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ASSESSING AFFIRMATIVE ACTION

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ABSTRACT

Although the debate over Affirmative Action is both high-profile and high-intensity, neither side's position is based on a well-established set of research findings. Economics provides an extensive, well-known literature on which to draw regarding the existence and extent of labor market discrimination against women and minorities, although views may often conflict, and a less extensive but also well-known literature on the effects of Affirmative Action on the employment of women or minorities. However, research by economists provides much less evidence and even less of a consensus on the question of whether Affirmative Action improves or impedes efficiency or performance, which is perhaps the key economic issue in the debate over Affirmative Action. This review focuses on all of these issues regarding Affirmative Action, but the major focus is on the efficiency/performance question.

All in all, the evidence suggests to us that it may be possible to generate Affirmative Action programs that entail relatively little sacrifice of efficiency. Most importantly, there is at this juncture very little compelling evidence of deleterious efficiency effects of Affirmative Action. This does not imply that such costs do not exist, nor that the studies we review have captured the overall welfare effects of Affirmative Action. It does imply, though, that the empirical case *against* Affirmative Action on the grounds of efficiency is weak at best.

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I. Introduction

The future of Affirmative Action in the United States is uncertain. Proposition 209 in California, passed in 1996, prohibits all government institutions from "discriminating against or giving preferential treatment to any individual or group in public employment, public education, or public contracting on the basis of race, sex, color, ethnicity, or national origin."[1] A similar initiative (Initiative 200) passed in 1998 in Washington. Recent court cases (such as *Adarand v. Pena*) set up strict standards for race-conscious programs to pass constitutional muster. Legislation or referenda pending in many states may further circumscribe Affirmative Action programs. On the other hand, public opinion polls still indicate public support for some forms of Affirmative Action (The Gallup Organization, 1997),[2] and the Clinton Administration is committed to "support affirmative action measures that promote opportunities in employment, education and government contracting for Americans subject to discrimination or its continuing effects" (White House Memorandum, July 19, 1995).

Although the debate over Affirmative Action is both high-profile and high-intensity, neither side's position is based on a well-established set of research findings. Economics provides an extensive, well-known literature on which to draw regarding the existence and extent of labor market discrimination against women and minorities, although views may conflict (see, e.g., Darity and Mason, 1998, and Heckman, 1998), and a less extensive but also well-known literature on the effects of Affirmative Action on the employment of women or minorities (see, e.g., Leonard, 1989, 1990). However, research by economists provides much less evidence and even less of a consensus on the question of whether Affirmative Action improves or impedes efficiency or performance, which is perhaps the key economic issue in the debate over Affirmative Action. This review focuses on all of these questions regarding Affirmative Action, but the major focus is on the efficiency/performance question. Aside from being a central economic policy question, the research findings that potentially bear on this question are less well-known, appear (often recently) in a wide-ranging

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[1]An earlier 1995 decision by the University of California Board of Regents eliminated the use of race as a factor in undergraduate and professional school admissions.

[2]This needs to be qualified. Support for Affirmative Action appears to drop substantially, especially among whites, when questions are couched in terms of "preferential treatment" or quotas (Lipset and Schneider, 1978; Kluegel and Smith, 1986; Kinder and Sanders, 1990; Civil Rights Monitor Leadership Conference on Civil Rights Online Monitor). This was illustrated dramatically in developments surrounding a Houston ballot measure (Proposition A) to ban Affirmative Action in city contracting and hiring, which was voted down in 1997. Proponents of the ban originally collected signatures for a proposition to ban "discrimination" and "preferential treatment," but the City Council reworded the proposition that went on the ballot to ask whether the city should ban Affirmative Action.

set of disciplines and journals, and have not been reviewed, synthesized, and evaluated so as to provide researchers and policy-makers with a thorough understanding of our current state of knowledge.

Illustrating the absence of a research base with which to assess Affirmative Action, the Clinton Administration's extensive *Review of Federal Affirmative Action Programs* (Stephanopoulos and Edley, 1995) draws on empirical evidence limited nearly exclusively to discrimination and to the effects of Affirmative Action on boosting employment, university admissions, or contracting among women or minorities.[3] Critics also typically fail to base their view on empirical evidence. Steele (1990), for example, levels numerous charges against Affirmative Action, including that it "offers entitlements, rather than development, to blacks" (p. 89), that "blacks ... stand to lose more from it than they gain" from it (p. 113), that Affirmative Action results in the "lowering of normal standards to increase black representation" (p. 117), and does "nothing whatever to stop the very real discrimination that blacks may encounter" (p. 121). Each of these claims is inherently empirical, yet no evidence is offered to support them.

Our review in this paper aims to delineate the key questions economists should be asking about Affirmative Action to adequately assess the set of policies it represents, and to point out the (unfortunately ubiquitous) shortfalls between what we do know and what we would like to know.[4] At the same time, there is a nascent literature that, in our view, begins to ask and answer some of the right questions.

