2002

Affirmative Action in College Admissions: Examining Labor Market Effects of Four Alternative Policies

Bruce Wydick
University of San Francisco, wydick@lucas.usfca.edu

AFFIRMATIVE ACTION IN COLLEGE ADMISSIONS: EXAMINING LABOR MARKET EFFECTS OF FOUR ALTERNATIVE POLICIES

BRUCE WYDICK*

A rancorous debate continues to rage over the use of affirmative action policies in college admissions. This paper uses a simple signaling model to evaluate the labor market impacts of four types of affirmative action admissions policies. Race-based preferential policies and policies guaranteeing admission based on high school academic rank may induce discrimination in labor markets when there exists strong heterogeneity in socio-economic disadvantage within the under-represented minority group. Under such conditions, it may also be difficult to realize ethnic diversity with disadvantage-based preferential policies. The paper argues instead for affirmative action policies emphasizing intensive college preparation for targeted groups.

I. INTRODUCTION

In March 1961, President John F. Kennedy issued executive order number 10925, requiring employers contracting with the federal government to "take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to race, creed, color, or national origin." Several years after Kennedy's initial executive order, colleges also began using affirmative action policies in college admissions, principally employing some level of race-based preferential policies. Most proponents of affirmative action on college campuses viewed these as "second-best" policies in the face of both historical and present discrimination, but necessary in the short-term to encourage the participation of under-represented groups in the mainstream economy. Nevertheless, with the possible exception of

abortion, there is hardly an issue that has been as divisive in legal, public, and academic discourse as race-based affirmative action in college admissions.

Although race-based preferential policies remain strong at many colleges, important court decisions have restricted the use of such policies. The first of these was the Supreme Court's famous 1978 *Bakke* decision, which prohibited the use of quotas in college admissions, but allowed race to continue to be used as one of many factors in the consideration of an applicant. In the *Hopwood vs. Texas* court decision of 1996, a federal court barred the University of Texas from using race as a factor in college admissions. The court decision forced the state to consider new policies, including the use of high school academic rank as a primary criterion for college admission, in order to maintain minority enrollment on its public university campuses.

The latter half of the 1990s also saw a number of states politically abandoning race-based affirmative action policies. In 1995, the University of California Regents passed a resolution against the use of race-based preferential admissions on all of its nine campuses. California voters endorsed this decision the following year by passing state Proposition 209, which banned race-based preferential policies in state contracting, hiring, and college admissions. Patterned after Proposition 209, Initiative 200 in the State of Washington ended preferences for minorities and women in state employment, public education, and contracting after its passage in the November 1998 state election. In February of 2000, the independently elected cabinet of Florida voted to cease considering race and gender as factors in college admissions, a political move with solid popular backing within the state. The popular support behind these initiatives suggests that the coalition of interests that had previously supported race-based preferential policies may have begun to dissolve.

Race-based preferential policies have also come under increasing attack in academic circles, although much research has presented policy conclusions that remain solidly in favor of

such policies. Leonard (1989, 1990), for example, argues that race-based affirmative action policies brought significant gains in employment opportunities for African Americans during the 1970s, the period just after most affirmative action programs were in place. Yet the gains for African Americans were virtually erased during the 1980s, he notes, when the federal government relaxed its enforcement of existing affirmative action policies. Similarly, Carlson and Swartz (1988) find that the wage gap between Hispanic and African-American women and white men narrowed dramatically during this period. More recent work also yields conclusions broadly supportive of race-based preferential policies, such as the Bowen and Bok (1998) study on affirmative action, *The Shape of the River*. Their study, using a 1976 cohort of African-American college graduates at 28 elite colleges and universities, highlights the substantial accomplishments of these college graduates, especially with respect to the large numbers of graduates entering professional study in law, business, and medicine. Particularly significant, they note, are the positive externalities of such policies: the rates at which beneficiaries of race-based affirmative action policies take leadership in civic, youth, and professional organizations upon graduation.

Nevertheless, race-based preferential policies have become much more openly subject to criticism in academic circles from both liberal and conservative scholars. In his classic work *The Truly Disadvantaged* (1987), William Julius Wilson reflects on the effects of affirmative action policies on African Americans. Although Wilson asserts that affirmative action programs may represent a welfare-increasing set of policies in the face of severe racial discrimination, he maintains that affirmative action programs have successfully fostered a high degree of upward economic mobility only for the highest income quintile of African-American households, while having little impact on the poorest households.

Conservative African-American scholars Thomas Sowell and Shelby Steele are more pointed in their criticism of race-based affirmative action policies. Sowell (1990) maintains that, "because preferential benefits tend to be concentrated on more lucrative or prestigious things, they are often within striking distance only for the fortunate few who have already advanced well beyond most other members of the preferred group" (1990, p. 156). Steele (1990, 1998) argues that race-based affirmative action policies negatively alter perceptions of targeted groups. Such policies, he argues, "mark whites with an exaggerated superiority just as they mark blacks with an exaggerated inferiority" (1990, p.120).

Welch (1981) and Bound and Freeman (1992) provide a measure of empirical support for the assertions of Wilson, Sowell, and Steele. They show that African-American males with high levels of education made dramatic economic advances in the years after affirmative action programs were enacted, but that the incomes of African-American males with less education regressed relative to those of whites during the same years. Trejo (1997) finds that, even in the presence of affirmative action policies, the wage gap between Hispanics and non-Hispanic white males is approximately equal to that between African-American and white males, approximately 21 percent. In the case of Hispanics, he attributes this gap primarily to differing levels of education, language ability, and work experience.

The challenges to race-based preferential admissions policies from court rulings, voter initiatives, and academic circles have led to the search for new means of achieving diversity on college campuses. The purpose of this paper is to examine the labor market effects of four approaches to affirmative action in college admissions, which represent the four most commonly discussed means of achieving diversity on university campuses today. The analysis presented here resembles that of Coate and Loury (1993) in that it uses imperfect information in labor market relationships as a basis for its analysis (as distinct from much of the empirical work in

this area.) However, the model presented here is distinct in that it specifically treats the issue of affirmative action in the context of college admissions rather than in the labor market itself.

