastes, these workers perceive net low-skill black wages to have declined as a result of discrimination. Now alternatively consider the case where discrimination causes low-skill white wages to increase. Since we know $w_W^L - w_B^L = d^*$, it must be the case that $w_0^L - w_B^L < d^*$, where the inequality is strict. Any

high-skill white with $w_0^L - w_B^L < d_i < d^*$ perceives low-skill wages to have increased.[7] And the resulting decline in productive interaction with low-skilled workers may overwhelm the effect of paying their low-skilled workers wages below marginal product, leading to a decrease in their own income.

The second group of prejudiced high-skilled workers interacts exclusively with low skilled whites. The wages of this most prejudiced group must fall. As a result of the increase in white low-skill wages, these high-skilled discriminators choose to match with fewer low-skilled workers. It is among this group of workers that we see most clearly Becker's insight that discriminators pay some of the cost of discriminating.

Black and White Net Gains and Losses from Discrimination

The preceding shows that high- and low-skill blacks are affected very differently by discrimination, even though we have assumed white prejudice not to be a function of black skill levels. The market's tendency to segregate discriminators and discriminated tends to separate high-skilled blacks from prejudiced whites. High-skilled blacks benefit from a decrease in the price of a complementary factor of production. This is obviously not the deliberate intention of white racists; it is rather a side effect of their prejudice. The effect of prejudice is different for different types of whites as well. Only prejudiced whites with the strongest racial feelings lose unambiguously from the existence of prejudice. Unprejudiced whites certainly benefit, and whites with mild levels of prejudice may benefit as well.

Is it possible to say something about whether blacks as a group gain more (or lose less) from the presence of racial prejudice in the labor market than do whites? We turn to Becker (1957) to answer this central question. Using the analogy of two countries trading, he reminds us that any reduction in trade must be detrimental to the total income of each of the countries. In our case the countries should be thought of as black and white, and trade as the productive interaction of workers within a racially integrated firm. Because discrimination causes a decrease in the amount of productive interaction across race, each race must lose as a whole from discrimination.

But, who loses more? Becker's analysis shows that the ratio of black to white total income falls as a result of a decrease in trade so long as in a world with no discrimination

$$\frac{I(W)}{I(B)} > \frac{N_B^L}{N_W^L}$$

where I indicates the total income of each race, and N^L indicates total labor supply of low-skilled workers by race. This condition is clearly satisfied if there are fewer low-skilled blacks than low-skilled whites.

[7] A high-skilled worker who matches with low-skilled blacks will perceive the low-skill wage to have increased net of his own prejudice if $w_B^L + d_i > w_0^L$. We can rewrite this condition $w_0^L - w_B^L < d_i$.

4. Empirical Evidence about Racial Prejudice and Wages

4.a. Data description

Remarkably, very little work has been done in economics studying racial prejudice directly, and no empirical work of which we are aware has assessed the connection between prejudice and wages.[8] Several questions thus remain unanswered. How do racist sentiments vary across regions in the U.S? Is the level of prejudice to be found among different types of workers – employers versus non-employers – consistent with the long run predictions of the theoretical work of Becker and Arrow? How have racially prejudiced views evolved or time, and have they changed differentially across different types of people or places? Most important for our purposes, what is the empirical relationship between racially prejudiced feelings among whites in a community and the absolute and relative level of black wages in those places? In particular, is there evidence in the data to suggest that relative black wages are reduced when prejudice is high among whites overall, among white employers, and especially, when the prejudice of the white person who could plausibly be called the marginal discriminator is high?

We use data from multiple waves of the General Social Survey (GSS) [1972-2004] and from multiple waves of the May [1973-1978] and Outgoing Rotation Group [1979-2002] files of the Current Population Survey (CPS) to attempt to answer these questions. The GSS is our source of data on racial prejudice. In many survey years, this nationally representative data set elicited responses from survey questions about matters that are clearly strongly related to racially prejudiced sentiments. "Prejudice" is a nebulous construct, so it is useful that the various questions posed in the survey over the years touch on the different dimensions along which racist sentiments might manifest themselves. Among other things, respondents were asked over the years such questions as their feelings about interracial marriage, their sense of whether racially restrictive housing covenants were appropriate, their views about children being racially segregated in schools, and their view on whether the government should be obligated to help blacks.

Over the approximately 30 years of GSS data used in the paper, respondents answered some twenty-six different questions relating to some aspect of racial prejudice. A different subset of the full questions was asked each year, with no particular question asked in each year of the survey, and with much variation in the total number of times a given question appears. In much of our analysis to follow, we focus on changes in racial prejudice over time -- an exercise which requires identifying a consistent set of preference questions from one year to the next. When doing these analyses we study the six question which *jointly* appear most frequently in the survey. Table 1 lists the GSS variable abbreviation and a summary for each of full set of 26 racial prejudice questions asked in the GSS. The shaded rows in the table indicate the six questions, used later in the analysis, which jointly appear most frequently in our data.

[8] One exception is Cutler et al (1999) who relate a subset of the questions studied in this paper to levels of residential racial segregation.

We use responses from whites aged 18 and older, and recode responses so that higher values correspond to more prejudiced answers.[9] To permit straightforward aggregation across questions and interpretation of magnitudes, we normalize each variable using the 1977 report. Specifically, we subtract off from responses to each question the mean of the response to that question in 1977, and divide by the standard deviation of answers measured in the first year the question was asked.[10] Two of the variables (HELPBLK and RACOPEN in the table) were not asked in 1977, but were asked in both prior and subsequent years. A linearly interpolated mean is subtracted for these variables instead of the 1977 mean. For questions that were introduced to the survey subsequent to 1977 or that were asked only in 1972, we normalize by both the mean and standard deviation measured the first year the question was asked.

4.b. Definitions of various prejudice indices

Rather than present results separately for each of the 26 questions, we form a uni-dimensional index of prejudice. To compute this index, we compute the average of the normalized responses described above to the full set of prejudice questions, separately for each individual*year observation in the GSS. Call this variable $\overline{d}_i$; call the mean taken over the six questions referenced above $\overline{d}_i^{subset}$. Our empirical work focuses on community level prejudice, where the communities we focus on are the nine Census divisions. These are the smallest areas of aggregation available in both the GSS and CPS. We take various averages of the individual measures $\overline{d}_i$ to compute these community prejudice measures. Our analysis uses two main measures for three subgroups of the population: all whites, white employers (as indicated by self-employed status), and high-skilled whites (as indicated by those with at least 16 years of education). The first measure of prejudice is the average of $\overline{d}_i$ by census division (indexed by *r*) over all individual*year observations within the subgroup. We denote this measure $\overline{d}_r$ for all whites, $\overline{d}_r^{ER}$ for white employers, and $\overline{d}_r^{H}$ for high-skilled whites.

We present results using measures of prejudice for high-skilled whites for two reasons. First, the imperfect substitution model discussed above implies that it is the relevant measure of prejudice in determining equilibrium black-white wage differences. Second, being a college graduate is an alternative indicator (relative to being self-employed) of the kind of person likely to be an "employer" in the Becker model.

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[9] In most cases, this recoding is straightforward (e.g. those who would not vote for an otherwise qualified black person for president are more prejudiced than those who would). In some cases the ordering of responses is less clear (e.g. those who think the federal government is spending too much improving the conditions of blacks may not be prejudiced; they may think the federal government is spending too much on everything). However, in each case we think it is clear which response was *meant* to denote greater prejudice.