II. An Overview of Affirmative Action

To begin, we require a definition of Affirmative Action. In principle, at least, Affirmative Action can be distinguished from other anti-discrimination measures by requiring pro-active steps (hence the phrase "affirmative") to erase differences between women and men, minorities and non-minorities, etc., in contrast to laws that only prevent employers from taking steps that disadvantage minorities in the labor market, such as refusing to hire them. However, it is more difficult to construct a working definition of Affirmative Action policies, for a number of reasons. First, the definition of Affirmative Action as a specific "policy" is fuzzy, since it is more an amalgam of components of other legislation and of court rulings than a single coherent policy. Second, Affirmative Action is commonly used to refer to

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[3]The only evidence it presents on efficiency/performance questions is based on examining whether in open-ended survey responses contractors happened to suggest that Affirmative Action operated like a quota system (Section 6 of the *Review*). Since this question was not directly posed, the fact that only a small number of respondents made this suggestion is not very informative.

[4]Our focus on questions of direct interest to economists dictates that we give short shrift to political or philosophical issues, such as the "procedural fairness" of Affirmative Action (e.g., Folger and Konovsky, 1989). However, later we briefly note that these considerations may have economic ramifications, if workers' behavior depends on perceived fairness.

policies or behavior in different spheres, including employment, education, and government contracting. Third, Affirmative Action may operate at a number of different levels and in a number of different ways, including public vs. private, federal vs. state vs. local, and involuntary vs. voluntary. Fourth, Affirmative Action may cover many different activities, including recruitment, training, hiring, promotion, etc. Finally, the status of Affirmative Action is undergoing change contemporaneously, as a result of both policy initiatives and court rulings. Our approach in this survey is to cover the relevant literature without restricting attention to any particular subset of policies, strategies, etc., that fall under the rubric of Affirmative Action in the civilian sector. In the remainder of this section we provide an overview of the different dimensions, definitions, and domains of Affirmative Action.[5]

A. Affirmative Action in the Labor Market vs. Equal Employment Opportunity Enforcement

To better understand the potpourri of policies, court rulings, etc., that comprise Affirmative Action, Table 1 provides a summary of executive orders and court rulings that might be regarded as encompassed by Affirmative Action in the labor market.[6] Executive Order 11246 (which restated an earlier Kennedy Executive Order) is probably the single "policy" most commonly interpreted as establishing Affirmative Action (Leonard, 1989), because this order is most strongly linked with the interpretation of Affirmative Action as emphasizing numerical yardsticks with respect to the hiring of minorities and women. In particular, in the initial implementation of Executive Order 11246, the Department of Labor developed what is referred to as the "Philadelphia Plan," which aimed to increase minority representation in construction and is viewed as the "precursor of the numerical "goals and timetables" obligations of federal contractors" (Bloch, 1994, p. 70). Currently, employers with federal contracts and 50 or more employees, or with contracts worth $50,000 or more, are required to file reports indicating "underutilization" of women or minorities in any job group in which minorities or women are underrepresented. Contractors are then obliged to address this underutilization by making corrective efforts including the use of written "goals and timetables." Contractors may be sued and barred from federal contracts if they are judged to be discriminating or not pursuing Affirmative Action, although apparently this latter outcome is rare (Stephanopoulos and Edley, 1995).

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[5]For fuller discussions, see Edley (1996), and the *Review of Federal Affirmative Action Programs* (Stephanopoulos and Edley, 1995).

[6]For thorough discussions of the legislation, rulings, etc., listed in Table 1 see, e.g., Epstein (1992), Bloch (1994), Stephanopoulos and Edley (1995), Edley (1996), and Radford (1997).

However, other legislation that has ostensibly targeted discrimination in the workplace has also led to Affirmative Action, in practice.[7] Title VII of the Civil Rights Act, which established Equal Employment Opportunity as law, allows for Affirmative Action as a means of remediation for past discrimination. While the main focus of this legislation is the prohibition of discrimination in employment, the act also allows the courts, when finding that an employer is engaging in an unlawful employment practice, to "order such affirmative action as may be appropriate, which may include reinstatement or hiring of employees ..." As indicated in some of the key court rulings summarized in Table 1, this provision of Title VII has served as the basis for court-ordered Affirmative Action plans, although the courts have gone back and forth on what is allowed or encouraged under Title VII.

In addition to the absence of a clear legal distinction between Affirmative Action and Equal Employment Opportunity legislation, in practice the difference is muddied further. Many employment discrimination cases concern hiring, and are based on evidence of "disparate impact," according to which underrepresentation of women or minorities–relative to some suitably-defined pool of job candidates–is sufficiently large to support an inference of discrimination. Much of the argument in such cases concerns the definition of the appropriate candidate pool (see, e.g., Epstein, 1992, Ch. 18). But regardless of how this issue is settled, it is obvious that employers concerned with a possible disparate impact discrimination claim will seek to ensure that women and minorities are adequately represented among their hires. Indeed, EEOC guidelines for defining disparate impact essentially establish a system of numerical yardsticks, embodied in the "80%" or "four-fifths" rule, which states that "A selection rate for any race, sex, or ethnic group which is less than four-fifths ... of the rate for the group with the highest rate will generally be regarded by the Federal enforcement agencies as evidence of adverse impact..." (*Code of Federal Regulations*, Section 1607.4D, 1997). This is easily monitored for many companies, as all employers with 100 or more employees are required to file EEO-1 reports indicating the percentages of female and minority workers in broad occupational categories.[8]

Thus, in our view an analysis of Affirmative Action in the labor market should not be limited solely to the effects associated with contractor status, but ought to focus as well on policies or actions that might encourage anything

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[7]Conversely, Executive Order 11246, usually associated with Affirmative Action, has an explicit anti-discrimination component. The *Review of Federal Affirmative Action* (Stephanopoulos and Edley, 1996) reports that because the Office of Federal Contract Compliance Programs (OFCCP) is responsible for enforcement of both the Affirmative Action and non-discrimination components of this order, contractors are often confused and incorrectly attribute requirements to hire a woman or minority worker to remedy past discrimination to Affirmative Action, rather than to anti-discrimination efforts.

