Labor Market Discrimination: Theory

Definition of Discrimination

- A situation in which persons who provide labor market services and who are equally productive in a physical or material sense are treated unequally in a way that is related to an observable characteristic such as race, ethnicity, or gender.
- Unequal = Workers receive different wages or face different demands for their services at a given wage.
- Note: Difficult to define exactly differences in productivity:
  - Example: beauty (Hamermesh and Biddle, 1994).
- Theories are typically classified in two groups:
  - Taste-based (prejudice).
  - Statistical (information-based).

Taste-based discrimination: Employer-discrimination

- Majority group A, minority group B (discriminated against).
- Employers maximize utility (not profits!)

$$U = pf\left(N_A + N_B\right) - w_A N_A - w_B N_B - dN_B$$

- Key parameter: $d =$ employer's taste for discrimination.
- Prejudiced employers act as if group B wage is $w_B + d$.
- Workers perfectly substitutable, employers hire group B workers only if

$$w_A - w_B \geq d$$

- Let $G\left(d, \bar{d}\right)$ be the CDF of the prejudice parameter d in the population (where $\bar{d}$ is the mean of the distribution).
- The fraction of firms that hire B workers (i.e., $d \leq w_A - w_B$):

$$G\left(w_A - w_B; \bar{d}\right)$$

- First order conditions:
  - Firms that hire A workers

$$pf'\left(N_A\right) = w_A$$

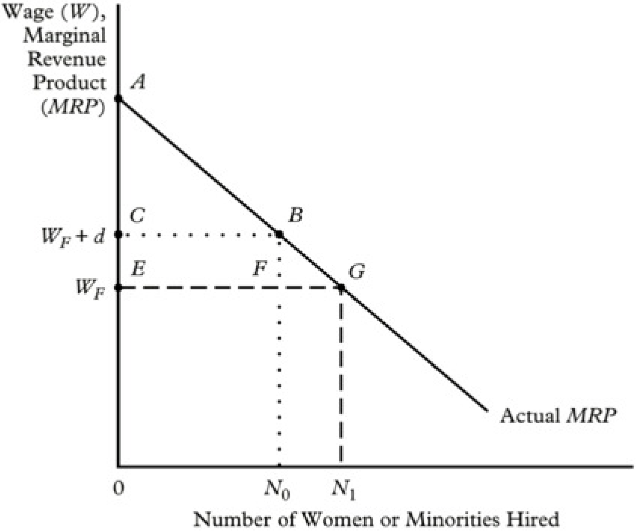
  - Firms that hire B workers

$$pf'\left(N_B\right) = w_B + d$$

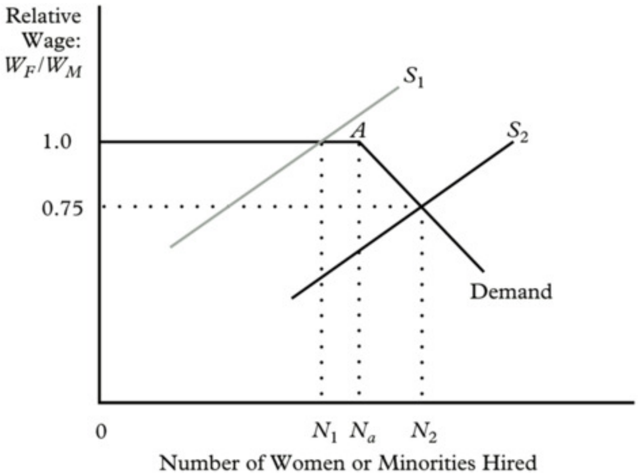
- Aggregate over all firms to obtain the market demand for A and B workers, $N_A^d(w_A, w_B, \bar{d})$ and $N_B^d(w_A, w_B, \bar{d})$.