The four types of policies analyzed in this paper are a race-based preferential policy, a disadvantaged-based preferential policy, a policy heavily weighting high school academic rank, and a policy focused on college preparation of targeted groups. In keeping with much of the research in economics in the last twenty years, this paper assumes that agents in the economy are rational, but that they are forced to make decisions in the context of imperfect information. This paper uses a simple game-theoretic framework in which individuals use a Bayesian decision-making process, where decisions are contingent upon observable variables and knowledge of the current policy environment. The paper concludes that it is only under the fourth policy--a policy focused on college preparation of targeted groups--that colleges can achieve campus diversity without triggering labor market discrimination.

II. A GAME-THEORETIC ANALYSIS OF FOUR POLICY ALTERNATIVES

The tool used in this analysis is a variation on the two-player signaling model pioneered by Spence (1974), which has been widely utilized and adapted to analyze labor market behavior under imperfect information.[1] In the signaling framework, the function of advanced education is to act as a screening device for employers in the labor market, rather than to increase the labor market productivity of graduates. In such models, an educational degree serves its purpose if it produces a Nash equilibrium in which it is only high-ability types (by virtue of their lower psychic costs of learning) who are able to fulfill admission and degree requirements. The game presented here is a simplified version of that in Wydick (1998).

The two players in the game are the “Student” and the "Employer". The Student player is a member of an under-represented minority group that the Employer can identify from outward

characteristics, such as last name or skin color. Furthermore, assume that a Student's type is defined over two characteristics. First, assume that the Student is either "gifted" (*g*), with probability γ, or "mediocre" (*m*) with probability 1-γ.[2] Second, suppose that the Student is either "advantaged" (*a*) with probability α, or "under-privileged" (*u*), with probability 1-α. Thus the Student is one of four different types: t_{ga}, t_{gu}, t_{ma}, or t_{mu} with probabilities $\gamma\alpha$, $\gamma(1-\alpha)$, $(1-\gamma)\alpha$, and $(1-\gamma)(1-\alpha)$ respectively. While the Student knows his or her own type, this information is hidden from the Employer.

In the initial move of the game, the Student must decide whether or not to obtain a college degree. The student undertakes one of two actions: "College" or "No College". In the model, the costs of completing a college degree vary according to *both* giftedness and degree of disadvantage. For simplicity, assume that the sum of these costs forms the total "psychic" costs (see Spence 1974) of obtaining a college degree, and that any type of student can obtain a college degree by incurring these costs. All else equal, the psychic costs, *c*, of attending college are lower for a t_g than for a t_m, or $c_g < c_m$. The opportunity cost of the study time required to perform adequately in college courses is lower for the gifted type since learning for a t_g comes quickly. Moreover, the mental process of synthesizing college material is simply less frustrating for the gifted type. In addition, the psychic costs of attending college are lower for a t_a than for a t_u, or $c_a < c_u$. The environment of the t_a (*e.g.* a supportive family structure, study aids such as a home computer, positive peer pressure to succeed) reduce psychic costs relative those of a t_u for any given level of academic performance. If students are restricted in their ability to borrow to finance their education, the fatigue involved with needing to work to maintain sufficient liquidity while studying may pose an additional psychic cost to the t_u.

The Employer's strategy consists of a plan of action undertaken in response to each possible action by the Student. The Employer hires for two classes of jobs, offering a job applicant either a first-tier position as a "Manager" or a second-tier position as "Mailroom Clerk." To simplify, the Managerial wage is set at $w = 1$, and the mailroom wage is normalized to zero. Furthermore, assume that the productivity of all types in the mailroom is equal to some ε slightly greater than zero. However, q, a worker's productivity in the Managerial position, is greater for the "gifted" type than for the "mediocre" type, and since $q_g > w > q_m$, the Employer is interested in hiring only "gifted" types for the Managerial position.

A. *Nash Equilibrium under Homogeneous Disadvantage Levels*

The first step of the analysis is to establish the base-line Nash equilibrium under conditions of relatively homogeneous disadvantage faced by members of an under-represented minority group. A series of simple numerical simulations using the signaling model will be used to illustrate the impact of different types of affirmative action policies on labor market Nash equilibria.[3] To illustrate the effect of difference in giftedness of students, let us assume, for example, that $c_g = 0.4$ and $c_m = 0.8$. For c_a and c_u, however, consider two sets of psychic cost parameters. The first set of parameters for c_a and c_u is intended to reflect conditions of relatively *homogeneous* disadvantage within the under-represented group, say, $c_a = 0.7$ and $c_u = 0.8$. This set of parameters characterizes an environment of relatively uniform discrimination against all members of the group in question. In this environment profit-maximizing employers have no "taste" for discrimination (as in Becker, 1957), yet barriers to college entry are very high, even for the least disadvantaged of the under-represented group.

A second set of parameters for c_a and c_u is intended to reflect conditions of *heterogeneous* disadvantage levels within the under-represented group, say, $c_a = 0.4$ and $c_u = 0.9$. These parameters, in contrast, reflect an environment in which a subset of the group in question is heavily disadvantaged, perhaps resulting from a protracted period of discrimination. This could be due to poor-quality schools, low expectations by teachers, or myriad societal norms working against a subset of the under-represented group.

Let us first examine the environment of *homogeneous* disadvantage within the under-represented group in the absence of affirmative action policies. Under these conditions, a Nash equilibrium must be found, in which neither party has an incentive to change an action given the actions of the other player. The employer seeks to maximize profits which, in this model, equal worker productivity minus wages. Thus let us consider a plausible strategy by the Employer of (Manager | College , Mailroom Clerk | No College), meaning that the Employer hires the student as a Manager if the student has a college degree, and that the Student is hired as Mailroom Clerk if he or she has no college degree.