[8]Bloch (1994, p. 105) suggests that "noncontractors required to file EEO-1 reports that are monitored by the EEOC ... would not be acting rationally if they were to avoid hiring minorities and women."

other than race- or sex-blind behavior in the labor market.[9] Using a broad working definition provides a more thorough analysis of the tapestry of policies that might be regarded as "Affirmative Action," and that might be affected by policies barring any form of preferential treatment based on race, sex, or other criteria. In addition, this broad definition clarifies our view that the position of some critics of Affirmative Action–that we can do away with Affirmative Action but maintain vigorous enforcement of anti-discrimination laws (i.e., "color blindness")–is to some extent based on an artificial distinction.[10] Laws barring race- or sex-conscious behavior in hiring, promotions, etc., are likely to undermine not only explicit forms of Affirmative Action, but also any prohibitions of discrimination that rely on disparate impact analyses for their enforcement.[11]

B. Affirmative Action in Education and Contracting

There are no explicit federal policies regarding Affirmative Action in university admissions. However, universities have implemented Affirmative Action admissions policies that are widely regarded as giving preferential treatment to women and minority candidates. As outlined in Table 2, such admissions policies initially came under attack in the *Bakke* case, in which the Supreme Court declared that policies that set aside a specific number of places for minority students violated the 14th Amendment of the U.S. Constitution, which bars states from depriving citizens of equal protection of the laws. As a consequence, the courts have ruled that the 14th Amendment applies to Affirmative Action programs at state and local levels of government. However, while this decision is viewed as declaring strict quotas illegal, it is also interpreted as ruling that race can be used as a "flexible factor" in university admissions (Edley, 1996, p. 58).[12] Affirmative Action in university admissions most recently suffered serious setbacks as a result of Proposition 209 in California, and a court ruling against the University of Texas Law School in *Hopwood*

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[9]Note that this broad working definition of Affirmative Action is quite similar to that adopted in the Clinton Administration's *Review of Federal Affirmative Action Programs* (Stephanopoulos and Edley, 1996). The authors of that review defined Affirmative Action as "any effort taken to expand opportunity for women or racial, ethnic and national origin minorities by using membership in those groups that have been subject to discrimination as a consideration..." (footnote 1). Welch (1981) takes a similarly broad (if not broader) view, using Affirmative Action to refer to the full apparatus of anti-discrimination policies, rulings, etc.

[10]For example, Steele (1990) writes, "I would ... like to see affirmative action go back to its original purpose of enforcing equal opportunity–a purpose that in itself disallows racial preferences" (p. 123). See also Carter (1991).

[11]They would presumably still leave open "disparate treatment" cases, which rest on explicit instances of discriminatory behavior.

[12]Specifically, the decision allowed admissions officers to "take race into account" as a means to secure the educational benefits of a student body with diverse backgrounds and experience (Bowen and Bok, 1998, p. 8).

v. State of Texas. The latter addresses an admissions program that granted preferential treatment to minorities in the evaluation of grade point averages and test scores. Proposition 209 addressed preferential treatment in any program, although most of the attention has focused on its impact on university admissions.

In addition to admissions procedures, financial assistance programs may give preferential treatment to particular minority groups. A well-known example was the Banneker program for black students at the University of Maryland, which ran parallel to another color-blind program, but with lower scoring thresholds (Edley, 1996). In *Podberesky v. Kirwan*, the Supreme Court let stand a Circuit Court ruling that this program violated the 14th Amendment. However, the Circuit Court ruling clarified that such programs were not necessarily unconstitutional. To pass muster, two criteria had to be met. First, a program must be based on a "compelling government interest," in this case a remedy for past discrimination. Second, it must be narrowly tailored to the specific problem of past discrimination it addresses. These two criteria were established as "strict scrutiny" for race-based state and local Affirmative Action measures, in a 1989 case regarding a contracting program (*City of Richmond v. J.A. Croson Co.*).

Aside from scholarships, other programs also seek to increase underrepresentation of women or minorities through incentives for higher education. A partial list of these includes Department of Education programs to encourage minority students to become teachers, Health and Human Services programs to encourage minorities to enter the health professions, National Science Foundation programs targeting both minorities and women, and federal aid to historically black colleges and universities (Stephanopoulos and Edley, 1995). These programs may come under scrutiny in the future, but as federal programs are not subject to the 14th Amendment.

The third major component of Affirmative Action is contracting and procurement programs. At the federal level, these have principally taken the form of preferential treatment in bidding (such as sole-source contracting for small projects (the section 8(a) program), "bid price preferences," and "rule-of-two set-asides") for Small/Disadvantaged Businesses (SDBs), and Small Business Administration (SBA) programs of technical assistance.[13] These contracting and procurement programs focus more on minorities than women.[14] Some have been

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[13]Bid price preferences allow contracting officers to add a specified amount to non-SDB bids (typically 10% at the federal level) and then to award the contract based on the adjusted bids. Rule-of-two set-asides allow contracting officers to "limit bidding on a particular contract to ... SDB's if two or more such firms are potential bidders and the officer determines the prevailing bid will likely be within 10 percent of the fair market price" (Stephanopoulos and Edley, 1995, Section 9).