- In equilibrium, wages are determined by equating demand and :

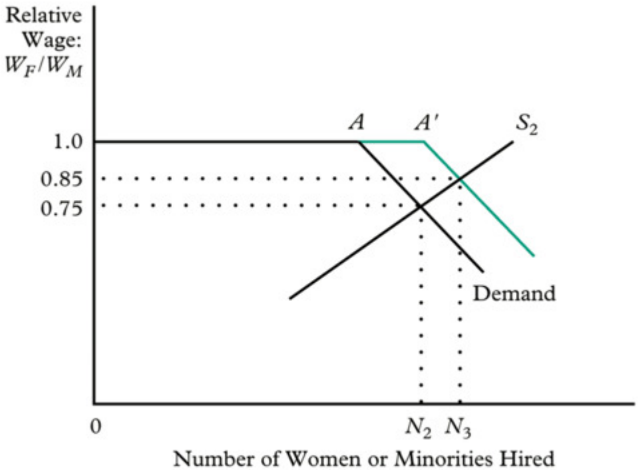
$$\begin{aligned} N_A^d(w_A, w_B, \bar{d}) &= N_A^s(w_A) \\ N_B^d(w_A, w_B, \bar{d}) &= N_B^s(w_B). \end{aligned}$$



Discriminating firm acts as if wage is $w_B + d$, hires fewer B-type workers.



Equilibrium in the market is determined by demand and supply (i.e., one wage only). If number of discriminating firms is small, or supply of B-type workers is small, possibly there will be no wage differential in the market.



What happens if the number of discriminating firms diminishes.

Features of the equilibrium:

- Segregation in the labor market: most prejudiced employers will only hire A workers, B workers hired only by the least prejudiced employers.
- The wage gap between A and B workers is determined by the marginal discriminator: the least prejudiced employer who hires B workers.
- Discriminating firms make lower profits: discrimination cannot survive with free entry, discriminators will be driven out of the market by competition.
- In practice, wage differences are persistent:
  - gap not due to discrimination
  - employer discrimination not important

Customer Discrimination

- Models of employer discrimination not entirely satisfactory, because discriminating firms should be weeded out of the market by competition.

- Maybe it's rational for firms to discriminate? Customer discrimination.

- Customer discrimination: consumers of group A dislike interacting with group B workers, will only buy good if price p is lower.

- MRP_L of B workers is lower, in the end same predictions as model with employer-based discrimination.

- Wage gap is reduced to the extent that B workers can serve only B customers or unprejudiced A customers, or B workers can work in occupations without customer contact (again, segregation).

Co-worker discrimination

- Employees of group A dislike working with coworkers of group B.
- A workers require a wage premium to work together with B workers.
- Why not just fire the discriminating workers? Maybe A workers are skilled, and production requires at least one skilled worker, not enough B workers are skilled.

Statistical discrimination

- Previous models: taste-based discrimination. We would expect it to decline as attitudes towards minorities improve.
- But there is still a persistent wage gap between blacks and whites.
- Statistical discrimination: model of discrimination not based on preferences, entirely rational. Will not go away with changes in attitudes.
- Statistical discrimination: arises because employer has imperfect information about the quality of job applicants at the time of hiring.

First-moment statistical discrimination (Phelps, 1972)

- Employers' prior belief is that B-type workers are less productive.
  - Perhaps justified because of pre-market discrimination.
- Without additional information, group B workers less likely to be hired, or hired at a lower wage.
- Even if I can conduct an admissions test, and I have two candidates with identical scores, will hire A worker because some weight is given to prior expectations.
- First moment statistical discrimination: not very interesting from a theoretical point of view, but probably very relevant empirically.
- Is it legal?
  - Sometimes: Hiring, credit market: NO; Insurance markets, YES.

Self-fulfilling stereotypes (Arrow, 1973)

- Workers are ex-ante identical, but first moment statistical discrimination arises as an equilibrium outcome.
- Model of self-fulfilling stereotypes.

