E C O N O M I C S   B U L L E T I N

Statistical Discrimination and Social Assimilation

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Abstract

Social assimilation has been observed in many societies where members of the minority group suffer from discrimination. In this note, we provide a simple economic model of assimilation and show that the adoption of the social behavior of the dominant group can be used as a signal by high productivity members of the minority group.

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1. Introduction

Recently, economists have started to pay attention to the interaction between social identity and economic decisions (Akerlof (1997), Akerlof and Kranton (1999)). A striking example of the choice of social identity is the phenomenon of assimilation, by which members of a minority group choose to adopt the social behavior of the dominant group (Lazear (1999)). Social assimilation has been observed in many societies where members of the minority group suffer from discrimination. In the United States, the classical study of Wilson (1987) analyzes the emergence of a black middle class adopting the same modes of behavior as whites. In India, Srinivas (1966) studies the phenomenon of *Sankritization*, i.e. the adoption of the language and social habits of upper castes by lower castes. There are clearly a number of sociological explanations for the adoption of the behavior of the dominant group by members of the minority group. In this note, we provide an alternative explanation, based on a signaling model of assimilation. In a society where statistical discrimination is prevalent, we show that high productivity members of the minority group have an incentive to adopt the social behavior of the dominant group in order to signal their productivity to prospective employers. The transition from a régime of statistical discrimination to a régime of selection based on social behavior results in higher welfare for members of the dominant group, and lower welfare for low productivity members of the minority group.

2. Statistical Discrimination

We suppose that the society is divided into two groups: the dominant group (group A) and the minority group (group B). The total population is normalized to 1, and λ denotes the size of the dominant group. In each group, there are two types of workers, high productivity workers (with productivity π^h) and low productivity workers (with productivity π^l). The proportion of high productivity workers is equal across groups, denoted by μ. As employers ignore the productivity of the workers they hire, they screen them by conducting a test, which can take on two values, *0* and *1*. For simplicity, we suppose that the probability that a high productivity worker passes the test is equal to the probability that a low productivity worker fails and let p denote this probability for members of the group A and q for members of the group B. Following Phelps (1972) and Aigner and Cain (1977), we suppose that the screening device is more accurate for members of the dominant group, $p > q$.

<u>Proposition 1.</u> *In a competitive labor market, all employers offer the following wage schedule:*

$w^A(1)=(\mu p/(\mu p+(1-\mu)(1-p)))\ \pi^h + ((1-\mu)(1-p)/(\mu p+(1-\mu)(1-p)))\ \pi^l$,

$w^A(0)=(\mu(1-p)/(\mu(1-p)+(1-\mu)p))\ \pi^h + ((1-\mu)p/((1-\mu)p+\mu(1-p)))\ \pi^l$,

$w^B(1)=(\mu q/(\mu q+(1-\mu)(1-q)))\ \pi^h + ((1-\mu)(1-q)/(\mu q+(1-\mu)(1-q)))\ \pi^l$,

$w^B(0)=(\mu(1-q)/(\mu(1-q)+(1-\mu)q))\ \pi^h + ((1-\mu)q/((1-\mu)q+\mu(1-q)))\ \pi^l$.

In our simple model, statistical discrimination arises as the wage schedules offered to workers of the two groups are different. It is easy to observe that members of the dominant group face a steeper wage schedule than members of the minority group $w^A(1) > w^B(1)$ and $w^A(0) < w^B(0)$.[1]

3. Assimilation

We now introduce an indicator of social behavior which is unrelated to the worker's productivity. Members of the dominant group are initially endowed with social behavior α and members of the minority group with behavior β. By incurring a cost C members of the minority can emulate the dominant group by adopting α.[2] We analyze the following simple signaling model. First, members of group B choose whether to adopt the social behavior of the dominant group. Employers observe the social behavior of workers, propose a wage schedule to the workers, and conduct a test to determine the worker's productivity. Finally, the results of the test are revealed and wages are paid accordingly. We assume that employers are competitive, so that the wage schedule they offer is equal to the worker's expected productivity. We distinguish between two possible situations: either employers can condition the wage schedule on group membership and social behavior, or they can only condition their wage schedule on social behavior.