[14]The *Review of Federal Affirmative Action Programs* (Stephanopoulos and Edley, 1995, Section 9) states that eligibility for these programs "is targeted to minority-owned businesses (and in some cases non-minority women-

dropped or modified in response to court decisions discussed below. In addition to the federal level, numerous states and localities have used programs aimed at increasing the share of contracts awarded to minority-owned businesses.

As summarized in Table 3, court rulings in the last decade or so have challenged the legal standing of such programs. *City of Richmond v. J.A. Croson Co.* established strict criteria ("strict scrutiny") that must be met for state programs to be legal. However, because the 14th Amendment applies to state and local government policies, court rulings restricting federal programs (*Fullilove v. Klutznick* and *Metro Broadcasting, Inc. v. FCC*) initially applied less strict standards ("intermediate scrutiny"). However, in *Adarand Constructors, Inc. v. Pena*, the Supreme Court ruled that strict scrutiny could also apply to federal programs. The Court ruled that federal race-conscious programs will be evaluated on the basis of the 5th Amendment to the U.S. Constitution, which guarantees that citizens shall not "be deprived of life, liberty, or property, without due process of law," with much the same interpretation with which the Court had applied the 14th Amendment to non-federal programs. These various rulings do not prohibit race-based programs at any level of government, although they do raise the standards for their legal justification. It is too early to be able to characterize how local, state, and federal programs will ultimately be shaped in response to these rulings.

C. Variation in Affirmative Action

Aside from the distinction between federal vs. state and local programs, there are other important sources of variation in Affirmative Action. First, Affirmative Action can arise not just in the public sector, but in the private sector. Second, Affirmative Action may be used voluntarily or involuntarily. As noted above, involuntary Affirmative Action plans may be implemented in the private sector as a court-ordered remedy for past discrimination. Such involuntary plans are authorized by Section 706(g)(1) of Title VII of the Civil Rights Act, which allows a court to "order such affirmative action as may be appropriate, which may include reinstatement *or hiring of employees*, ..." (italics added).[15] Voluntary Affirmative Action plans may be initiated by employers in order to accomplish some other goal, such as avoiding EEOC violations or becoming eligible for federal contracts. Alternatively, an employer may

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owned businesses), but by statute available more broadly to "socially and economically disadvantaged" individuals." The targeting toward minorities is implemented via definitions of these terms, in particular because "By statute, persons from certain racial and ethnic groups–but not women–are presumed to be socially disadvantaged." On the other hand, the *Review* suggests that for some agencies (notably, the Department of Transportation), SDB programs make all women eligible.

[15]However, such plans are limited by language in Section 703(j) indicating that Title VII shall not be interpreted as requiring any employer "to grant preferential treatment to any individual or to any group" on the basis of their race, sex, etc. Clearly these sections of Title VII leave some ambiguities as to precisely what type of Affirmative Action is permissible.

perceive direct benefits from increased hiring of underrepresented groups, perhaps because it broadens a company's appeal to its customers (Radford, 1997). As indicated in the description of *United Steelworkers of America v. Weber*, in Table 1, the Supreme Court has attempted to establish criteria under which voluntary Affirmative Action plans are permissible under Title VII; note that Title VII regulates private Affirmative Action, in contrast to the application of the 14th Amendment to public Affirmative Action.

Variation also exists because Affirmative Action goals may be pursued through a number of different channels. For example, in the labor market Affirmative Action may influence the "pre-hiring" stages of recruitment and screening, hiring itself, or "post-hiring" behavior such as training or promotion. Similarly in a university setting, Affirmative Action may affect recruiting, admissions, or remedial education. As an example, drawing on some of our own research (Holzer and Neumark, forthcoming and 1998), we find that employers using Affirmative Action tend to hire minorities who are less qualified in terms of some readily-observable measure of qualifications such as education; this suggests that, as critics of Affirmative Action contend, it leads to hiring of less-qualified minority workers. Yet we also find that employers using Affirmative Action recruit more extensively and use more intensive screening of job candidates, which raises the possibility that employers are uncovering other information about minority workers that offsets their lower educational qualifications. Thus, if we do not try to look at the gamut of behaviors or outcomes that Affirmative Action might influence, we may be led to incorrect assessments about its effects.

D. An Uncertain Future

The final difficulty that arises in defining and assessing Affirmative Action is that it is currently in flux. In addition to uncertainty over the effects that policies and rulings such as Proposition 209, Initiative 200, and *Adarand* will have on the shape of Affirmative Action programs, additional referenda, legislation, and court cases loom in many states.[16] These all raise questions about the ways in which Affirmative Action might be circumscribed in the future. There is also uncertainty about how existing policies might be modified to achieve some of the goals of Affirmative Action while remaining within the parameters of the law as interpreted by the Supreme Court. For example, in

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[16]Two leading pending court cases are *Gratz and Hammacher/Grutter v. The Regents of the University of Michigan*, filed in 1997, which challenges undergraduate admissions procedures at that university alleging unlawful preference to minorities, and *Smith v. University of Washington Law School*, also filed in 1997, which challenges Affirmative Action in admissions. As another example, a bill was recently introduced in the Michigan House to amend the state constitution to ban any preferential treatment based on race, sex, religion, etc., in employment, public education, or public contracting; similar bills are being considered in other states (see the Civil Rights Monitor Leadership Conference on Civil Rights Online Center).

response to the *Hopwood* decision, in 1997 the Texas State Legislature passed a bill to admit all students in the top ten percent of their high school class, regardless of their test scores. One critical question is the extent to which such policies will still target groups that may have received preferential treatment in the past. As Bowen and Bok (1998) point out, such a policy will do less for blacks, in particular, because they are only "half as likely as whites to finish in the top 10 percent of ... [their] high school class" (p. 272). On the other hand, minority students at highly segregated schools would likely see their chances of admission increased under such a proposal.

