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GARY BECKER'S CONTRIBUTIONS TO THE ANALYSIS OF DISCRIMINATION

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Becker analyzes racial discrimination given its existence; as we know from his 1977 paper with George Stigler, "De Gustibus Non Est Disputandum," Becker felt that the determination of preferences was to be taken as given, at least from the standpoint of conducting neoclassical economic analysis. One of the ingredients of this research is the distribution of racial animus in the populations of employers, employees, and customers. The most interesting and memorable feature of the analysis is the examination of equilibrium racial wage and employment outcomes when there are "tastes" for discrimination of various kinds and labor and product markets vary in their degree of competitiveness.

As someone who strongly believed in the role of competitive markets as a force for the good, it was natural for Becker to examine the manner in which departures from competitiveness could lead to "bad" outcomes in both the efficient and normative senses. His analysis begins by using tools from trade theory, and discrimination is viewed as bad here since it limits trade between racially-defined groups. In this view of the world, in which portions of each racial group are predetermined to be employers and employees, Becker shows how different classes of racial-employee status groupings would be affected by racial barriers in trade. Depending on the production technology and the split of each racial group into owners and workers, any group could potentially benefit, or be hurt, from the racial divide. What was not of doubt was that the equilibrium would be inefficient. Although some individuals could profit from the existence of discrimination, which is one reason that it might persist, from a societal standpoint it was unambiguously bad.

Becker's work, although not overly mathematical or technical, was extremely rigorous and comprehensive. As do all good researchers, he sought to find the simplest framework possible in which to conduct his analysis of racial discrimination. He examined discriminatory attitudes on the part of employers, employees, and customers, and was able to nest all of these cases in a framework that emphasized the difference between market prices and shadow prices. I will mainly consider the case of employer discrimination, which is the one that received the most attention in his book and the ensuing literature. For simplicity, assume that the marginal productivity of white workers and black workers is the same. From a profit-maximization perspective, they should be perfect substitutes from the point of view of a firm owner. However, if a particular employer suffers a loss in utility

from employing black workers, then the effective (or "shadow") wage she pays the employee depends on the color of their skin, and in this case the shadow wage of black workers is higher than is the shadow wage of white workers. Let the equilibrium market wage rates of blacks and whites be denoted by w_B^* and w_W^*, respectively. In the absence of market discrimination, in a competitive market with no discrimination, $w_B^* = w_W^* = w^*$, where w^* is the common wage paid to each race of worker under the assumption that they are equally productive. In the competitive equilibrium, the labor supply of black and white workers would depend on the numbers of each race and their labor supply curves.

As a measure of discrimination, Becker proposes the market discrimination coefficient (MDC), which is defined as

$$MDC = \frac{w_W - w_B}{w_B},$$

for the case in which black and white workers are perfect substitutes in production. When this is not the case, $MDC = w_w/w_B - w_w^{ND}/w_B^{ND}$, where the superscript ND denotes that this is the equilibrium wage in the absence of any taste for discrimination on the part of employers. This reduces to the simpler definition in the perfect substitutes case since then $w_W^{ND} = w_B^{ND}$. Of course, this is a very stylized analysis, since productivity levels within the black and white populations are quite heterogeneous. One could think of this analysis as applying to black and white workers with similar observable characteristics, such as their schooling level and labor market experience. Even here there are problems, since schooling levels are likely to be quite imperfect measures of human capital levels given the large differences in the quality of schooling inputs that blacks and whites receive. The problem of finding individuals of similar productivity in different populations to determine the existence of discrimination is ubiquitous in both academic studies and in civil suits based on charges of racial, gender, or other sorts of discrimination. This is the principal limitation to carrying out empirical work in this research area.

As mentioned earlier, much of Becker's analysis focused on the subtle interplay of market forces and the distribution of preferences in the population. We will consider the simplest case in which black and white workers are perfect substitutes in production. We continue with our consideration of employer discrimination, and imagine that there exists a distribution of preferences in the population of employers within an industry with respect to the racial composition of their employees. This results in a distribution of $MDCs$ in the population. Let there be an equilibrium wage of blacks and whites such that

$$w_B^*(1 + \bar{d}) = w_W^*,$$

where $\bar{d}$ is the equilibrium MDC, which means that an employer with an $MDC = \bar{d}$ would be indifferent between hiring a black or a white worker. For all employers with a value of $d < \bar{d}$, only black workers will be hired, while for any employer with a $d > \bar{d}$, only white workers will be hired. This produces firms that have racially-segregated workforces and produces racial wage differentials.

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A strong version of the model is often invoked in which there exists a constant returns to scale production technology. In this case, the employer with the lowest value of d would employ the entire population of black labor market participants and could compete equally well for white employees, thus effectively taking over the entire market. This result leads to the oft-repeated claim that discrimination cannot survive in competitive markets when some employers are not prejudiced. Becker was careful to assume decreasing returns to scale, for the most part. In this case, discriminators could survive competitive pressures if there were not too many nondiscriminatory firms, if there were many more white workers than black workers, and if decreasing returns were sufficiently strong. He recognized that this was the case to consider if the theoretical analysis was to have any credible empirical implications.

Although we have focused on the case of discriminatory employers, Becker's analysis of employee- and customer-based cases is equally interesting. Once again, the idea that the level of discrimination can be measured by differences in wage payments to the different factors of production is utilized. In terms of employee-based discrimination, the problem is that white employees have disutility from working with black co-workers, and it also may be the case that black employees prefer to work with black co-workers. Thus, a white worker at a firm with some black employees would have to be paid a higher wage than if he worked in a firm with no black employees.