The Student seeks to maximize wages minus total psychic costs of education. Therefore, as a first step to finding a Nash equilibrium, one must find the best response of each type of Student to the strategy of the Employer. Given the parameters in our example, psychic costs become $c_{ga} = 1.1$, $c_{gu} = 1.2$, $c_{ma} = 1.5$, and $c_{mu} = 1.6$. Since $w = 1$, the best response to the Employer's strategy is No College for all types of Student. Does the Employer's original strategy constitute a best response to the actions of all types of Student? Remembering that $q_g > w > q_m$ (hiring a mediocre worker brings a net loss to the Employer), the Employer's strategy constitutes a best response provided that the average productivity across all types is less than the wage rate, w. (The specific condition is that $\gamma q_g + (1-\gamma) q_m < 1$, or that the average worker

productivity of non-college graduates must be less than the managerial wage.) If this does not hold, the Employer will offer the managerial position to a non-college graduate.

In the resulting Nash equilibrium with *homogeneous* disadvantage, none of the under-represented group attend college, and all in the under-represented group are hired as Mailroom Clerk. Furthermore in the resulting Nash equilibrium under *heterogeneous* disadvantage, only t_{ga}*'s* attend college since only $c_{ga} = 0.8$ is less than $w = 1$.

B. *Affirmative Action Policy #1: Race-based Preferential Admissions*

Consider the labor market effects of a purely race-based preferential admissions policy when there is homogeneous disadvantage within the under-represented group. This type of policy effectively "lowers the bar" to college entry and completion for members of the targeted group. In practical terms, this might mean lowering test score and grade-point average requirements for admission, as well as providing special classes and tutors for members of the targeted group once they arrive on campus. Together these policies make both college entry and graduation less difficult for beneficiaries of the program. Let the reduction in psychic costs of college graduation resulting from preferential admissions policy be equal to R.

How would a level of $R = 0.15$ change the current Nash equilibrium? With $R = 0.15$, the psychic costs for each type of Student become $c_{ga} = 0.95$, $c_{gu} = 1.05$, $c_{ma} = 1.35$, and $c_{mu} = 1.45$. Given an employer strategy of (Manager | College , Mailroom Clerk | No College), the best response for t_{ga} is to play College, while the best response for all other types is No College. Does the original strategy by the employer remain a best response to the actions of each type of student? Yes, provided that the weighted average of the productivities of t_{gu}, t_{ma} and t_{mu} are less than w, a condition less restrictive than the previous case. (Specifically, we must have that

$(1-\alpha\gamma)^{-1}\left(\gamma(1-\alpha)q_g + (1-\gamma)q_m\right) < 1$, which simply says that the average productivity in the pool of applicants without a college education, now without the gifted t_{ga}'s, is less than the managerial wage rate.) Thus, in the face of severe racial discrimination, a homogeneous disadvantage faced by all types of the under-represented group, a race-based preferential admissions policy can potentially result in a Pareto superior Nash equilibrium relative to the absence of race-based policy. Employers and t_{ga}'s are better off while non-college graduates are no worse off. (The present model, of course, does not consider potential losses for those in the over-represented majority group.) Moreover, if the policy is strengthened to $R = 0.25$ in the context of *homogeneous* disadvantage within the under-represented group, the conditions necessary for the Pareto superior Nash equilibrium become even less restrictive. In this case the psychic costs for each type of Student become $c_{ga} = 0.85$, $c_{gu} = 0.95$, $c_{ma} = 1.25$, and $c_{mu} = 1.35$. Here the optimal response to the employer strategy is for both t_{ga} and t_{gu} to play College, and for t_{ma} and t_{mu} to play No College. The conditions necessary for the Pareto superior Nash equilibrium are merely our basic assumption that $q_g > w > q_m$.

In contrast, consider a race-based preferential admissions policy implemented in the context of *heterogeneous* disadvantage levels, in which some members of the under-represented group have achieved a level of relative affluence, but other members of the under-represented group continue to face severe socio-economic disadvantage. Such an environment may perhaps more closely reflect the current experience of African Americans in the United States. (See studies such as Wilson (1987, 1996) which reveal the growing economic divide between African American households.)

Using the example of $R = 0.25$, psychic costs are now $c_{ga} = 0.55$, $c_{gu} = 1.05$, $c_{ma} = 0.95$, and $c_{mu} = 1.45$. Here the best response for the Student to the Employer's original strategy is for

types t_{ga} and t_{ma} to play College, and for t_{gu} and t_{mu} to play No College. But is the original strategy of the Employer a best response to the actions undertaken by each type of Student? Assuming again that the average productivity across all types is less than *w*, the optimal strategy response by the Employer is to play (Mailroom Clerk | College , Mailroom Clerk | No College). In response to this strategy change by the Employer, the best response for *all* types of Student in a Nash equilibrium is then to play No College, since no student wishes to bear the psychic costs associated with college if a college degree cannot be used to secure the Managerial position. Moreover, there is no level of *R* that is able to generate the Pareto superior outcome in which all gifted types obtain the Managerial position unless assumptions about relative productivities of types are relaxed substantially or the relative proportion of gifted types, γ, is very high.

When there is *heterogeneous* disadvantage within the under-represented group, the entrance of t_{ma}'s into the pool lowers the productivity of college graduates from the targeted group as *R* increases. This example illustrates how, in the context of imperfect information in labor markets, it is possible for race-based preferential policies to generate Pareto inferior equilibria. Gifted types fail to reap the returns to their giftedness, employers are unable to profitably identify gifted types, and mediocre types are no better off.

It is important to note that this model has assumed an exogenously fixed wage. The inability of members of targeted groups to secure employment in first-tier labor market positions follows from the interaction of race-based preferential admissions policies with a rigid wage structure. If wages are determined endogenously in the model (as in Wydick, 2000), the result is a lower equilibrium wage for *both* college graduates and non-college graduate members of targeted groups. Thus by dampening the signaling power of college degrees held by target groups, race-based preferential admissions policies can induce labor market discrimination against targeted groups.