III. Is Affirmative Action Likely to "Level the Playing Field?"

In this section we attempt to assess the merit of the "principle" of Affirmative Action. That is, before trying to assess how Affirmative Action works in practice, we consider the prior question of whether an "ideal" policy of Affirmative Action (i.e., taking race and sex into account) is more likely to "level the playing field" or to generate reverse discrimination. Two issues arise in attempting to answer this question. The first is whether significant discrimination against minorities and females persists in the labor market, in which case it is more likely (although not a given) that Affirmative Action can help to level the playing field by countering discrimination. We therefore begin by providing our assessment of the evidence on discrimination. We also discuss more general issues of unequal economic access, which might be thought of as a form of "societal discrimination," and specifically unequal opportunities in education and entrepreneurship.

The second issue–assuming that discrimination persists (which is our assessment)–is whether Affirmative Action is likely to be a helpful policy. In theory, the "redistribution" effects are clear, and in Section IV we review evidence on shifts in employment, admissions, etc., generated by Affirmative Action. The more difficult question, however, and the one of central interest to economists, concerns the efficiency effects of the policy. In this section, then, we also review the theoretical literature that asks whether policies that explicitly or implicitly make race or sex a consideration are likely to improve the workings of labor markets that are influenced by discrimination. We also consider the potential efficiency effects of Affirmative Action in university admissions and government contracting. One might think that if discrimination exists making an informed decision about the appropriateness of Affirmative Action would be straightforward. Thinking simplistically, Affirmative Action policies are likely to reduce efficiency in a world with no discrimination by leading to the hiring and promotion of less-qualified women and minorities. On the other hand, in the presence of discrimination Affirmative Action should increase efficiency, by discouraging the

hiring and promotion of less-qualified white males over more-qualified women and minority workers. It turns out, however, that this question is more complicated than this simple dichotomy suggests.

A. Is the Playing Field Level? Evidence on Labor Market Discrimination

The primary approaches to testing for race or sex discrimination in the labor market include: 1) wage regression tests; 2) audit studies; 3) direct evidence on the relative wages and productivities of different demographic groups; and 4) direct evidence on employer characteristics and behavior.[17] Below, we review evidence from each of these approaches, and offer our reasons for concluding that the overall evidence points to some continuing discrimination against women and blacks. Before doing so, though, one issue that must be addressed in any economic analysis of discrimination is whether, as originally suggested by Becker (1971), market competition precludes discrimination. Although some researchers (e.g., Fuchs, 1988; O'Neill, 1994) have used Becker's framework to dismiss the possibility that race or sex differences in labor markets could reflect discrimination, Becker was careful to specify the conditions under which his "market competition" result holds, and conversely those under which it does not hold. Moreover, there is very little empirical evidence on whether market competition roots out discrimination (see Hellerstein, et al., 1997). Thus, while this argument has to be taken seriously, there are neither theoretical nor empirical grounds for dismissing evidence of discrimination out of hand.[18]

1. Earnings/Employment Regressions. The traditional approach to the analysis of race/sex discrimination has been the estimation of regressions of the log of wages or earnings on observable determinants of productivity that are not themselves, at least in principle, attributable to race or sex.[19] Residual differences are then estimated either as the coefficients on dummy variables for race or sex, or from decompositions of overall race or sex differences into those based on differences in observable characteristics versus those based on differences in coefficients (e.g., Oaxaca, 1973; Neumark, 1988). Of course, any residual race/sex differences can be interpreted as discrimination or as unobserved

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[17]Evidence on labor market discrimination against minorities and women has recently been reviewed quite extensively (Blau, 1998; Darity and Mason, 1998; Heckman, 1998; Altonji and Blank, forthcoming). Here we provide a shorter summary of this evidence than is provided in these reviews.

[18]There are also theoretical models in which discrimination can persist. Black (1995) offers a search model with wage differentials stemming from discriminatory tastes in equilibrium. Kahn (1991) shows that customer discrimination can persist and create a discriminatory wage differential.

[19]As an example of this latter issue, the "feedback" hypothesis argues that some productivity-related characteristics are on average lower for women than for men because of past or anticipated sex discrimination (Blau and Ferber, 1991; Gronau, 1988; Neumark and McLennan, 1995).

productivity that is correlated with race/sex. Most labor economists presume that certain kinds of unobserved skills are lower among women and especially minorities, and that their omission leads us to overestimate race and sex differences in the market (e.g., Becker, 1985). This motivates the inclusion of variables that better control for these skills, to see whether residual race/sex differences are eliminated; if so, we would be inclined to conclude that labor market discrimination against the relevant groups does not exist. In fact, evidence from several recent studies indicates that residual wage differentials nearly disappear for some groups of minorities and women when we include controls for previously unmeasured skills. For instance, inclusion of Armed Forces Qualifications Test (AFQT) scores in log wage equations can account for much of the residual black-white difference in the National Longitudinal Survey of Youth (O'Neill, 1990; Maxwell, 1994; Neal and Johnson, 1996), while controls for language ability and education largely account for residual wage differences between whites and Mexican-Americans (Trejo, 1997).