- Each firm has two kinds of jobs, skilled and unskilled.
- Firms' production function $f(L_S, L_U)$, with derivatives f_1 and f_2.
- Workers can be either skilled or unskilled. Workers start unskilled, must invest c to become skilled.

$$c \sim G(\cdot)$$

  $G(\cdot)$ does not depend on group identity $j \in \{W, B\}$.
- Who can perform jobs?
    - Unskilled jobs: all workers
    - Skilled jobs: only skilled workers.
- π_W, π_B : Proportion of whites and blacks that are skilled, determined in equilibrium.

- Wages on unskilled job w_U.
- Wages on skilled job: w_j if worker is tested to be skilled, 0 otherwise.
- Firm must pay cost r to find out if worker is skilled or not.
- Competition among firms will result in zero-profit condition (cost and benefit from finding out if skilled are the same):

$$
\begin{aligned}
r &= \pi_W \left[f_1 \left(L_S, L_U \right) - w_W \right] \\
r &= \pi_B \left[f_1 \left(L_S, L_U \right) - w_B \right]
\end{aligned}
$$

- If for some reason $\pi_B < \pi_W$, then also $w_B < w_W$, otherwise $w_B = w_W$

- How can it be that $\pi_B < \pi_W$?
- Workers invest in skills if the gains from doing so outweigh the costs.
- Gain of investing for group j : $(w_j - w_U)$.
- Therefore, fraction of workers who invest:

$$\pi_j = G\left(w_j - w_U\right) \qquad \text{for } j \in \{B, W\}.$$

- This system can have multiple equilibria, such that $\pi_B \neq \pi_W$.
- Intuition for asymmetric equilibrium: if in a group very few workers invest, then firms will rationally infer that this group is on average low-skill, will receive lower wages $\rightarrow$ group has even less incentive to invest.

Second-moment statistical discrimination (Aigner-Cain, 1976)

- More interesting: discrimination may arise even if mean productivity is perceived to be the same for the two groups, but B type workers can only send a noisy (or more imprecise) signal of their true ability.
- Because of this noisy signal, B workers have less incentive to invest in human capital, so discrimination is self-perpetuating.
- Possible justifications:
    - Cultural and language differences may make assessments (by white male managers) of female and black employees less accurate.
    - Employers know what an "A" at TV means, but not necessarily what it means at a less known college.

Model

- Two types of workers, A and B, true ability θ_i.

$$\begin{aligned} \theta_i | \text{type } A &\sim N\left(\mu_A, \sigma^2_{\theta A}\right) \\ \theta_i | \text{type } B &\sim N\left(\mu_B, \sigma^2_{\theta B}\right). \end{aligned}$$

- μ_A can be equal to μ_B, expected prior ability the same for both workers.
- Employers don't observe θ_i, only an imperfect signal y_i :

$$y_i | \theta_i, type \sim N\left(\theta_i, \sigma^2_{yt}\right) \qquad t = A, B$$

- Employers want to pay workers their expected marginal product, $E(\theta | y, type)$.
- Standard signal-extraction problem:

$$E(\theta | y, type) = \frac{\sigma^2_{\theta t}}{\sigma^2_{\theta t} + \sigma^2_{yt}} y + \frac{\sigma^2_{yt}}{\sigma^2_{\theta t} + \sigma^2_{yt}} \mu_t, \qquad t = A, B$$

- Rewrite:

$$E\left(\theta | y, type\right) = \left(\frac{\frac{1}{\sigma^2_{yt}}}{\frac{1}{\sigma^2_{\theta t}} + \frac{1}{\sigma^2_{yt}}} \right) y + \left(\frac{\frac{1}{\sigma^2_{\theta t}}}{\frac{1}{\sigma^2_{\theta t}} + \frac{1}{\sigma^2_{yt}}} \right) \mu_t, \qquad t = A, B$$

  Weight given to signal y is inversely proportional to the *precision* of the signal, σ^2_{yt}.

- Intuition: the more precise the signal $(\sigma^2_y \to 0)$, the more weight you give to y, the less to the prior μ_t.

- Conversely, if signal is very imprecise $(\sigma^2_y \to \infty)$, give weight only to the prior.