Real-world policy makers are therefore faced with the following dilemma: a large fraction of gifted types are t_a's within the *over*-represented group, but in the *under*-represented group a large fraction of the gifted types are t_u's. Because this makes the relative fraction of t_{ga}'s in the under-represented group small, policies intended to create equal representation among all groups at the college level result in the admission of a large number of t_{ma}'s from the targeted group. The disadvantage level of the t_{gu}'s is so great with strongly heterogeneous disadvantage levels that it puts them at a competitive disadvantage in the college admissions process with respect to the t_{ma}'s. Upon graduation and entry into the labor market, the disproportionate presence of t_{ma}'s among graduates dilutes the average productivity of graduates in the labor market pool from the targeted group. Employers, unable to distinguish t_{ma}'s from t_g's because of imperfect information, will discriminate against graduates from the targeted group if the average productivity of graduates from the targeted group falls below the wage rate, *w*.

Recent empirical studies on earnings differentials in the labor market support the existence of discrimination induced by race-based affirmative action. Gaynor and Durden (1995) show that at the time of hiring, white males receive a wage premium over African-American males, controlling for qualifications and background characteristics, but that this differential disappears as years on the job increase, apparently as true productivity is revealed to an employer. Datcher Loury and Garman (1995) find that African-American earnings are much more sensitive than white earnings to differences in college grade-point average and choice of major.

The Bowen and Bok (1998) study presents empirical results from a separate data set that appear to reflect the same phenomena as Datcher Loury and Garman. Among their 1976 cohort at 28 elite colleges and universities, mean earnings of white men in 1995 who finished in the top

third of their class were $114,900; for African Americans they were actually higher at $115,800 (though this difference is not statistically significant). However, among those finishing in the bottom third of their class, mean earnings for whites were $83,200, while mean earnings for African Americans were $68,500. Moreover, African-American earnings were also much more sensitive to choice of college major. These results were unaffected after controlling for SAT scores, socioeconomic status, type of school attended, and advanced degree held.

The empirical evidence in these studies is consistent with the idea that in an environment of race-based preferential college admissions policies, the labor market discounts the signaling value of college degrees held by college graduates of targeted groups. The data show that for members of targeted groups, employers place a greater weight on other signals such as class rank, choice of major, and grade-point average. As might be expected, the labor market appears to have adjusted to account for race-based preferential admissions policies.

C. *Affirmative Action Policy #2: Disadvantage-based Preferential Admissions*

As many colleges and university systems have moved away from purely race-based preferential college admission policies, they have considered other forms of affirmative action as a way of achieving ethnic diversity on campus. The current evolution in thinking has reflected a shift toward disadvantage-based preferential policies. Disadvantage-based policies can give special consideration to any number of disabilities, but primary consideration is normally low socio-economic status, a status more common in under-represented minority groups.

Although political support for disadvantage-based policies is presumably more broadly based, there are significant problems with disadvantage-based policies. The first of these problems is related to asymmetric information in the applications process. Despite the problems of race-based policies, race, nevertheless, constitutes an easily verifiable claim for preferential

treatment. Claims of disadvantage are much more difficult to verify. Consequently, asymmetric information between admissions committees and college applicants is likely to create an incentive for applicants to overstate claims of disadvantage, especially if applicants believe that other applicants are overstating their own claims. Understanding this, admissions committees are likely to begin discounting the weight of unverifiable claims of disadvantage presented in college applications. However, a claim of disadvantage that is difficult to verify, such as a dysfunctional family, may in truth represent a larger barrier to college entry than a more verifiable claim of disadvantage, such as a physical disability. In this way, problems of asymmetric information make disadvantage-based programs difficult to implement, especially if claims of disadvantage are strongly weighted in the admissions process.

Unfortunately, *unless* claims of disadvantage are strongly weighted in the admissions process, a disadvantage-based policy is unlikely to produce an increase in relative admission rates of under-represented groups. As Bowen and Bok (1998, p.47) note, "(disadvantage-based) preferences cannot be substituted for race-based policies if the objective is to enroll a class that is both academically excellent and diverse. While it is true that African-American students are much more likely than white students to come from families of low socioeconomic status, there are almost six times as many white students as African-American students who come from both low socioeconomic status families *and* have scores that are above the threshold for gaining admission to the academically selective college or university."

A simple example illustrates this point. Again consider heterogeneous disadvantage in the under-represented minority group with $c_a = 0.4$, and $c_u = 0.9$. Assume psychic costs for the over-represented majority group to be $c_a^* = 0.4$, and $c_u^* = 0.7$. Giftedness and the proportion of gifted students are constant across ethnic groups, i.e. $c_g^* = c_g = 0.4$, $c_m^* = c_m = 0.8$, and

$\gamma = \gamma^* = 0.5$; however, the fraction of advantaged students is higher in the over-represented group, $\alpha^* = 0.80$, and $\alpha = 0.50$. Let the over-represented majority and under-represented minority groups make up 80 and 20 percent, respectively, of potential college applicants.

In the absence of an affirmative action policy, only t_{ga} and t_{ga}^* choose to attend college ($c_{ga} = c_{ga}* = 0.8$), resulting in a Nash equilibrium in which the best response by employers is a strategy of (Manager | College, Mailroom Clerk | No College) given a sufficiently large differential between q_g and q_m. However, in equilibrium the fraction of college graduates from the under-represented group is only $\frac{0.2\alpha\gamma}{0.2\alpha\gamma + 0.8\alpha^*\gamma^*} = 0.135$.

Now consider the effects of a disadvantage-based preferential admissions program in which admissions officers possess full information about the relative disadvantage levels of applicants. In this program, t_u's are identified in the admissions process, given preferential admissions, and provided access to special classes and tutoring programs once enrolled. Let the reduction in psychic costs of college admission and graduation resulting from the disadvantage-based preferential policy equal $D = 0.15$.