On the other hand, if the direction of the bias due to other omitted variables is indeterminate, or some of these additional control variables are invalid, then the inference of little remaining discrimination from these results is not necessarily warranted (Darity and Mason, 1998).[20] Also, although some of the studies listed above indicate that education and cognitive skills account for large percentages of racial/ethnic differences in wages, it would be premature to infer that discrimination against these groups (especially blacks) no longer exists. Significant racial differences can still be found for earnings in other data sets (e.g., Murnane, et al., 1995), and for employment even controlling for test scores (Neal and Johnson, 1998). Even in the NLSY data, there are significant differences across race-sex groups in the returns to components of the AFQT (Rodgers and Spriggs, 1996a; Cawley, et al., 1997) or other measures of skill, suggesting that the labor market still rewards comparably-skilled individuals differently.[21] Yet another issue that arises is whether there is racial bias in these test scores; we are not convinced that there is decisive evidence of bias, but do not necessarily believe that test score differentials reflect only productivity.[22]

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[20]For instance, Darity and Mason (1998) claim that when Goldsmith, et al. (1997) include some self-reported psychological variables in an earnings equation that also includes AFQT, the evidence "restores a negative effect on wages of being African-American" (p. 75). However, the authors do not present estimates for their sample excluding these psychological variables, so it is not clear what the basis is for claiming that including the psychological variables results in a sharper race difference in wages.

[21]Bratsberg and Terrell (1998) report higher returns to experience for whites, but comparable or higher returns to tenure for blacks. The extent to which racial differences in returns to experience are consistent with models of statistical discrimination is considered in Altonji and Pierret (1996) and Oettinger (1996).

[22]For instance, Rodgers and Spriggs (1996a) argue that the AFQT is racially biased, based on differences in regression equations between whites and blacks that are used to account for these scores. But the independent

Regarding male-female differences in the labor market, the "gender gap" in wages clearly narrowed in the 1980s but remained significant even after controlling for experience and job tenure (Blau, 1998). While significant sex differences in educational attainment no longer exist, there is evidence of persistent sex differences in math test scores (Altonji and Blank, forthcoming) and in high school/college curricula (Brown and Corcoran, 1996), although these do not seem to account for remaining sex differences in earnings, especially among the less-educated. Also, Waldfogel (1998) has recently shown that a significant sex gap in pay continues to exist only among men and women with children. The extent to which this gap reflects discrimination as opposed to differences in unobserved skills, preferences or job characteristics between mothers and fathers remains unclear.

2. Audit Studies. The "audit" methodology has become a popular means of detecting discrimination in housing and labor markets. In audit studies, researchers send matched pairs of individuals with similar education and experience but of different races/sexes to employers, landlords, realtors, etc. Assuming that the auditor pairs are well-matched, any resulting differences in treatment between race/sex groups should be attributable to discrimination rather than heterogeneity in skills or behavior that is correlated with race or sex. The labor market audit studies (e.g., Bendick, et al., 1993; Fix and Struyk, 1994; Kenney and Wissoker, 1994; Neumark, 1996; Goldin and Rouse, 1998) generally indicate that significantly fewer minorities or females obtain job offers than white males. The magnitudes of the net differences favoring whites or males in the probabilities of receiving job offers generally range from 5-20 percentage points. Because in virtually all of these studies most job candidates do not get offered a job, the estimated amount is small relative to the pool of all applicants, but large as a percentage of those who are actually getting offers.

Heckman (1998) has criticized many of these audit studies on a wide range of conceptual and empirical grounds.[23] He also argues that, even if valid, they tell us only about *individual* rather than *market* discrimination, by average rather than marginal employers. But the empirical importance of this argument depends not only on the relative numbers of discriminating and nondiscriminating employers and the characteristics of jobs within each

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variables used in their equations are quite sparse, and the "racially-neutral" predicted AFQT score that they generate contains only a small fraction of the variance in the original variable. See Jencks and Phillips (1998) and Campbell (1996) for arguments against the notion that test scores are racially biased as predictors of job performance or earnings; in general, test scores have roughly comparable predictive power across racial groups.

[23]One conceptual criticism of these studies is that whites and minorities may continue to differ, on average, in characteristics that remain unobserved but that employers anticipate. The more empirically-based criticisms include the fact that the job openings are not randomly generated (e.g., they are often based on newspaper ads, which account for small fractions of overall hiring) and that the empirical magnitudes of the biases generated are, according to Heckman, quite small.

category (Kahn, 1991), but also on whether any other barriers or disadvantages prevent minorities/women from gaining jobs with non-discriminatory employers. We return to these issues below.