> Proposition 2. *If employers can condition their wage schedule on group membership and social behavior, the signaling game does not admit any separating equilibrium.*

Proof: In a separating equilibrium, employers offer a wage π^h to high productivity workers of the minority group, and π^l to low productivity workers. As the cost of switching behavior, C, is unrelated to productivity, low productivity workers have an incentive to imitate high productivity workers. *Q.E.D.*

> Proposition 3.*Suppose that employers can only condition their wage schedule on social behavior. Let*
> $w^\alpha(1)=((p\mu\lambda +q(1-\lambda)\mu)/(p\mu\lambda +q(1-\lambda)\mu+(1-p)(1-\mu)\lambda))\, \pi^h+((1-p)(1-\mu)\lambda)/(p\mu\lambda +q(1-\lambda)\mu+(1-p)(1-\mu)\lambda))\, \pi^l$ *and*
> $w^\alpha(0)=(((1-p)\mu\lambda +(1-q)(1-\lambda)\mu)/((1-p)\mu\lambda +(1-q)(1-\lambda)\mu+p(1-\mu)\lambda))\, \pi^h+(p(1-\mu)\lambda)/((1-p)\mu\lambda +(1-q)(1-\lambda)\mu+p(1-\mu)\lambda))\, \pi^l$.
> *If* $w^\alpha(0)+(1-q)(w^\alpha(1)- w^\alpha(0)) < \pi^l + C < w^\alpha(0)+(1-q)(w^\alpha(1)- w^\alpha(0))$*, there exists a separating equilibirum, where high productivity workers of group B adopt the behavior of the dominant group, and employers offer a wage schedule* $w^\alpha(1)$, $w^\alpha(0)$, $w^\beta(1)= w^\beta(0)= \pi^l$. *There*

[1] In this model, the wage received by minority workers is not uniformly lower than the wage received by workers of the dominant group. Aigner and Cain (1977) show that for some extensions of the model (for instance when employers are risk averse), minority workers receive a wage which is always below the wage of members of the dominant group.

[2] We assume that the cost of adopting the dominant group's social behavior is unrelated to the worker's productivity. There are numerous case studies in sociology describing the psychic and social costs incurred by individuals who break away from their original group. (See the examples given in Akerlof (1997).) These examples indicate that this cost is not directly related to the abilities of individuals.

is no separating equilibrium where low productivity workers of group B adopt the behavior of the dominant group.

Proof: Given that only high productivity workers are switching, the wages $w^{\alpha}(1)$ and $w^{\alpha}(0)$ are the expected productivities of workers with social indicator α whereas all workers adopting behavior β are low productivity workers and receive a wage π^{l}. The incentive conditions guaranteeing that an equilibrium exist are given by

$$q\, w^{\alpha}(0)+(1-q)w^{\alpha}(1)-C < \pi^{l} < (1-q)w^{\alpha}(0)+q\, w^{\alpha}(1)-C.$$

As $q > ½$ and $w^{\alpha}(1) > w^{\alpha}(0)$, the two inequalities are consistent, and there exists a range of values of parameters for which the separating equilibrium exists. In a separating equilibrium where low productivity workers switch, a worker keeping social behavior receives a wage π^{h}. Low productivity workers thus have an incentive to deviate, and keep their original social behavior. *Q.E.D.*

4. Discussion

Propositions 2 and 3 show that a separating equilibrium only exists if employers are prevented from using group membership to discriminate among workers. The intuition underlying this result is easily grasped. If employers can condition their wages on group membership the cost of the signal is unrelated to productivity and the single-crossing condition fails, and there is no separating equilibrium in the signaling game. If, on the other hand, employers can only condition their wages on social behavior, the single-crossing condition is recovered as high productivity workers are more likely to pass the test than low productivity workers, and thus receive a higher expected wage if they are pooled with workers of the dominant group. The results of Propositions 2 and 3 are consistent with empirical evidence, suggesting that the rate of social assimilation of blacks in the U.S. has increased dramatically since the civil rights movement of the 60's (see Wilson (1987)).