[10] We normalize by the standard deviation in the first year the question was asked rather than, say, the overall standard deviation, because we want to avoid a mechanical relationship between trends in responses and the weight the question receives in the overall aggregate.

Our second measure of the prejudice in a community is meant to approximate as closely as possible the theoretical construct of the marginal discriminator – that person whose racial views determine the equilibrium black wage gap if prejudice is indeed an important part of the explanation for equilibrium discrimination. The logic we use to construct this measure is straightforward and flows naturally from the reasoning presented earlier in the theoretical discussion. Suppose that *p* percent of the population is black. If racial prejudice governs hiring and compensation in the manner earlier described, then efficiency requires that workers will be sorted first to the least prejudiced employers. If we assume that employers are essentially the same with respect to firm size, then it follows that blacks will work at the *p* percent least prejudiced of all employers. A natural measure for the prejudice of the marginal discriminator, $\hat{d}_r^{ER*}$, is thus the p^{th}-percentile of the census-division-specific distribution of $\bar{d}_i^{subset}$ among white employers, where p is the share of the Census division that is black over the full CPS sample period.[11] Motivated by the idea that employer status is endogenous, we also compute this "marginal discriminator" measure of prejudice for all whites, denoted $\hat{d}_r^{*}$, and for high-skilled whites, denoted $\hat{d}_r^{H*}$.

Notice also that none of the community prejudice measures described above varies over time. In some of our analysis, we wish to examine the effect of *changes* in a community's prejudice over time. To compute a community-wide time-varying measure $\bar{d}_{rt}$, we take the average of $\bar{d}_i^{subset}$ by census-division*year over all individual*year observations. We compute $\bar{d}_{rt}^{ER}$ and $\bar{d}_{rt}^{H}$ by similarly aggregating $\bar{d}_i^{subset}$ by census-division*year for each respective subgroup. To compute a time varying measure of the marginal discriminator's prejudice, $\hat{d}_{rt}^{*}$ we compute the p^{th}-percentile of the census-division*year-specific distribution of $\bar{d}_i^{subset}$, where *p* is the percent of the workforce in the census division that is black over the full CPS sample period. We then compute $\hat{d}_{rt}^{ER*}$ and $\hat{d}_{rt}^{H*}$ as the p^{th}-percentile of the census-division*year-specific distribution of $\bar{d}_i^{subset}$ for each respective subgroup.

4.c. Patterns and trends in prejudice in the GSS

We begin by describing the general patterns of prejudice across regions of the U.S. and over time. Table 2 shows three of the prejudice indices for each of the nine census

[11] We construct our measures of the marginal discriminator's prejudice as the p^{th} percentile of the distribution of $\bar{d}_i^{subset}$ and not $\bar{d}_i$ because it is based on a constant number of questions in each year. Since $\bar{d}_i$ is an average over responses to different numbers of questions in different years, the variance of $\bar{d}_i$ will tend to be higher in years in which a smaller number of questions happened to be asked. Statistics based on the tails of the distribution of $\bar{d}_i$ would disproportionately measure prejudice in those years in which a relatively small number of questions were asked.

divisions. As described above, higher values indicate greater racial prejudice. The correlation matrix for the prejudice indices, shown in Appendix table 1, indicates that all six region-level prejudice measures are very highly correlated. Each index shows that racial prejudice is most severe in the southeastern portion of the country, and least severe in New England and in the West. Prejudice is greatest in the East South Central division (Alabama, Kentucky, Mississippi, Tennessee), and next greatest in the South Atlantic (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia), and West South Central (Arkansas, Louisiana, Oklahoma, Texas) divisions. Prejudice is least severe in New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), and in the Pacific (Alaska, California, Hawaii, Oregon, Washington) and Mountain (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming) divisions. We suspect these patterns match many readers' priors.

The magnitude of differences in measured prejudice across regions is also noteworthy. The difference in $\bar{d}_r$ between the East South Central and New England Census divisions is on the order of one-half of an *individual-level* standard deviation. To put this difference in perspective, the median East South Central respondent has the same $\bar{d}_i$ as the 82nd percentile respondent from New England. The median-prejudiced New England respondent would be at the 22nd percentile of the East South Central prejudice distribution.

It is interesting to notice that blacks live most predominantly in regions of the country where racial prejudice is most severe. This pattern may indicate that prejudice is caused in part by cross-racial contact and by competition for economic resources. Furthermore, as with any survey data, significant care must be taken in interpreting these responses. Another concern is that regional differences in answers to the GSS questions indicate differences in candor about true racial feelings rather than differences in actual prejudice. If this is the case, then we should find no relationship between measured prejudice and wage differences. A more serious concern for our purposes is that the indices are correlated with unobserved regional differences in productivity between black and white workers. This is a concern we address below.

Figure 1 shows trends in responses to the twelve most commonly asked GSS prejudice questions, averaged across the entire sample of whites. The figure reveals a general downward trend in reported racial prejudice. As described above, each question is normalized so that the mean response in 1977 is zero, and the standard deviation in the first year it was asked is 1. The average response among whites to each question has declined steadily over the past 30 years. Declines range from close to zero for questions concerning government treatment of and spending for blacks, to more than a half a standard deviation for questions concerning laws about school and residential integration. In the midrange of declines, at about a quarter to a third of a standard deviation, are questions about the willingness to vote for an otherwise qualified black presidential candidate, support for laws concerning interracial marriage, and the desired racial composition of schools.

Figure 2 shows trends in the uni-dimesional prejudice measure $\bar{d}_{rt}$ plotted separately for each Census division. Two key things should be noted about the figure. First, the decline in measured prejudice has been widespread. Between 1977 and 1996 (the years over which $\bar{d}_{rt}$ is available) measured prejudice declined in each of the nine Census divisions. Second, the relative rankings of prejudice across regions has been preserved. New England, and the Pacific and Mountain divisions remain the least prejudiced, while the East South Central and South Atlantic divisions remain the most prejudiced, according to our index.

In short, there is a great deal of variation across regions of the U.S. in levels of measured prejudice. Racial prejudice appears to be greater in the South and lesser in the Northeast and West. Furthermore, there has been a marked decline in measured prejudice over the past 30 years. This variation in tastes raises a natural question: are black-white wage gaps largest in the places with the most severe prejudice? The answer appears to be yes, and the correlations are striking. Table 1 shows that black wages are lowest relative to whites in precisely the census divisions where measured prejudice is greatest. Figure 3 shows this relationship clearly. With only 9 observations, the point estimate of -0.186 is statistically significant ($t = 3.37$) and the univariate regression has an R^2 of 0.619.

4.d. The prejudice of employers

Before turning to a more formal analysis of the empirical relationship between region-level prejudice measures and the black-white wage gap, we examine a more direct test of the view that competitive pressures should force the most prejudiced employers out of the market. Persons who survive as employers would thus have less prejudice than whites overall. This is a testable implication of the theory, which does not hold up well to scrutiny.

For this analysis, we treat persons who describe themselves as "self-employed" as employers. Though this is not an ideal proxy, it is fairly close to what Becker meant in his model of "Employer Discrimination". The important distinguishing characteristic is that he can set wages of his employees. In Becker's model, the employer is also the residual claimant of the firm. In practice many agents with wage setting power are not also the owner of the firm. However, the self-employed are probably more likely than the average worker to have the power to make wage offers to employees. Importantly for our purposes the view that competition drives prejudiced employers out ot business strongly predicts that firms owned by discriminatory self-employed should not survive competition. In what follows for ease of exposition we therefore use the terms "self-employed" and "employers" interchangeably.