3. Direct Evidence on Relative Productivities and Wages. To date, the paucity of data on worker productivity by race or sex has made direct tests of discrimination with large data sets very rare, except for a limited number of studies on athletes (e.g., Kahn and Sherer, 1988). But large data sets that match workers and their establishments have recently become available that enable researchers to directly compare relative worker productivities and earnings across race and sex groups. To date, Hellerstein, et al. (forthcoming) have provided evidence of lower relative wages among female workers in manufacturing, but comparable productivities between them and male workers, in data for the U.S. In contrast, they find little evidence of significant differences in earnings or productivity by race in manufacturing.[24]

4. Evidence on Employer Characteristics and Behavior. Evidence on employer characteristics and behavior is likely to yield additional information of two varieties. First, data on hiring out of applicant pools potentially tells us more about the demand side of the market from which discrimination emanates. Second, variation in behavior toward different race/sex groups based on employer characteristics can provide evidence on specific hypotheses regarding discrimination. However, few studies have presented evidence on employers, due to data limitations.

Holzer (1996) uses data from a recent survey of 3000 establishments in four large metropolitan areas to provide evidence on employer willingness to hire applicants from different race/sex groups into jobs that differ by skill needs, location, compensation, etc. Unfortunately, this survey does not include data on the *quality* of the individual applicants, although there is information on relative skills of the various population groups by geographic area. The evidence in this study indicates that Hispanic applicants are generally hired at higher rates than blacks, while among blacks female applicants are hired at higher rates than males; these differences do not appear to be accounted for by differences in relative skills or in the characteristics of jobs for which each demographic group applies.[25]

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[24]Similar estimates for Israel (Hellerstein and Neumark, 1999) do not reflect wage discrimination against women. Leonard (1984a) also estimated productivity differentials by race and sex, although using state-by-industry data rather than plant-level data.

[25]These hiring patterns are quite consistent with more qualitative evidence on employer behavior from interviews or ethnographic studies (e.g., Kirschenman, 1991; Kirschenman and Neckerman, 1991; Moss and Tilly, 1995). At the same time, these studies point to at least perceived differences among some of these groups, indicating, for example, that employers prefer other ethnic groups, especially immigrants, over native-born blacks because they perceive a stronger work ethic and better attitudes among the former.

Other research looking at employer characteristics uncovers evidence consistent with discrimination. Holzer (1998) finds that small establishments hire blacks at lower rates than do larger establishments; greater discrimination in hiring among small employers is consistent with the lower likelihood that small employers are covered by EEO law or monitored for Affirmative Action compliance. Chay (1998) reports further evidence consistent with this hypothesis, finding that the relative employment and pay of blacks appear to have been boosted at small establishments that came under EEO law with the Equal Employment Opportunity Act of 1972. Also, Holzer and Ihlanfeldt (1998) find that the race of the customers at an establishment has significant effects on the race of workers hired into jobs that involve direct contact with these customers, and also on the wages that they are paid (see also Ihlanfeldt and Young, 1994), consistent with customer discrimination. Finally, Raphael, et al. (1998) show that black owners/managers hire more black employees than white owners/managers in similar locations.

5. Summary. Taken together, the various studies summarized above suggest that, while differences in educational attainment and cognitive skills account for large fractions of racial differences in wages, employer discrimination continues to play a role in generating different labor market outcomes by race and sex. It is true that one can construct arguments explaining away specific types of evidence as discrimination, and as new types of evidence have been brought to bear in response to criticisms of early evidence (e.g., the introduction of audit studies in studying labor market discrimination), such arguments have arisen in response (e.g., Heckman's critique of audit studies). However, many of the empirical assumptions underlying these arguments are themselves untested, and it is our view that increasingly subtle arguments are needed to explain away evidence consistent with discrimination as newer, more reliable evidence is obtained in response to earlier criticisms. In contrast, a uniform, relatively simple behavior–discrimination–can explain much of both the older and newer evidence. While this does not necessarily imply that discrimination *is* the explanation of the evidence accumulated thus far, these considerations make us far more inclined to reach this conclusion.

B. Other Sources of Disadvantage in Labor Markets: "Societal Discrimination"

Aside from the potential effects of Affirmative Action in countering discrimination, some other arguments in favor of Affirmative Action–in particular, perhaps, with respect to university admissions–may also be strengthened by the presence of other disadvantages that limit the abilities of minorities to develop their human capital and hence to compete on an equal footing in the labor market. For instance, Currie and Thomas (1995), Neal and Johnson (1996),

and Rodgers and Spriggs (1996a) document that family background and neighborhood characteristics adversely affect the test scores obtained by young blacks, while Borjas (1994), O'Regan and Quigley (1996), and Ellen and Turner (1997) report similar effects on employment and earnings of young urban blacks.[26] The role of residential racial segregation in limiting the educational and employment opportunities of blacks has been clearly demonstrated by Cutler and Glaeser (1997).[27] This segregation appears to reflect the effects of past labor market discrimination against blacks and other minorities, as well as past and current discrimination in housing and credit markets.[28]

Thus, a case can be made that the inferior labor market outcomes of minorities and women reflect labor market discrimination, as well as a variety of other disadvantages and barriers. As a result, it seems a reasonable conclusion that the "playing field" in the labor market is not level across these groups. This does not necessarily imply that Affirmative Action is the best policy response, but in our view it provides a prima facie case for a serious consideration of Affirmative Action as a policy tool to address race and sex differences in these outcomes.

C. Discrimination in Education and Entrepreneurship

There is relatively little work that investigates current discrimination against women or minorities in university admissions.[29] Nonetheless, prior to the civil rights movement there was clear discrimination against blacks in Southern schools, and at a minimum very low representation in Northern schools (Bowen and Bok, 1998; Thernstrom and Thernstrom, 1997). One might argue that preferential treatment of "legacy" students to some extent

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[26]Other evidence documents race differences in school resources. For example, Kain and Singleton (1996) show that per-pupil expenditures and other measures of school quality remain lower among black students than white students in Texas. Of course, the effects of school resources on educational outcomes are still heavily debated.