With $D = 0.15$, for the under-represented group $c_{ga} = 0.8$, $c_{gu} = 1.15$, $c_{ma} = 1.2$, and $c_{mu} = 1.55$; for the over-represented minority group $c_{ga}^* = 0.8$, $c_{gu}^* = 0.95$, $c_{ma}^* = 1.2$, and $c_{mu}^* = 1.35$. Again, given a sufficiently large differential between q_g and q_m, a Nash equilibrium is produced in which (only) t_{ga}, t_{ga}^*, and t_{gu}^* attend college and the employer plays (Manager | College , Mailroom Clerk | No College). Yet the disadvantage-based preferential admissions policy reduces the fraction of college graduates from the under-represented group from 0.135 to $\frac{0.2\alpha\gamma}{0.2\alpha\gamma + 0.8\gamma^*} = 0.111$, an equilibrium in which no t_{gu}'s attend college.

The point is that a disadvantage-based preferential admissions policy is unlikely to increase ethnic diversity on college campuses if the range of disadvantage level is greater in the under-represented group than in the over-represented group. In our present example, the under-represented minority group is only able to achieve its proportional representation (of 20 percent) when the strength of the disadvantage-based program is increased to $D = 0.25$. In practice, however, a strong disadvantage-based program is likely to require the admission of a prohibitively large number of applicants from the over-represented majority group. Practical spatial constraints on university campuses are likely to render such a policy extremely difficult and costly under these conditions. Disadvantage-based policies thus constitute a very blunt and inefficient policy tool for achieving diversity on college campuses.

D. *Affirmative Action Policy #3: Heavy Weighting of High School Academic Rank*

In order to realize many of the goals of traditional race-based affirmative-action programs, some colleges have increased the weighting of high school academic rank in the admissions selection process (hereafter an HSAR policy) at the expense of the more traditional grade-point average and SAT score. The University of Texas, for example, now automatically grants admission to the top ten percent of the graduating class from each public high school. In February 2000, the state of Florida announced that its public universities will no longer consider race in college admissions, and instead will admit the top twenty percent of the graduating class from every state high school. The University of California is also currently implementing an HSAR admissions policy in which the top four percent of each graduating class would be automatically eligible for admission.

An HSAR admissions policy implicitly gives preferential admissions to students who graduate from high schools where average academic performance is low, such as inner-city

schools in which there is a high concentration of students from under-represented minority groups. Weighting high school academic ranking heavily in the admissions process allows a college to admit a student who ranks, for example, in the 10th percentile of her class in an inner-city high school, but who might rank in only the top 30th percentile if she attended a high school in a suburban neighborhood.

Ironically, an HSAR policy is dependent on the continued segregation of public high schools in its efforts to achieve diversity in public universities. Yet in political terms, an HSAR policy may be perceived as fairer than an overtly race-based preferential admissions policy, since other commonly used selection processes operate on a similar criterion. For example, the subset of sports teams selected for playoffs are frequently not the teams with the best overall records in the entire league, but rather the teams with the best records in their own divisions.

To study the labor market effects of an HSAR policy, let us construct an example in which a university system offers admission to the top Z percent of the graduating class from each high school in the state. In this example, assume for simplicity that (1) the population of students in both inner city and suburban areas is equally divided between t_g's and t_m's; (2) a fraction s of students from an under-represented ethnic group attend high school in the suburbs, while $r = (1 - s)$ attend inner-city high schools; (3) f_{ga}^{r} equals the fraction of those ranking in the top Z percent of their (inner-city) high school class who are t_{ga}'s from the under-represented group, f_{ga}^{s} equals the fraction of those ranking in the top Z percent of their (suburban) high school class in the under-represented group who are t_{ga}'s, and so forth; (4) in suburban high schools, where the proportion of advantaged types is very high, only t_{ga}'s are able to rank in the top Z percent of a high school class, *i.e.* $f_{gu}^{s} = f_{ma}^{s} = f_{mu}^{s} = 0$; (5) in inner city high schools, where

the proportion of advantaged types is much lower, only t_{mu}'s are unable to rank in the top Z percent of the class, *i.e.* $f_{mu}^{r} = 0$.

How does an HSAR policy affect the quality of college graduates from the under-represented group in the labor market? Using Bayes' Rule, one can calculate that $p(t_g \mid college) = \frac{sf_{ga}^{s} + r(f_{ga}^{r} + f_{gu}^{r})}{sf_{ga}^{s} + r(f_{ga}^{r} + f_{gu}^{r} + f_{ma}^{r})}$. What labor market Nash equilibria are likely to be generated for plausible values of f? First consider a "best-case" scenario in which inner-city high schools adeptly identify and prepare gifted types for college, and a large fraction of t_{ga}'s from the under-represented group living in suburban areas are able to rank near the top of their high school class. In this best-case scenario, f_{ga}^{r}, f_{gu}^{r}, and f_{ga}^{r} are relatively large, while f_{ma}^{r} is relatively small, creating a high probability that a college graduate is a gifted type, even though r may be large relative to s for the under-represented group. Because $p(t_g \mid \text{college})$ is high under this best-case scenario, the Employer is confident that a member of the under-represented group is a gifted type. Therefore under the best-case scenario, an HSAR policy can support a Nash equilibrium of (Manager | College , Mailroom Clerk | No College) even with loose restrictions on the productivity parameters, q_g and q_m (for example, even when q_m is relatively low and mistakenly hiring a t_m is costly).

However, consider the opposite case in which a low fraction of the top Z percent of suburban high school classes consist of members of the under-represented group, and degree of disadvantage rather than giftedness determines the top Z percent of the graduating class from inner-city high schools, *i.e.* f_{ga}^{r}, f_{gu}^{r}, and f_{ga}^{r} are relatively small, and f_{ma}^{r} is relatively large. Under such conditions $p(t_g \mid \text{college})$ is low; employers are not confident that college graduates from the under-represented group are gifted types. This renders the aforementioned Nash

equilibrium possible only under strong restrictions on productivity parameters (*e.g.* hiring mistakes cannot be too costly--q_m cannot be too low unless q_g is very high).