Table 3 shows comparisons of the responses to each of the prejudice questions by white employers and non-employers. For each question, two regression coefficients are reported, each one from a separate regression. The left-hand coefficient is the unconditional difference in $\bar{d}_i$ between self-employed and all other white workers. A positive point estimate indicates that employers are more prejudiced. The right-hand

coefficient is the difference estimated in a regression with education, age, region, and year dummies.

The results fairly clearly reject the notion that employers are the least prejudiced members of society. In fact, the self-employed are statistically significantly *more* prejudiced than the average worker. This is true both conditionally and unconditionally. The smaller point estimate in the specification with controls suggests that the difference is smaller among those with the education and experience levels typical of employers. This table shows that there is no evidence in the data that employers are the *least* prejudiced in society, let alone that they are less prejudiced than the average individual.

This result seems at first blush a strong rejection of the common interpretation of Becker in that prejudiced employers do not appear to be forced out of business. A proponent of the traditional interpretation might respond that competition forces prejudiced employers not to act on those preferences in their treatment of racial minorities. That is, because of competitive pressures, employers who are prejudiced along the dimensions we measure remain in business but do not discriminate against racial minorities in the long run. Ultimately, to assess whether if employer based prejudice is rendered moot by competition we must examine the relationship between prejudice and racial wage gaps. We turn to this below.

4.e. The relationship between measured prejudice and the black-white wage gap

To estimate the relationship between relative black wages and region-level measures of prejudice we merge the prejudice indices described above with CPS data. We combine the May monthly supplement from 1973 to 1978 with the Merged Outgoing Rotation Group (MORG) files from 1979 to 2002.[12] The sample includes full-time black and white males aged 16 to 64.

The results are presented in tables 4 through 10. Table 4 shows the results for average measures of prejudice for all whites ($\bar{d}_r$ and $\bar{d}_{rt}$). The basic result can be seen in column (2). These results come from an OLS regression of log wages on education, a quadratic in potential experience, year dummies, a black dummy, $\bar{d}_r$ and the interaction of $\bar{d}_r$ and the black dummy. The coefficient of interest is the estimate on the interaction and is reported in the first row. If one were to interpret it causally, this coefficient would be the effect of average prejudice on relative black wages, or the black-white wage gap. We take the deviation of $\bar{d}_r$ from its sample mean before interacting it, so the estimated black coefficient is the black-white wage gap in a census division with average prejudice. Moving to the right across the table, the specifications add controls. Column (4) shows results that also control for region effects and race specific year effects.

[12] See e.g. Lemieux (2006) or Autor, Katz and Kearney (2005) for a discussion of the merits of the May and MORG files for measuring wages. We follow Autor et. al.'s sample restrictions and data cleaning protocol, which are described in the data appendix. We thank David Autor for sharing his programs with us.

The results imply that conditional on observables, blacks earn 0.160 log points less than whites in a region with average prejudice levels. The estimated interaction effect implies that in a region with $\bar{d}_r$ higher by 0.5 (the difference between average prejudice in New England and the East South Central division), the black wage penalty is 0.093 log points larger than the mean. An estimate of this magnitude implies that differences in levels prejudice can explain virtually all of the difference in the black-white wage gap between New England and the East South Central division.

The estimates in columns (5)-(7) add industry*occupation dummies. We caution the reader to interpret these estimates with care since the industry and occupation to which blacks and whites sort might very well be endogenous with respect to prejudice. Both the average black-white wage gap and the correlation with measures of average prejudice are smaller in magnitude, though both are still significant and large.

In columns (8)-(11) we present results that replace the region-level measure of prejudice with one that varies year by year within region. As discussed at the beginning of this section, to create this index we must focus on a subset of questions which happen to have been asked in a large set of common years. The results tell a similar story, though they are less robust. All four specifications include region effects so the interaction should be interpreted as the relationship between changes in prejudice within a census division and changes in relative black and white wages. The estimates in columns (8) and (10) suggest that indeed the regions that have had the largest declines in prejudice have experienced the smallest decreases in black wages relative to whites. However, this estimated effect goes to zero when race-specific region effects are included. It is unclear whether this indicates that there is no true relationship or that we have over-controlled.

To summarize the results so far, the census divisions with the most severe prejudice over the past 30 years are also the ones with the lowest black wages conditional on observable characteristics. This is true controlling for differences in education and experience, and various other controls. Furthermore, there is less robust evidence that the regions that had the largest *declines* in prejudice also had the largest relative *increases* in black wages.

Average employer prejudice and the black-white wag gap

On the whole, we find broadly similar results when regional prejudice is measured by the average prejudice of employers or high-skilled workers. The results for $\bar{d}_r^{ER}$ and $\bar{d}_{rt}^{ER}$ are shown in table 5. The point estimates are slightly smaller than the results in Table 4, but the patterns are the same. Regions with more prejudiced employers have larger black-white wage gaps. In some ways, the similarity between these results and those in table 4 are not too surprising, given the high correlation among the various regional prejudice measures. The results are nonetheless noteworthy for two reasons. First, $\bar{d}_r^{ER}$ and $\bar{d}_{rt}^{ER}$ are much noisier measures of region-level sentiments since they are computed from much smaller samples. It is therefore especially striking that black relative wages are so closely related to this noisy measure. Second, the Darwinian interpretation of Becker implies

that the tastes of this subset of the population in particular should not influence relative wages of blacks and whites. If as discussed in section 4.d., competition forces employers not to act on their prejudices, then again there should be no relationship between $\overline{d}_r^{ER}$ or $\overline{d}_{rt}^{ER}$ and the black-white wage gap. That there is a relationship is evidence against this interpretation.

The tastes of the "marginal discriminator"

Becker's analysis and our theoretical discussion earlier in the paper, were more precise about which individual's taste should determine the equilibrium black-white wage gap. Black workers should sort first into firms with the least discriminatory employers. Thus, in a labor market that is *p* percent black with equal sized firms, it is the employer at the p^{th} percentile of the distribution of prejudice among employers who should be indifferent between hiring black and white workers. It is the prejudice of this marginal discriminator that determines the equilibrium black-white wage gap in a model of employer prejudice.

The results in Table 6 assess the importance of the marginal discriminator's prejudice for determining the racial wage gap. As described above, $\hat{d}_r^{ER*}$ and $\hat{d}_{rt}^{ER*}$ are the p^{th} percentile of the distribution of $\overline{d}_i$ and $\overline{d}_i^{subset}$, respectively. The results show a strong relationship between the level of prejudice of the "marginal" white employer and the black-white wage gap. If anything, the point estimates are slightly larger in magnitude than those for the average among all whites.

The theoretical discussion above points out that the choice of whether to be an employer is an endogenous one. The model with imperfect substitutes suggests that a better measure of the marginal discriminator might be the p^{th} percentile of the d_i distribution among *high-skilled* whites. Table 7 shows results where the measures of prejudice are $\hat{d}_r^{H*}$ and $\hat{d}_{rt}^{H*}$. High-skilled here is taken to be those with at least 16 years of education. These results are remarkably consistent with those with the previous measures of prejudice, with one exception. Even controlling for race-specific region effects in columns (9) and (11), there is a significant negative relationship between changes in prejudice and changes in relative black wages.