We can illustrate the idea easily with a simple example. Say that there are two firms with two positions each, and there exists four potential employees of equal productivity, two of whom are black and two of whom are white. Each individual on the supply side of the market exhibits a preference for working with someone of their same race. The firms bid against each other for the services of the employees, which makes this a competitive labor market, and the firms will pay the individuals the value of their productivity. Now, assume that an individual of race i has utility given by $U_i(w, \pi_{i'})$, where $\pi_{i'}$ is the proportion of co-workers of the other race, and where both the utility of all workers is increasing in the wage and decreasing in the proportion of their co-workers who belong to a different race. The unique equilibrium employment allocation will have one firm employing the two black workers and the other firm will employ the two white workers, with the same wage w^* paid to all workers. This is an equilibrium because no firm can have an integrated workforce, since to do so would result in each of its employees receiving an effective wage (that is, the value of the wage payment discounted by the cost of working with others of a different race) that is lower than what they would receive in a segregated firm. This analysis reveals that wage differences between races, conditional on productivity characteristics, may not exist even in the presence of discrimination. One of the messages of this research program is that behavioral models are required to be able to fully understand the ways in which the results of discrimination can be exhibited in labor and product markets. In this case, one would have to look at the employment distributions within firms to detect the presence of discrimination.

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Becker always looked ahead at how a field might develop, and was very humble regarding his own contributions. As evidence for this claim, consider the last paragraph in his introduction to the 1971 edition of his book.

> Although our understanding of the economic effects of discrimination has increased significantly since the mid-fifties, I hope it increases so rapidly in the future that the materials in this book become obsolete before another decade begins.

While there have been a number of notable achievements in the economic theory of discrimination and improvements in measurement since his dissertation research, there is little doubt that his contributions continue to provide the underpinnings of research in this area. I will briefly consider two research directions that have been taken and how they relate to this seminal work.

Perhaps the most well-known attempt to produce what would appear to be discriminatory labor market outcomes in the absence of agents having any particular animus toward members of other racial groups is the theory of statistical discrimination (see, e.g. Arrow (1973), Lundberg and Startz (1983) and Moro (2003)). The usual basis for these models is imperfect observability of a potential employee's productivity. Aigner and Cain (1977) construct a simple linear model in which the measured productivity of an individual is equal to her true productivity plus a disturbance term, and consider this measured productivity to be the result of a test. If the disturbance term has mean zero in both racial groups but the variance in the disturbance term is greater for black employees, then the wage paid by an employer to a black worker will put a larger weight on average productivity in the population of black workers and a smaller weight on the test score result than will be the case for white workers (in terms of the weights given to the average productivity of white workers and their own test scores). If blacks and whites have the same average productivity, then the average wage will be equal in the two groups, but the slope of the wage function (with respect to the test score) will be flatter for blacks. Lundberg and Startz (1983) agree with Cain and Aigner that this does not constitute racial discrimination in wages. However, Lundberg and Startz then add a layer of complexity by allowing workers to make pre-market investments in human capital that will increase their (average) test performance. Since black workers have a lower return to test performance, this will lead them to invest less in human capital, which will result in a drop in the marginal productivities of blacks relative to whites, and this, they argue, does constitute racial discrimination. The important building block of all of this work is the assumption that it is harder for employers to evaluate job applicants who are black, possibly because most employers are white. This does not constitute taste-based discrimination in Becker's sense, since employers are willing to pay individuals of the same productivity the same wage. However, problems in measurement lead to an equilibrium in which black workers do rationally choose to become less productive than whites, on average, which leads to racial differences in average earnings.

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The theory of statistical discrimination is thought-provoking, but if employers eventually learn the productivity of their employees, it seems unable to explain persistent racial wage differentials. Doing so requires market imperfections, as recognized by Becker. Flabbi (2010) looks at the issue of discrimination (in his application, gender-based) using a search, matching, and bargaining framework. Due to search frictions, employers and potential employees both have bargaining power with respect to each other, which yields a positive surplus to each side of the employment contract. Upon meeting a potential employer, the individual's productivity at the job is determined (by a draw from a known distribution) and the employee simultaneously learns whether the employer is discriminatory or not. In the population, a proportion π of employers are discriminators. At a discriminator, black and white workers with equal productivity (a) will earn different wages, with the wage of the black worker less than the white. At a nondiscriminatory firm, black employees will also receive lower wages than a similarly productive white, simply because a black worker's outside option (the value of continued search in this case) is lower than is a white worker's as long as some potential employers are discriminatory (i.e., $\pi > 0$). One of the most interesting features of this model is its implication that some black workers will be employed by discriminatory employers, but only when their match-specific productivity is sufficiently high. This means that the wage distribution for blacks at discriminatory firms may dominate the distribution of wages of black workers at non-discriminatory firms due to this selection effect. The clear implication is that discriminatory firms will employ fewer black workers than will non-discriminatory firms. Flabbi takes the model to data and is able to estimate π, the level of bias shown by discriminatory employers, and other parameters characterizing his partial equilibrium model of gender discrimination. The key to discriminatory employers being able to survive in the long run is that all employers earn positive profits in equilibrium. Discriminatory employers take part of their "profits" in the utility they get from having few black employees.

In this brief review, I hope to have communicated my feeling that the path-breaking work of Gary Becker, in this research area and others, transcended the traditional boundaries of social science disciplines and the artificial distinction between theory and empirics. His research, even that which was the most "theoretical," was guided by empirical observation and was evaluated (by him) in terms of its empirical relevance. The courage he showed in applying standard neoclassical methods to areas outside the purview of "mainstream" economics was the defining characteristic of his research and made him one of the most influential social scientists of the last one hundred years. His analysis of racial discrimination marked the beginning of this journey.

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