

## 4 Empirical Studies of Discrimination

### 4.1 Traditional Regression Analysis and Its Problems

- See, e.g., the Boston Fed study: “Mortgage Lending in Boston: Interpreting HMDA Data”, by Alicia Munnell, Geoffrey Tootell, Lynn Browne and James McEneaney, AER March 1996.

### 4.2 Market Test: Becker (1993)

- “An employer discriminates when he refuses to hire applicants from a group even though they would produce more profit than those who are

hired. Employees discriminate if they refuse to work alongside members of a group even though they can earn more by doing that. The corollary here is that if a company chooses not to hire members of a group, *its decisions may not be discriminatory if hiring others who are cheaper or more productive results in more profits.*"

- He then proposed an approach to detect if there is racial animus (or taste baste discrimination) in bank lending:

"If banks do discriminated against blacks and other groups, they would impose stricter standards on loan to them than to whites with truly comparable credit backgrounds. The banks would be willing to finance only the most profitable of African-American applications. Were that the case, the mortgage loans approved for minority applications should be more profitable than loans to whites, not less profitable or even equally profitable."

- He then suggests that we look at the average default rates of accepted loans for blacks, Hispanics and whites. If the average default rate for the blacks are smaller than for the whites, then it is a market outcome indication of discrimination against the blacks: the banks are imposing a higher standard on the blacks than that on the whites.

## CRITIQUE:

- There is no doubt that Becker raised a very creative way of detecting discrimination by looking at the market outcomes. However, his suggestion of looking at the average default rates is not consistent with theory and will lead to mistaken conclusions.
- Suppose that the distribution of default probabilities among the blacks and whites are respectively given by  $G_B(b)$  and  $G_W(b)$ .
- If a bank loans a dollar to a white borrower and if he does not default, the bank receives  $(1 + r)$ , while if he defaults, the bank gets zero. Suppose that the bank has a racial animus against black borrowers valued at  $0 \leq t \leq r$ .

- Suppose that the bank observes the default probability of borrowers perfectly.

- Then the bank will lend the dollar to whites if

$$(1 + r)(1 - b) \geq 1 \Leftrightarrow b \leq b_W^* = \frac{r}{1 + r},$$

and it will lend to the blacks if

$$(1 + r)(1 - b) - t \geq 1 \Leftrightarrow b \leq b_B^* = 1 - \frac{1 + t}{1 + r}.$$

Clearly, if  $t > 0$ , then  $b_W^* > b_B^*$ .

- That is, the *marginal* white that is granted the loan will have a higher default probability if the bank discriminates against blacks.

- What about the average default rates among the whites and blacks who are granted the loan? The average default rate among the white and black borrowers (who obtain loans) are respectively

$$\bar{b}_W = \frac{\int_0^{b_W^*} b dG_W(b)}{G_W(b_W^*)},$$
$$\bar{b}_B = \frac{\int_0^{b_B^*} b dG_B(b)}{G_B(b_B^*)}.$$

If  $G_B(b) \neq G_W(b)$ , then  $\bar{b}_W > \bar{b}_B$  does not follow from  $b_W^* > b_B^*$ .

- Example: let the distribution of blacks' default rates be

2%	4%	5%	$\geq 10\%$
0.1	0.3	0.2	0.4

and that of the whites be

2%	4%	5%	$\geq 10\%$
0.3	0.1	0.2	0.4

- Suppose that the threshold default rates banks use in granting loans are 4% for blacks and 5% for whites.
- If we calculate the average default rates among the black and white borrowers, we will find that

$$\bar{b}_B = 3.5\%, \bar{b}_W = 3.33\%.$$

Hence we find that on average the default rates is lower among the white borrowers, which will lead to a clearly misleading conclusion that the whites are being discriminated!

- To summarize: Economic theory suggests that if employers, or banks, have racial animus against a minority group, then the *marginal minority worker, or borrower, should perform better than the marginal majority worker, or borrower.*
- The paper by Smart and Waldfogel (1996) asked the question whether there is discrimination against articles written by minority researchers by comparing the citation rates for articles written by minorities and by whites. It suffers from the problem we identify here.

## 4.3 Audit Method and Its Problems

- Main reference here is Heckman and Siegelman. The major criticism against regression analysis of the differential treatments of agents controlling for observable characteristics is the omitted variable bias. Audits were suppose to present evidence that two individuals, identical as much as possible, except for race and/or gender, are disparately treated.

- Advantages of audit method over regression analysis:
  - Because the audit pairs are chosen by the investigators, more characteristics can be controlled for than what can be achieved in typical data sets;
  - Audit method allows social scientists to study behavior of employers, or landlords that are not necessarily reflected in the market outcome. For example, all regression analysis examines only the employment segregation and wage differentials, and could not explicitly consider the *hiring process*: for example, is interviewed granted? Are different questions asked during the interview? What is the rationale for not making an offer?
- Audits were originally employed by legal activists, who pioneered their use in the enforcement of fair-housing laws during the late 1960s.

- The audit procedure can be divided into two parts:
  1. First is the selection and training of auditors. Groups of two individuals, one white and one black, are selected from a group of applicants to resemble each other as closely as possible except for race. The auditors are also called testers. Testers are typically matched on such attributes as age, education, physical appearance (subjective level of attractiveness), physical strength, and level of verbal skills, as deemed relevant. The goal is to produce pairs of testers who are identical in all relevant characteristics so that any systematic difference in treatment within each pair can be attributed only to the effect of race.

2. In addition to their outward similarities, testers are given training about how they are supposed to behave during the course of the audits. Such training typically includes developing synthetic biographies (current and past employment, references, education, and so on), behavioral alignment (e.g., level of aggressiveness and overall presentation of self) and experience in role-playing, simulating the kind of transaction being audited.

## Heckman and Siegelman's Critique of Audit Method:

- The implicit assumption is that audit pair analysts know which characteristics are relevant to employers, and when such characteristics are “sufficiently” close to make majority and minority audit pair members “indistinguishable”. There is a presumption of knowledge about “what is really important” that is difficult to demonstrate objectively. This inability to defend, or even fully enunciate, the criteria used to match audit pair members constitutes the Achilles heel of the audit pair methodology.

- It is quite expensive to conduct large scale audits, moreover, the pool of potential match partners is small. This, coupled with the likely large number of relevant productivity attributes, makes the probability of successful matches rather low.
  - For example, suppose that investigators want to conduct an audit study in Washington DC. Suppose that 10 potential white match partners for 10 potential black partners (who responded to the ad for such a study).
  - Suppose that there are five productivity attributes that describe each worker, each independently distributed as binomial with probability one half for each value of each attribute (the case of discrete attributes is most favorable to matching), and suppose that black and white distributions are identical.
  - Then the number of expected successful matches is less than 2.7. If the number of relevant attributes is increased to 10, the expected number of successful matches is less than 0.1.