A comparison of different measures of prejudice

The results using various measures of prejudice raise some interesting questions. Which measure is most predictive of relative black wages? And, is there empirical content to Becker's claim that the taste of the marginal rather than average discriminator should affect black wages? We now attempt to answer both questions.

In specifications, not shown here, that include both $\overline{d}_r$ and either $\hat{d}_r^{*}, \hat{d}_r^{ER*}$ or $\hat{d}_r^{H*}$ simultaneously, the negative relationship between prejudice and black relative wages clearly loads on the prejudice of the "marginal discriminator". Specifications that

include all four measures at once are shown in table 8. It is remarkable that the negative relationship loads either on $\hat{d}_r^{ER*}$ or $\hat{d}_r^{H*}$, and not on $\overline{d}_r$ or $\hat{d}_r^{*}$. This result is striking because the high correlation among the measures would seem to preclude our being able to separately identify effects when they are jointly controlled for. Even more importantly, the results are striking because of how closely they correspond to Becker's original insight and with the theoretical ideas discussed earlier in this paper.

Additional tests are shown in tables 9 and 10. In table 9, the measure of average employer prejudice is included along with the measure of the marginal employer's prejudice. Table 10 is similar, but for high-skilled workers instead of employers. In both cases, though most strikingly for employers, the correlation loads clearly on the measure of the marginal discriminator's prejudice. The estimate for marginal high-skilled worker continues to be significant even in specifications that rely exclusively on within region changes over time and which control for race-specific region effects.

Controlling for correlations between measured prejudice and unobservables

We have thus far interpreted this last set of specifications as "horse races" of the different measures of prejudice. There is, however, another useful interpretation. A valid concern one might raise after viewing the preceding results is that regions with more severe measured prejudice also have other unobserved characteristics that negatively affect black wages more than white wages. Though we control for the most obvious suspects, such as differences in education levels, there are always other possibilities. One example is that school quality (not quantity) may be relatively worse for blacks in places with more prejudice.[13] In fact, this may be a direct result of prejudice as in the case of segregated schools. If this were the case, we could see the negative relationships observed in the data even if there were no direct effect of prejudice on wages in the labor market.

The "horse race" specifications provide a potential solution to this problem. In each of these specifications, we include a control for the average level of prejudice in the census division. Becker pointed out that these variables should not affect relative wages of blacks and whites in a direct way. They should, however, be correlated with the unobservables just described (for instance, because they represent the prejudice of the median voter). The results in tables 4-10 show that black relative wages are related to the prejudice of Becker's marginal discriminator, *even conditional on average prejudice levels in the region*.

5. Conclusion

[13] Notice that it would not cause a bias if school quality were relatively lower for both blacks and whites since we include region effects, unless the effect of school quality on wages differed by race.

Our goal in this paper has been to argue that the null under which economists have recently operated that employer prejudice is not an important part of the explanation for observed racial wage gaps might be incorrect. Two lines of argument have been adduced in support of our claim that racial prejudice of the sort first formalized by Becker (1957) in his seminal analysis of labor market discrimination may indeed matter for observed minority wages.

The first part of our analysis re-evaluated the theoretical underpinning of the null mentioned above. We show that the widely accepted view that employer taste-based discrimination is driven out of the market in the long-run because of competitive pressure hinges on a very specific assumption about how racial prejudice operates. Specifically, we show that implicit in Becker's original analysis and in subsequent treatments is the assumption that a prejudiced employer's prejudice is not taken with him to other roles he might play in the market. In particular, the standard treatment implicitly supposes that a prejudiced employer who shuts down his firm and takes a job as an employee at another firm would somehow be an unprejudiced employee. We show that under the more reasonable assumption that racial prejudice is portable across roles – that a prejudiced employer in one firm would likely be a prejudiced employee at another – it is not necessarily the case that prejudiced employers will be driven out of the market in the long-run. Instead, we show that if it is costly to separate the market by race, a prejudiced employer can very well remain in business. Using the specific example of imperfect substitution, we show that with portable preferences racial wage gaps arising from employer discrimination can theoretically last into the long-run, with the size of the wage gap determined by the prejudice of the least prejudiced person to hire black workers.

The second part of our analysis is an empirical examination of racial prejudice and of the connection between prejudice and wage gaps. Strangely, in the large previous literature on discrimination in economics, we have been unable to find any previous work directly studying reported racial prejudice. Using rich data on prejudice from multiple years of data from the General Social Survey, we summarize both the cross sectional variation and trends over time in racial prejudice among whites. We document significant variation in prejudice across different regions of the country. We also show that while reported prejudice has declined significantly everywhere over the past thirty years, the magnitude of that decline has varied widely across regions.

We present several pieces of empirical evidence about reported prejudice which suggest that, consistent with our theoretical argument, prejudice might indeed be an important source of racial wage differences. We show that employers are no less prejudiced that the average white person, and seem to be slightly *more* prejudiced. This is inconsistent with the notion that prejudiced employers are driven out of the market. Next, using individual level data from Current Population survey, we directly examine the relationship and between the racial wage gap and the level of prejudice in a community. We show that the racial wage gap is larger the higher the level of overall prejudice in a community and that it has increased most in regions with the smallest declines in prejudice over time. We find the same basic patterns for alternative measures of community racial prejudice, but

the strongest effects are for results in which we measure community prejudice using our estimate of the prejudice of marginal discriminator. This result is striking because the marginal discriminator's prejudice is shown to be so strongly related to the relative wage gap even in regressions which control for the average level of prejudice among employers overall. More importantly, that the marginal discriminator's prejudice seems so important for wages is precisely what Becker's original analysis as well as our treatment with portable preferences predict.

In our view, the paper's various results, both theoretical and empirical, point to a larger role for racial prejudice in wage determination for minorities than has been acknowledged in the recent discrimination literature. Clearly, much more work, both on the theoretical front and with respect to empirical analysis, needs to be done in order to for us to have a better sense of the ways in which prejudice operates and the effect it has on wages. For example, we have analyzed a particularly simple form of racial animus: an aversion to cross-racial contact. In this we follow Becker, who assumes that this is the form that racial prejudice takes. However, racial animus can take other forms that might be relevant for wage determination. Explicit theoretical analysis of alternative formulations of prejudice is an obvious next step for future work. Similarly, while the empirical evidence we have presented is strongly suggestive of an important role for racial prejudice, we have been careful to stress that absent quasi-experimental evidence, causal interpretations cannot necessarily be given to these estimates. Future work, in which scholars find suitable instruments for individual or community prejudice is an obvious next step on the empirical front.