From this example it becomes clear that an HSAR policy is likely to cultivate diversity on college campuses without triggering labor market discrimination under the following conditions: First, in suburban high schools, gifted students from under-represented minority groups must be as likely to finish in the top fraction of a high school class as other gifted students. Second, inner-city high schools must create an environment in which gifted students from both affluent and under-privileged backgrounds are able to rank in the top *Z* percent of their graduating class. In short, for an HSAR policy to be effective, the top fraction of the graduating class from inner-city high schools must capture the truly gifted students in the pool, not merely the mediocre students whose supportive parents remind them to turn in their homework. (It is important to recall here our assumption that "once an *m*, always an *m*.")

Unless inner-city schools are able to develop an environment in which t_{gu}'s as well as t_{ga}'s can satisfy college admission requirements, an HSAR policy is likely to generate labor market discrimination much in the same manner as do more overtly race-based forms of affirmative action. Under an HSAR policy, labor market discrimination will be more severe: 1) the greater the disparity in socio-economic disadvantage among members of the under-represented minority group; 2) the greater the disparity in academic standards among different high schools; and 3) the greater the disparity in productivity between gifted and mediocre types.

The point here is the following: Although firms are forced to make decisions under imperfect information, firms cannot be systematically "fooled" by soft university admissions policies any more than they can be fooled into keeping prices low after a series of inflationary increases in the money supply by the Federal Reserve Board. If employers are rational, free to make their own employment decisions, and well-informed of the current policy environment, we

must believe that profit-maximizing firms make their hiring and wage decisions contingent on all the information available to them about job applicants. Therefore, it is consistent with profit-maximizing behavior for employers to statistically discriminate against groups whose signals have been dampened by preferential admissions policies if employers can identify such groups by outwardly observable characteristics. This will hold true even with policies that may be more widely perceived as relatively "fair", such as an HSAR admissions policy.

E. *Affirmative Action Policy #4: Affirmative Action directed at College Preparation*

If a wide degree of disadvantage exists within an under-represented group, problems with imperfect information dictate that there is no "cost-free" affirmative action policy to increase the proportional representation of the under-represented group. While the popular notion is that the cost of affirmative action is borne by non-targeted groups, the argument here is that many of these costs are borne by targeted groups in the form of labor market discrimination.

An alternative, for which costs are more directly borne by taxpayers instead of targeted groups, is a college-preparatory-focused (CPF) policy. A CPF policy focuses resources on college preparation of t_{gu}'s within the targeted group. The goal of a CPF policy is to vastly increase the presence of well-prepared t_{gu}'s from the targeted group in the pool of admissible college applicants. Such programs have recently begun to play a significant role in minority recruitment and preparation on many well-known university campuses. Two current examples are the Early Academic Outreach Program (EAOP) at the University of California, and the Post Secondary Readiness Enrichment Program at the University of Georgia.

The University of California's EAOP illustrates the range of activities that must be undertaken to prepare students from the targeted group for college admission.[4] The stated goal of EAOP is to significantly increase the number of educationally disadvantaged students who are

competitively eligible for admission to the University of California. Because California law now prohibits purely race-based forms of affirmative action, EAOP officially defines its targeted group as disadvantaged students. However, the program purposefully focuses its resources on relationships with California's inner-city public schools, therefore capturing a large share of African-American and Hispanic students. The program tries to identify t_{gu}'s in their partner public schools in the late elementary school years, and then directs resources toward lowering the psychic costs of college preparation for these students. The centerpiece of EAOP's approach is a rigorous summer-school program created for targeted students on college campuses, which begins as early as the summer after a student's sixth or seventh grade year. The program offers a demanding sequence of classes over the subsequent six summers, emphasizing reading, writing, mathematics, and the hard sciences. During the school year EAOP continues some of these classes after school and on Saturdays, while simultaneously offering classes in SAT test preparation and college counseling. The results of the program are impressive: In 1999, 63.7 percent of program graduates enrolled in four-year institutions, while 51.5 percent were eligible for admission to the University of California, significantly exceeding the goals for the program established by the California legislature of 55 percent and 35 percent, respectively.

A critical issue with CPF programs such as EAOP is the selection process of t_{gu}'s. Selection of t_{gu}'s by those in the K-12 system can be done in two ways: The first method of selection involves teachers and counselors identifying *gifted* students for participation in the program. A second method of selection involves teachers and counselors identifying *under-privileged* students who are then offered a college preparation "contract" that only the gifted students are likely to accept.

The principal problem with the first manner of selection for the CPF program is again related to issues of imperfect information: the success of such a program is sensitive to the

ability of teachers and counselors to accurately discern who are in fact the gifted students. Let $f_{ga}, f_{gu}, f_{ma},$ and f_{mu} represent now the fraction of college graduates of the respective types from the under-represented group graduating from college after the implementation of a CPF program. The probability then that a college graduate from the under-represented group is a gifted type is simply $p(t_g \mid college) = \frac{f_{ga} + f_{gu}}{f_{ga} + f_{gu} + f_{ma} + f_{mu}}$. Because α is likely to be small for the under-represented group, f_{ga} is likely to be small. Since it is likely that f_{mu} is zero (or close to zero), the ability of program to successfully achieve diversity on university campuses without triggering labor market discrimination hinges on the ability of teachers and counselors to accurately distinguish between t_{gu}*'s* and t_{ma}*'s*. If f_{gu} is low relative to f_{ma}, $p(t_g \mid college)$ falls, and labor market discrimination against the under-represented group in the context of a CPF policy becomes more likely. In light of this, a battery of tests has emerged in recent years to identify t_{gu}'s in the K-12 system.[5]

A clear policy alternative is for teachers and counselors in the K-12 system to select a group of *under-privileged* students (which may constitute a majority in many public schools) and present these students and their families with the option of participating in a demanding college preparatory program. In this way, the process of determining who participates in the CPF program operates by self-selection. This idea, based on the well-known Revelation Principle (Myerson, 1983), is to offer a "contract" to all under-privileged students that only t_{gu}'s are inclined to accept. Specifically, a program can be offered to all under-privileged students that lowers psychic costs of gaining college admission by *P*, where the strength of *P* must lie between $c_{gu} - w$ and $c_{mu} - w$. This kind of contract could even include stipends for completing

successive levels of the program to defray costs of lost part-time work. (It may be helpful to think of P in terms of the resources allocated to each student in the preparatory process.)