We can also use the results of Propositions 1 and 3 to study the welfare consequences of the transition from a régime of discrimination based on group membership to a régime of selection based on social behavior. Low productivity workers of the minority group are clear losers, as they move from a situation where they are pooled with high productivity workers to an equilibrium where their type is revealed. Simple computations also show that $w^{\alpha}(1) > w^{A}(1)$ and $w^{\alpha}(0) > w^{A}(0)$. Hence, the expected wage of workers of the dominant group is higher in the régime of selection based on social behavior, as they benefit from the entry of high productivity workers into their pool. For high productivity agents of the minority group, the welfare effects are ambiguous.[3] The transition leads to a higher wage for workers who pass the test, as $w^{\alpha}(1) > w^{A}(1) > w^{B}(1)$. The effect of the transition on the wages of workers failing the test is unclear, as two opposite forces come into play. On the one hand, workers are

[3] We only discuss the effect of the transition on wages, but workers of the minority group also incur a cost for switching social behavior. The welfare effects of the transition must take into account both wages and cost, and are typically ambiguous.

now pooled with a mix of high and low productivity workers, resulting in an increase on the worker's expected productivity. On the other hand, workers are pooled with agents of the dominant group for whom the screening dvice is more accurate, resulting in a lower wage for workers who fail the test. On balance, computations show that $w^{\alpha}(0) > w^{B}(0)$ if and only if $\lambda < (q-q^2)/(p-q^2)$, *i.e.* the first effect dominates if the proportion of high productivity workers is low enough and the differences in test accuracies is not too high.

We conclude by observing that, even though we have focussed our attention on separating equilibria, pooling equilibria also exist in our model. In a pooling equilibrium where nobody switches behavior, the expected utilities of high and low productivity workers are $(1-q)w^{B}(0)+qw^{B}(1)$ and $qw^{B}(0)+(1-q)w^{B}(1)$. When employers condition the wage schedule on group behavior, the cost of signaling is identical for the two types of workers, and the intuitive criterion cannot be used to eliminate the pooling equilibrium. If employers condition the wage only on social behavior, the intuitive criterion can be used to eliminate the pooling equilibrium when the following condition holds:

$$(1-q)(w^{\alpha}(1)-w^{B}(1))+q(w^{\alpha}(0)-w^{B}(0)) < C < q(w^{\alpha}(1)-w^{B}(1))+(1-q)(w^{\alpha}(0)-w^{B}(0)).$$

The first inequality implies that even when employers believe that they face high productivity workers, a low productivity worker has no incentive to switch behavior, the second inequality states that, when employers believe that they face high productivity workers, high productivity workers have an incentive to adopt the social behavior of the dominant group. There also exists a pooling equilibrium where both types of workers switch behavior. When employers can condition the wage on group membership, the expected utilities of high and low productivity workers are $(1-q)w^{B}(0)+qw^{B}(1) -C$ and $qw^{B}(0)+(1-q)w^{B}(1).-C$. When employers can only condition the wage on social behavior, the expected utilities are $(1-q)w(0)+qw(1) -C$ and $qw(0)+(1-q)w(1).-C$, where $w(0)$ and $w(1)$ denote the expected productivity of workers passing and failing the test in the entire population. This pooling equilibrium disappears when $(1-q)w^{B}(0)+qw^{B}(1) -C < \pi^{l}$ (when employers condition the wage on group membership) or $(1-q)w(0)+qw(1) -C < \pi^{l}$ (when employers condition the wage on social behavior).

5. References

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