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Table 1: GSS questions used to measure prejudice

AFFRMACT	Do you oppose a preference in hiring and promotion?
BUSING	In general do you favor the busing of black and white children from one school district to another?
CLOSEBLK	In general, how close do you feel to blacks?
FEELBLKS	In general, how warm or cool do you feel towards blacks?
HELPBLK	Agree? The government is obligated to help blacks.
HELPBLK	Agree? The government is obligated to help blacks.
NATRACE	Agree? We are spending too much money improving the condition of blacks.
RACAVOID	If you were driving through neighborhoods in a city, would you go out of your way to avoid going through a black section?
RACCHNG	If you and your friends belonged to a social club that would not let blacks join, would you try to change the rules?
RACDIN	How strongly would you object if a family member brought a black friend home for dinner?
RACJOB	Do you think blacks should have as good a chance as anyone to get any kind of job, or do you think white people should have the first chance at any kind of job?
RACMAR	Do you think there should be laws against marriages between blacks and whites?
RACMAREL	How would it make you feel if a close relative of yours were planning to marry a black?
RACMARPR	Agree? You can expect special problems with marriages between blacks and whites.
RACOBJCT	If a black with the same income and education as you have, moved into your block, would it make any difference to you?
RACOPEN	Would you vote for a law that says a homeowner can refuse to sell to blacks, or one that says homeowners cannot refuse to sell based on skin color?
RACPEERS	Aggregation of three questions about whether you would object to sending your kids to a school that had few/half/most black students.
RACPRES	If your party nominated a black for President, would you vote for him if he were qualified for the job?
RACPUSH	Agree? Blacks shouldn't push themselves where they're not wanted.
RACQUIT	If yes to RACCHNG: If you could not get the rules changed, do you think you would resign from the club, even if your friends didn't?
RACSCHOL	Do you think white students and black students should go to the same schools or separate schools?
RACSEG	Agree? White people have the right to keep black people out of their neighborhoods and blacks should respect that right.
RACSEG	Agree? White people have the right to keep black people out of their neighborhoods and blacks should respect that right.
RACSUBGV	Do you think the city government in white suburbs should encourage black people to buy homes in the suburbs, discourage them, or leave it to private efforts?
RACSUBS	Do you oppose voluntary (religious/private business) efforts to integrate white suburbs?
RACSUPS	Agree? You can expect special problems with black supervisors getting along with workers that are mostly white.
RACTEACH	Agree? A school board should not hire a person to teach if that person belongs to an organization that opposes school integration.
WRKWAYUP	Agree? Italians, Jews and other minorities overcame prejudice and worked their way up. Blacks should do the same without special favors.

Note: Table lists each of the 26 questions from the GSS used to measure prejudice. The 6 questions shaded in gray were asked in the 1977, 1985, 1988, 1989, 1990, 1991, 1993, 1994 and 1996 waves of the GSS. We use these six questions to construct the prejudice indices that vary within region over time, as well as the indices of the marginal discriminator's prejudice. In all but one case, the variable name is the same as the one listed in the GSS codebook. RACPEERS is constructed by the authors as described in the data appendix. Some of the descriptions are the verbatim questions asked in the survey, while others are paraphrased to save space. Questions were asked in various years of the GSS. No question was asked in every year and some were asked in only one.

Table 2: Means of prejudice indices by census division

Census Division	$\overline{d}_r$	$\overline{d}_r^{ER}$	$\overline{d}_r^{*}$	% Black	$\widehat{\log w_W - \log w_B}$
E. Sou. Central	0.129	0.161	-0.866	14.2	-0.231
South Atlantic	0.003	0.038	-0.914	16.9	-0.185
W. Sou. Central	-0.053	0.023	-1.080	9.7	-0.188
E. Nor. Central	-0.140	-0.116	-1.245	6.9	-0.129
W. Nor. Central	-0.183	-0.090	-1.500	2.2	-0.104
Middle Atlantic	-0.195	-0.203	-1.210	8.6	-0.160
Mountain	-0.304	-0.267	-1.499	1.7	-0.143
Pacific	-0.320	-0.301	-1.419	4.5	-0.138
New England	-0.368	-0.305	-1.518	2.4	-0.134
Total	-0.150	-0.118	-1.250	7.7	-0.157

Note: The first three columns of the table shows means of various indices of prejudice derived from GSS survey data. Reported means are pooled over the full sample of GSS survey years. Indices are normalized so that the mean in 1977 is zero and the standard deviation of each component of the index is one in the first year the respective question is asked. Percent black is the percent of employed 16-64 year-old blacks and whites that are black. The rightmost column shows the difference in between black and white log wages by region, conditional on controls for education, a quadratic in experience, and year effects. Wage gaps are estimated using CPS data from the May (73-78) and Merged Outgoing Rotation Group (79-02) files.

Table 3: The relative prejudice of employers

	Dependent Variable: $\bar{d}_i$	
	(1)	(2)
Self-employed	0.044 (0.014)	0.028 (0.007)
Controls:	N	Y
R^2	0.001	0.158
No. Obs.	35,779	35,779

Note: Dependent variable ($\bar{d}_i$) is the individual-observation-level average of the 26 GSS prejudice questions listed in table 1. Higher values of $\bar{d}_i$ correspond to greater racial prejudice. The reported estimate is the coefficient on a self-reported indicator for being self-employed. Controls included in the specification reported in column (2) are 20 education dummies, 71 age dummies, 24 year dummies, and 8 census division dummies. Standard errors are clustered by region (census division).

Table 4: The relationship between black relative hourly wages and region-level measures of (overall) prejudice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Black $\times \bar{d}_r$		-0.293 (0.079)	-0.185 (0.046)	-0.186 (0.048)	-0.195 (0.076)	-0.103 (0.050)	-0.103 (0.050)				
Black $\times \bar{d}_{rt}$								-0.166 (0.040)	-0.040 (0.061)	-0.102 (0.042)	-0.012 (0.049)
Black	-0.147 (0.014)	-0.174 (0.010)	-0.175 (0.007)	-0.160 (0.011)	-0.087 (0.010)	-0.085 (0.007)	-0.080 (0.007)	-0.226 (0.014)	-0.190 (0.019)	-0.123 (0.015)	-0.097 (0.015)
$\bar{d}_r$	-0.220 (0.095)	-0.198 (0.096)			-0.267 (0.099)						
$\bar{d}_{rt}$								-0.006 (0.067)	-0.015 (0.070)	-0.005 (0.058)	-0.012 (0.060)
Education, Experience, Experience-squared	x	x	x	x	x	x	x	x	x	x	x
Year Effects	x	x	x	x	x	x	x	x	x	x	x
Region Effects			x	x		x	x	x	x	x	x
Black*Year Effects				x			x	x	x	x	x
Black*Region Effects									x		x
Industry*Occupation Effects					x	x	x			x	x
R-squared	0.300	0.301	0.310	0.310	0.491	0.497	0.497	0.325	0.325	0.516	0.516
No. Obs.	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	559,259	559,259	559,259	559,259

Note: Each column refers to a single regression of log hourly wages on various controls, a black dummy a measure of region or region*year-level prejudice and an interaction of the black dummy and the prejudice measure. The coefficient on the interaction measures the relationship between the black-white wage gap and a labor market measure of prejudice. Standard errors are clustered by region (census division). Data are from the May (73-78) and Outgoing Rotation Group (79-02) files of the CPS. Sample includes black and white men, age 16-64, who worked at least 35 hours last week. The region-level measure of prejudice, $\bar{d}_r$, is an index of responses by all whites to questions about racial prejudice from the General Social Survey (GSS). The specific questions are listed in table 1. $\bar{d}_r$ is pooled over time for the full GSS sample period, separately for each of the nine census divisions. It implicitly weights questions by the number of years they are asked in the GSS. The region*year-level measure of prejudice, $\bar{d}_{rt}$, is an index of responses by all whites to a subset of six questions that are asked in each of the following years: 1977, 1985, 1988, 1989, 1990, 1991, 1993, 1994, and 1996. $\bar{d}_{rt}$ is computed separately by year in each of the nine census divisions.