In the context of *homogeneous* disadvantage within the under-represented group, P must therefore lie between 0.2 and 0.6. Using our parameters reflecting *heterogeneous* disadvantage, a program that will be voluntarily adopted by t_{gu}'s, but not by t_{mu}'s must be characterized by P that lies between 0.3 and 0.7. In the latter example, a CPF program with P greater than 0.7 will be adopted by both t_{gu}'s and t_{mu}'s, but a program with P less than 0.3 will be refused even by t_{gu}'s since the level of assistance in such a program is insufficient to entice the t_{gu} to invest in the college preparatory process. A CPF program can achieve these ends by striking a balance between a demanding level of scholarly commitment by students involved in the program, and a commitment by teachers and counselors to labor for the success of each individual student.

III. SUMMARY AND POLICY CONCLUSIONS

The use of affirmative action in college admissions is one of the most controversial topics in higher education. This paper has employed a simple two-player signaling model to analyze the labor market effects of four different types of affirmative action programs that are in use or being considered by colleges today: purely race-based preferential admissions, disadvantage-based preferential admissions, policies that admit based on high school academic rank (HSAR policies), and college-preparatory-focused (CPF) policies. A summary of the findings from the analysis can be viewed in Table 1.

The paper shows that moderate levels of race-based preferential admissions can benefit both employers and gifted members of under-represented minority groups by providing an opportunity for these individuals to signal their ability to employers in the labor market. This is more likely where there is a homogeneous level of disadvantage within the under-represented

group. However, if race-based preferential admissions policies are too strong, especially when there is strong heterogeneity in the degree of disadvantage within the targeted group, race-based policies are likely to generate labor market discrimination against targeted groups.

Disadvantage-based preferential admissions are plagued by issues related to asymmetric information and verifiability of students' claims of disadvantage in the college application process. Moreover, disadvantage-based policies may require the admission of an overwhelming number of students from *over*-represented groups to significantly increase the proportional representation of *under*-represented groups.

Several major state university systems are shifting from an emphasis on grade-point average and SAT score to placing a heavy admissions weighting on high school academic rank. When a high degree of racial segregation exists in public schools, an HSAR policy can help colleges to reach goals of campus diversity without the official use of race-based preferential policies. However, because an HSAR policy functions as a *de facto* race-based policy, it is susceptible to generating labor market discrimination in the same way as do preferential admissions policies. Nevertheless an HSAR policy may be able to avoid inducing labor market discrimination if gifted members of the under-represented minority group are able to compete for a high academic class ranking on an equal level with other students in affluent areas, and the main determinant of relative academic success in inner-city high schools is giftedness rather than disadvantage level.

If colleges are unwilling to commit significant resources toward the college preparation of targeted groups, a trade-off remains between admitting a small number of students from under-represented groups, and inducing labor market discrimination against groups targeted by preferential admissions policies. A CPF policy focuses specifically on the college preparation of gifted, but disadvantaged, students from under-represented groups.

The costs of a CPF policy are more conspicuous than the other policies because they occur directly within the operating budgets of participating academic institutions, but they are likely to be lower than the hidden costs of labor market discrimination. CPF policies do not induce labor market discrimination since program beneficiaries gain acceptance into degree programs through standard channels and without the aid of preferential admissions policies.

The political disadvantage of CPF policies are, nevertheless, that the cost of their programs (at least at public universities) are borne directly by taxpayers. Currently the University of California spends $60 million in its EAOP outreach and college preparation program for students from under-represented minority groups (Los Angeles Times, 7/19/98). Yet even this figure (which has doubled since the termination of race-base preferential policies) would have to increase substantially for a CPF program to allow college campuses to reflect the ethnic diversity of, in this case, the State of California as a whole. CPF policies entail real public expenditures, but it is important to understand that they also produce real returns in the labor market for program participants, in effect representing a progressive transfer from taxpayers to low-income households. The positive externalities of ethnic diversity in the pool of college graduates as documented by the Bowen and Bok (1998) study additionally justify such expenditures.

Moreover, the marginal cost of CPF programs may not be as high as one might think. Many of the costs of CPF programs are actually sunk costs from the perspective of colleges themselves, such as the excess capacity in classrooms and dormitory space that often exists on college campuses during the summer months. Furthermore, in staffing CPF programs, schools can utilize the domestic pool of graduate students, advanced undergraduates, and former program participants, who may also serve as excellent role models for younger students. For the latter reason, it may be true that a public university system may actually have a comparative advantage in college preparation for many students relative to their K-12 systems.

In concluding, it is important to note that the fundamental insights yielded by the model hold even when some of its basic assumptions are relaxed. In a signaling model, the function of higher education is to serve as a screening device for the labor market, yet the policy conclusions of the model hold even if education also enhances productivity. What is critical is that gifted types retain a productivity advantage over mediocre types even after graduation.

Future research in this area should involve a collaboration of economists, political scientists, and educational policymakers in the development of affirmative action policies that are politically feasible, can be implemented under tight university budgets, and that do not induce labor market discrimination. A specific focal point of this collaboration could be in the design of college preparatory programs that are sufficiently rigorous to appeal only to truly gifted students, but sufficiently generous that they reach students from even the most severely disadvantaged backgrounds.