Table 5: The relationship between black relative hourly wages and region-level measures of (employer) prejudice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Black $\times \bar{d}_r^{ER}$		-0.235	-0.166	-0.167	-0.149	-0.090	-0.090				
		(0.084)	(0.049)	(0.050)	(0.076)	(0.046)	(0.047)				
Black $\times \bar{d}_{rt}^{ER}$								-0.142	-0.021	-0.088	-0.008
								(0.029)	(0.027)	(0.032)	(0.016)
Black	-0.144	-0.159	-0.168	-0.153	-0.076	-0.081	-0.076	-0.215	-0.183	-0.117	-0.095
	(0.015)	(0.011)	(0.007)	(0.011)	(0.009)	(0.006)	(0.007)	(0.009)	(0.009)	(0.011)	(0.009)
$\bar{d}_r^{ER}$	-0.269	-0.250			-0.310						
	(0.089)	(0.092)			(0.091)						
$\bar{d}_{rt}^{ER}$								0.013	0.005	0.011	0.005
								(0.021)	(0.022)	(0.019)	(0.020)
Education, Experience, Experience-squared	x	x	x	x	x	x	x	x	x	x	x
Year Effects	x	x	x	x	x	x	x	x	x	x	x
Region Effects			x	x		x	x	x	x	x	x
Black*Year Effects				x			x	x	x	x	x
Black*Region Effects									x		x
Industry*Occupation Effects					x	x	x			x	x
R-squared	0.302	0.303	0.310	0.310	0.492	0.497	0.497	0.325	0.325	0.516	0.516
No. Obs.	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	559,259	559,259	559,259	559,259

Note: Each column refers to a single regression of log hourly wages on various controls, a black dummy a measure of region or region*year-level prejudice and an interaction of the black dummy and the prejudice measure. The coefficient on the interaction measures the relationship between the black-white wage gap and a labor market measure of prejudice. Standard errors cluster by region (census division). Data are from the May (73-78) and Outgoing Rotation Group (79-02) files of the CPS. Sample includes black and white males, age 16-64, who worked at least 35 hours last week. The region-level measure of employer prejudice, $\bar{d}_r^{ER}$, is an index of responses by self-employed whites to questions about racial prejudice from the General Social Survey (GSS). The specific questions are listed in the data appendix. $\bar{d}_r^{ER}$ is pooled over time for the full GSS sample period, separately for each of the nine census divisions. It implicitly weights questions by the number of years they are asked in the GSS. The region*year-level measure of prejudice, $\bar{d}_{rt}^{ER}$, is an index of responses by self-employed whites to a subset of six questions that are asked in each of the following years: 1977, 1985, 1988, 1989, 1990, 1991, 1993, 1994, and 1996. $\bar{d}_{rt}^{ER}$ is computed separately by year in each of the nine census divisions.

Table 6: The relationship between black relative hourly wages and region-level measures of (marginal employer) prejudice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Black $\times \hat{d}_r^{ER*}$		-0.384	-0.184	-0.186	-0.294	-0.118	-0.119				
		(0.073)	(0.040)	(0.040)	(0.067)	(0.031)	(0.031)				
Black $\times \hat{d}_{rt}^{ER*}$								-0.089	-0.017	-0.051	-0.009
								(0.020)	(0.018)	(0.019)	(0.013)
Black	-0.165	-0.128	-0.140	-0.125	-0.057	-0.065	-0.059	-0.194	-0.180	-0.103	-0.094
	(0.012)	(0.013)	(0.007)	(0.012)	(0.011)	(0.004)	(0.007)	(0.010)	(0.010)	(0.010)	(0.009)
$\hat{d}_r^{ER*}$	-0.001	0.021			-0.047						
	(0.106)	(0.104)			(0.096)						
$\hat{d}_{rt}^{ER*}$								-0.017	-0.023	-0.017	-0.020
								(0.016)	(0.016)	(0.015)	(0.015)
Education, Experience, Experience-squared	x	x	x	x	x	x	x	x	x	x	x
Year Effects	x	x	x	x	x	x	x	x	x	x	x
Region Effects			x	x		x	x	x	x	x	x
Black*Year Effects				x			x	x	x	x	x
Black*Region Effects									x		x
Industry*Occupation Effects					x	x	x			x	x
R-squared	0.297	0.298	0.310	0.310	0.487	0.497	0.497	0.325	0.325	0.516	0.516
No. Obs.	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	559,259	559,259	559,259	559,259

Note: Each column refers to a single regression of log hourly wages on various controls, a black dummy a measure of region or region*year-level prejudice and an interaction of the black dummy and the prejudice measure. The coefficient on the interaction measures the relationship between the black-white wage gap and a labor market measure of prejudice. Standard errors cluster by region (census division). Data are from the May (73-78) and Outgoing Rotation Group (79-02) files of the CPS. Sample includes black and white men only, age 18-65. The region-level measure of employer prejudice, $\hat{d}_r^*$, is meant to measure the taste for discrimination for the "marginal discriminator" in the local labor market. It is computed as the p^{th}-percentile of the average of normalized responses by self-employed whites to the questions about racial prejudice from the General Social Survey (GSS) listed in table 1, where p is the percent of fulltime workers in the census division who are black. $\hat{d}_r^*$ is pooled over time for the full GSS sample period, separately for each of the nine census divisions. It implicitly weights questions by the number of years they are asked in the GSS. The region*year-level measure of prejudice, $\hat{d}_{rt}^*$, the p^{th}-percentile of the average of normalized of responses by self-employed whites to a subset of six questions that are asked in each of the following years: 1977, 1985, 1988, 1989, 1990, 1991, 1993, 1994, and 1996. $\hat{d}_{rt}^*$ is computed separately by year in each of the nine census divisions.

Table 7: The relationship between black relative hourly wages and region-level measures of (marginal high-skilled) prejudice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Black $\times \hat{d}_r^{H*}$		-0.265	-0.163	-0.164	-0.176	-0.100	-0.101				
		(0.073)	(0.024)	(0.025)	(0.060)	(0.028)	(0.056)				
Black $\times \hat{d}_{rt}^{H*}$								-0.124	-0.041	-0.085	-0.044
								(0.015)	(0.020)	(0.015)	(0.014)
Black	-0.152	-0.128	-0.143	-0.128	-0.057	-0.067	-0.061	-0.185	-0.179	-0.097	-0.094
	(0.012)	(0.009)	(0.008)	(0.013)	(0.007)	(0.005)	(0.009)	(0.006)	(0.010)	(0.007)	(0.008)
$\hat{d}_r^{H*}$	-0.127	-0.105			-0.171						
	(0.090)	(0.093)			(0.083)						
$\hat{d}_{rt}^{H*}$								0.023	0.017	0.017	0.014
								(0.024)	(0.024)	(0.017)	(0.017)
Education, Experience, Experience-squared	x	x	x	x	x	x	x	x	x	x	x
Year Effects	x	x	x	x	x	x	x	x	x	x	x
Region Effects			x	x		x	x	x	x	x	x
Black*Year Effects				x			x	x	x	x	x
Black*Region Effects									x		x
Industry*Occupation Effects					x	x	x			x	x
R-squared	0.299	0.300	0.310	0.310	0.489	0.497	0.497	0.325	0.325	0.516	0.516
No. Obs.	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	559,259	559,259	559,259	559,259

Note: Each column refers to a single regression of log hourly wages on various controls, a black dummy a measure of region or region*year-level prejudice and an interaction of the black dummy and the prejudice measure. The coefficient on the interaction measures the relationship between the black-white wage gap and a labor market measure of prejudice. Standard errors cluster by region (census division). Data are from the May ('73-'78) and Outgoing Rotation Group ('79-'02) files of the CPS. Sample includes black and white men only, age 18-65. The region-level measure of employer prejudice, $\hat{d}_r^*$, is meant to measure the taste for discrimination for the "marginal discriminator" in the local labor market. It is computed as the p^{th}-percentile of the average of normalized responses by self-employed whites to the questions about racial prejudice from the General Social Survey (GSS) listed in table 1, where p is the percent of fulltime workers in the census division who are black. $\hat{d}_r^*$ is pooled over time for the full GSS sample period, separately for each of the nine census divisions. It implicitly weights questions by the number of years they are asked in the GSS. The region*year-level measure of prejudice, $\hat{d}_{rt}^*$, the p^{th}-percentile of the average of normalized of responses by self-employed whites to a subset of six questions that are asked in each of the following years: 1977, 1985, 1988, 1989, 1990, 1991, 1993, 1994, and 1996. $\hat{d}_{rt}^*$ is computed separately by year in each of the nine census divisions.

Table 8: The relationship between black relative hourly wages and average and marginal measures of prejudice

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Black $\times \bar{d}_r$	0.144	0.258	0.255	0.062	0.209	0.209				
	(0.203)	(0.069)	(0.069)	(0.175)	(0.048)	(0.049)				
Black $\times \hat{d}_r^*$	-0.158	-0.092	-0.079	-0.004	0.052	0.056				
	(0.162)	(0.039)	(0.043)	(0.166)	(0.069)	(0.071)				
Black $\times \hat{d}_r^{ER*}$	-0.231	-0.086	-0.095	-0.240	-0.112	-0.117				
	(0.076)	(0.045)	(0.048)	(0.081)	(0.050)	(0.051)				
Black $\times \hat{d}_r^{H*}$	-0.028	-0.225	-0.226	0.011	-0.200	-0.199				
	(0.122)	(0.030)	(0.029)	(0.142)	(0.025)	(0.026)				
Black $\times \bar{d}_{rt}$							-0.054	-0.021	-0.029	0.004
							(0.055)	(0.061)	(0.049)	(0.045)
Black $\times \hat{d}_{rt}^*$							-0.017	-0.024	0.000	-0.030
							(0.036)	(0.033)	(0.035)	(0.031)
Black $\times \hat{d}_{rt}^{ER*}$							-0.031	-0.012	-0.013	-0.003
							(0.013)	(0.019)	(0.010)	(0.015)
Black $\times \hat{d}_{rt}^{H*}$							-0.079	-0.044	-0.068	-0.047
							(0.017)	(0.018)	(0.009)	(0.013)
Education, Experience, Experience-squared	x	x	x	x	x	x	x	x	x	x
Year Effects	x	x	x	x	x	x	x	x	x	x
Region Effects		x	x		x	x	x	x	x	x
Black*Year Effects			x			x	x	x	x	x
Black*Region Effects								x		x
Industry*Occupation Effects				x	x	x			x	x
R-squared	0.305	0.310	0.310	0.493	0.497	0.497	0.325	0.325	0.516	0.516
No. Obs.	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	559,259	559,259	559,259	559,259

Note: All regressions include main effects for prejudice measures as well as indicated controls. Standard errors are clustered by region (census division).

Table 9: Comparing the role of average and marginal measures of employer prejudice

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Black $\times \bar{d}_r^{ER}$	-0.031	-0.005	-0.002	0.009	0.042	0.045				
	(0.086)	(0.053)	(0.053)	(0.089)	(0.050)	(0.051)				
Black $\times \hat{d}_r^{ER*}$	-0.247	-0.180	-0.184	-0.192	-0.148	-0.152				
	(0.099)	(0.050)	(0.051)	(0.068)	(0.032)	(0.033)				
Black $\times \bar{d}_{rt}^{ER}$							-0.105	-0.004	-0.070	0.004
							(0.046)	(0.030)	(0.041)	(0.020)
Black $\times \hat{d}_{rt}^{ER*}$							-0.043	-0.017	-0.020	-0.010
							(0.030)	(0.020)	(0.023)	(0.015)
Education, Experience, Experience-squared	x	x	x	x	x	x	x	x	x	x
Year Effects	x	x	x	x	x	x	x	x	x	x
Region Effects		x	x		x	x	x	x	x	x
Black*Year Effects			x			x	x	x	x	x
Black*Region Effects								x		x
Industry*Occupation Effects				x	x	x			x	x
R-squared	0.306	0.310	0.310	0.494	0.497	0.497	0.325	0.325	0.516	0.516
No. Obs.	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	559,259	559,259	559,259	559,259

Note: All regressions include main effects for prejudice measures as well as indicated controls. Standard errors are clustered by region (census division).

Table 10: Comparing the role of average and marginal measures of high-skilled worker prejudice

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Black $\times \overline{d}_r^H$	0.083	-0.056	-0.077	0.040	-0.019	-0.026				
	(0.161)	(0.124)	(0.130)	(0.147)	(0.080)	(0.083)				
Black $\times \hat{d}_r^{H*}$	-0.293	-0.125	-0.112	-0.183	-0.088	-0.083				
	(0.105)	(0.085)	(0.090)	(0.099)	(0.071)	(0.074)				
Black $\times \overline{d}_{rt}^H$							-0.094	-0.006	-0.068	-0.015
							(0.018)	(0.055)	(0.011)	(0.031)
Black $\times \hat{d}_{rt}^{H*}$							-0.076	-0.040	-0.051	-0.041
							(0.017)	(0.016)	(0.014)	(0.012)
Education, Experience, Experience-squared	x	x	x	x	x	x	x	x	x	x
Year Effects	x	x	x	x	x	x	x	x	x	x
Region Effects		x	x		x	x	x	x	x	x
Black*Year Effects			x			x	x	x	x	x
Black*Region Effects								x		x
Industry*Occupation Effects				x	x	x			x	x
R-squared	0.304	0.310	0.310	0.492	0.497	0.497	0.325	0.325	0.516	0.516
No. Obs.	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	1,272,414	559,259	559,259	559,259	559,259

Note: All regressions include main effects for prejudice measures as well as indicated controls.
Standard errors are clustered by region (census division).