Table 1
Affirmative Action Policy Comparison
(c_g = 0.4 and c_m = 0.8)

Type of Program:	Policy Environment:	Psych. Cost Parameters:	Policy Parameters	t_g's to college?	Labor Market Discrimination
No Affirmative Action Policy	Homogeneous Disadvantage	c_a = 0.7 c_u = 0.8	R = 0	None	_
	Heterogeneous Disadvantage	c_a = 0.4 c_u = 0.9	R = 0	t_{ga} only	none
Race-based Preferences	Homogeneous Disadvantage	c_a = 0.7 c_u = 0.8	R = 0.25	all t_g	none
	Heterogeneous Disadvantage	c_a = 0.4 c_u = 0.9	R = 0.25	?	severe
Disadvantage-based Preferences	Heterogeneous Disadvantage	c_a = 0.4 c_u = 0.9	D = 0.15	t_{ga} only	none, but t_g hard to identify
	Heterogeneous Disadvantage	c_a = 0.4 c_u = 0.9	D = 0.25	all t_g	none, but t_g hard to identify
Use High School Academic Rank	Homogeneous Disadvantage	c_a = 0.7 c_u = 0.8	Admit top Z percentile	city t_{ga} and t_{gu}?	probably minimal
	Heterogeneous Disadvantage	c_a = 0.4 c_u = 0.9	Admit top Z percentile	city t_{ga} only ?	potentially severe
College Prep. Focus	Homogeneous Disadvantage	c_a = 0.7 c_u = 0.8	P$\in$(0.2, 0.6)	all t_g	none if proper "contract" offered
	Heterogeneous Disadvantage	c_a = 0.4 c_u = 0.9	P$\in$(0.3, 0.7)	all t_g	none if proper "contract" offered

REFERENCES

Becker, Gary S., *The Economics of Discrimination*, University of Chicago Press, Chicago , 1957.

Bound, John and Richard B. Freeman, "What Went Wrong? The Erosion of the Relative Earnings and Employment among Young Black Men in the 1980s," *Quarterly Journal of Economics*, 62:4, Winter 1992, pp. 201-232.

Bowen, William G. and Derek Bok, *The Shape of the River: Long-Term Consequences of Considering Race in College and University Admissions,* Princeton University Press, Princeton, NJ, 1998.

Coate, Stephen, and Glenn C. Loury, "Will Affirmative Action Policies Eliminate Negative Stereotypes?" *American Economic Review*, 83:5, December 1993, pp.1220-40.

Carlson, Leonard and Caroline Swartz, "The Earnings of Women and Ethnic Minorities, 1959-1979" *Industrial and Labor Relations Review*, 41:4, July 1988, pp 530-45.

Datcher Loury, Linda, and David Garman, "Affirmative Action in Higher Education." *American Economic Review Papers and Proceedings*, May 1993, 83:2, pp.99-103.

Gaynor, Patricia and Garey Durden, "Measuring the Extent of Earnings Discrimination," *Applied Economics*, 27:8, August, 1995, pp.669-676.

Leonard, Jonathan S, "Women and Affirmative Action," *Journal of Economic Perspectives*, 3:1, Winter 1989, pp.61-71.

_____, "The Impact of Affirmative Action Regulation and Equal Employment Law on Black Employment," *Journal of Economic Perspectives*, 4:4, Fall 1990, pp.47-63.

Myerson, Roger B., "Mechanism Design by an Informed Principal," *Econometrica* 51:1, 1983, 767-98.

Sowell, Thomas, *Preferential Policies: An International Perspective,* William Morrow and Company, Inc., New York, NY, 1990.

Spence, A. Michael, *Market Signaling: Information Transfer in Hiring and Related Screening Processes,* Harvard University Press, Cambridge, MA, 1974.

Steele, Shelby, *The Content of Our Character,* St. Martin's Press, New York, NY, 1990.

_____, *A Dream Deferred: The Second Betrayal of Black Freedom in America,* HarperCollins, New York, NY, 1998.

Trejo, Stephen, "Why Do Mexican Americans Earn Low Wages?" *Journal of Political Economy,* 105:6, December 1997, pp. 1235-68.

Welch, Finis, "Affirmative Action and Its Enforcement," *American Economic Review*, 71:2 May 1981, pp. 127-133.

Wilson, William J., *The Truly Disadvantaged,* University of Chicago Press, Chicago, IL, 1987.

_____, *When Work Disappears,* Knopf Publishers, New York, NY, 1996.

Wydick, W. Bruce, "A Game-Theoretic Analysis of Affirmative Action in College Admissions", University of San Francisco, unpublished manuscript, 2000.

Footnotes:

---

* This is a revision of a paper presented at the Western Economic Association International 73rd annual conference, Lake Tahoe, June 30, 1998. The author thanks Vai-Lam Mui, Debra Reed, Richard Wydick, seminar participants at Stanford University, and two anonymous referees for valuable comments. *Wydick:* Assistant Professor, Department of Economics, University of San Francisco, California. Phone 415-422-5863, E-mail wydick@usfca.edu.

[1] A significant debate has taken place in the literature since the pioneering work of Spence (1973) which focuses on the issue of understanding the positive empirical relationship between education and earnings. Human capital theorists view education as productivity enhancing, while others view the educational system as a screening device for the labor market, e.g. MBA's are paid more because only a high-ability type can complete an MBA.

[2] For purposes here, define a "gifted" type as a student who possesses a sufficient combination of creativity, learning ability, analytical skill, insight, perseverance, and adaptability that with sufficient opportunity and guidance in pre-college preparation, is able to enter and complete a rigorous college degree program without the need for special assistance at the college level.

[3] Technically speaking, the Nash equilibria presented in this paper are *separating* and *pooling* perfect Bayesian Nash equilibria in which different types of "senders" relay different (or similar) messages to a "receiver" in an equilibrium which is also determined by players' updated beliefs. However, for simplicity of exposition the present model assumes that players' actions are always consistent with their beliefs.

[4] By 1998-99, the University of California's Early Academic Opportunity Program had developed collaborative relationships with 514 public schools in California that enroll a high percentage of students from under-represented groups. This includes 15,960 students in 198

junior high/middle schools, and 61,834 students in 316 high schools. Programs include summer and Saturday academic training, SAT preparation workshops, and after-school tutoring in mathematics, English and science. (For more detailed information about the program, see www.EAOP.org.)

[5] There has been a recent proliferation of new tests used to correctly identify t_{ga}'s. These include the Bial-Dale College Adaptability Index, based on a novel test involving a Lego block construction project, a leadership test, and personal interviews, which the University of Michigan and Pennsylvania State University among others are using to admit some students. The Educational Testing Service now has a "strivers" equation to flag over-achieving, disadvantaged students. (WSJ 11/19/1999).