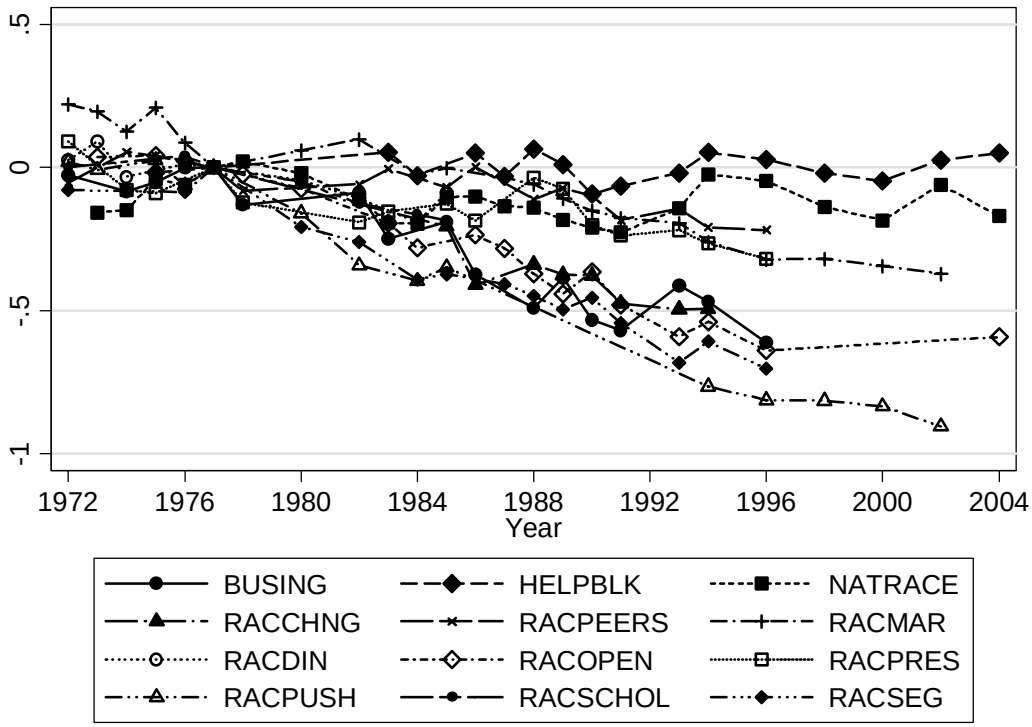

Figure 1:
Trends in responses to GSS prejudice questions

Note: Descriptions of questions are listed in table 1.

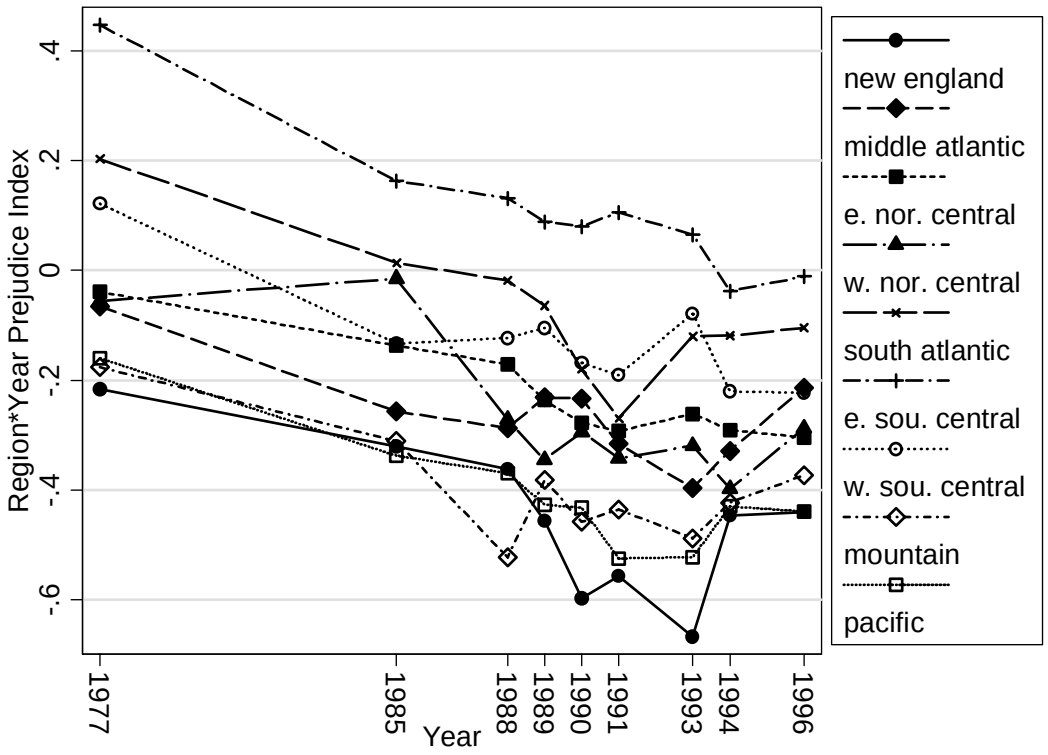

Figure 2: Trends in prejudice by Census division

Note: Figure plots $\bar{d}_{rt}$ over time by Census division for each of the years for which it is available.

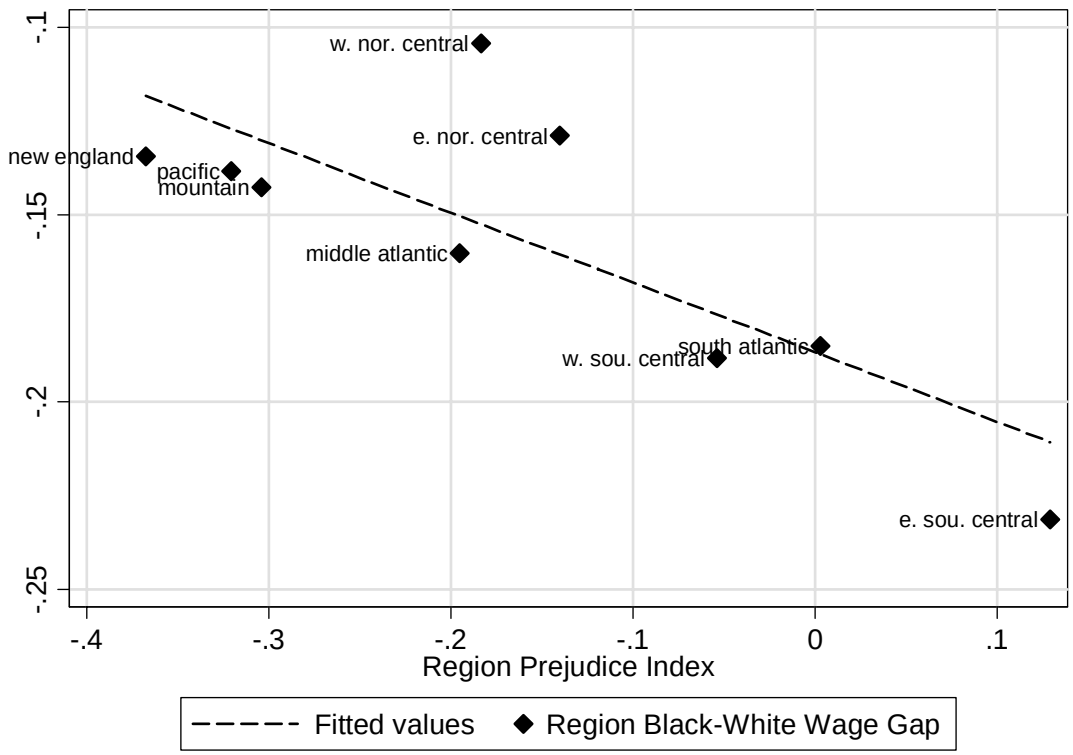

Figure 3:
Plot of the regional black-white wage gap against an index of regional prejudice ($\bar{d}_r$)

Note: The estimated slope is -0.186 (standard error, 0.055). $R^2 = 0.619, n = 9.$

Appendix Table 1: Correlation matrix of prejudice indices

	$\bar{d}_r$	$\bar{d}_r^{ER}$	$\bar{d}_r^{H}$	$\hat{d}_r^{*}$	$\hat{d}_r^{ER*}$	$\hat{d}_r^{H*}$
$\bar{d}_r$	1.000					
$\bar{d}_r^{ER}$	0.982	1.000				
$\bar{d}_r^{H}$	0.948	0.937	1.000			
$\hat{d}_r^{*}$	0.909	0.845	0.863	1.000		
$\hat{d}_r^{ER*}$	0.715	0.666	0.717	0.880	1.000	
$\hat{d}_r^{H*}$	0.939	0.893	0.944	0.929	0.824	1.000