[27]One effect of this segregation is "spatial mismatch" between suburban employers and inner-city workers (see reviews in Jencks and Mayer, 1989; Holzer, 1991; Kain, 1992; Ihlanfeldt and Sjoquist, 1998).

[28]Evidence of continuing discrimination in housing and mortgage markets is reviewed in Yinger (1998) and Ladd (1998). For evidence that existing racial segregation cannot be fully accounted for by differences in group incomes or by the preferences of black residents themselves see Farley, et al. (1997).

[29]There are some exceptions. One example is Cannings, et al. (1996), which finds no evidence that an applicant's sex affected the probability of medical school admission at the University of Montreal medical school in data from 1987. In a sample from 1979, Lentz and Laband (1989) find evidence consistent with slight discrimination against women and in favor of blacks and Hispanics relative to whites and Asians in medical school admissions. Taking a longer view, Cole (1986) finds no evidence that acceptance rates into medical school were lower for women than for men from the 1940s to the 1980s. In general, qualifications (MCAT scores) and acceptance rates have been very similar for men and women. The rapid rise in the percentage of medical students who were female in the 1970s was accompanied by a parallel rapid increase in application rates. As the author points out, though, nothing in his analysis rules out the hypothesis that lower application rates of women stemmed from discrimination either prior to or after medical school.

perpetuates a history of preferential treatment of whites; see Larew (1991).[30] In addition, it was relatively common for undergraduate or professional schools to exclude women in the earlier part of the century, but very uncommon by the end of World War II (e.g., Cole, 1986; Oko, 1996).

Like research on labor market discrimination, research on discrimination affecting women- and minority-owned business formation and success is driven by large disparities in the incidence and size of such businesses, with the share of black and Hispanic business ownership and receipts way below their representation in the population.[31] In *Fullilove*, Chief Justice Burger cited numerous factors holding down minority entrepreneurship generally, and government business in particular, including "deficiencies in working capital, inability to meet bonding requirements, disabilities caused by an inadequate "track record," lack of awareness of bidding opportunities, unfamiliarity with bidding procedures, preselection before the formal advertising process, and the exercise of discretion by government procurement officers to disfavor minority businesses" (cited in Stephanopoulos and Edley, 1995). Of course, only the last of these sounds like outright discrimination, and direct discrimination by the government at that.

Burger did not discuss discrimination in lending to blacks. There is less research on business lending than mortgage lending, but most of it points in the same direction, suggesting that capital market discrimination is partly responsible for some of the other disadvantages that Burger cites. In a study of the determinants of approval of loans to established small businesses in all 50 states, Ando (1988) finds that many factors (business experience, size, credit rating, previous bankruptcies, etc.) influence approval rates in the expected directions, but that after controlling for these factors loans to blacks are still less likely to be approved.[32] Using data from 1993 National Survey of Small Business Finances, Blanchflower, et al. (1998) find that "after controlling for a large number of characteristics of the firms, ... black-owned firms are substantially more likely to be denied credit than other groups" (p. 1), although they

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[30]Bowen and Bok (1998), for a set of three selective schools, find that admissions rates for legacy students are about the same as those for black students, although the legacy students have stronger academic records. Lentz and Laband (1989) find that sons of doctors get accepted to medical schools at higher rates, controlling for a wide variety of qualifications and traits, which they suggest may reflect favoritism toward legacies (p. 408).

[31]For example, even as late as 1990, "African Americans accounted for 12.1 percent of the population but they owned only 3.1 percent of the total business and 1.0 percent of receipts of all U.S. firms. That same year, Hispanic Americans accounted for 9 percent of the population, but only 3.1 percent of U.S. businesses and 1.2 percent of all receipts" (United States Commission on Minority Business Development, Final Report, 1992, p. 6, cited in Stephanopoulos and Edley, 1995).

[32]However, her sample is based on a low (24.1 percent response rate), and the fact that it displays some unusual characteristics relative to other samples–in particular, blacks and Hispanics having approximately the same human and financial capital as whites–raises questions about representativeness.

report little or no evidence that women are discriminated against in this market.[33] Conditional on getting approved for a loan, and controlling for other characteristics of owners and firms, it also appear that black- or minority-owned firms get less credit, or more expensive credit. Using the 1982 Characteristics of Business Owners survey, Bates finds that white owners typically command much more financial capital than blacks at the point of business start-up (1991, p. 66). Moreover, he finds that blacks get smaller bank loans than whites with otherwise identical characteristics.[34]

Of course, as in the mortgage literature (and as in the labor market literature), one can suggest unobservables that explain these differences in access to credit. But to suggest such unobservables is not to prove that they explain the findings. Presumably, the unobservables of interest are those related to business failures. Indeed, Bates (1991) reports that black business owners have higher discontinuance rates measured over the sample period. However, this does not appear to be true conditioning on the differences in loan amounts that they are offered. When he adjusts for the loan size differential associated with race (net of other factors), the evidence suggests that black-white differences "in business discontinuance rates would have been trivial among bank loan recipients" (p. 79). This evidence makes it more difficult to argue that unobservables related to loan risk are driving the race differences.[35]

We are not aware of research that directly addresses the issue of discrimination in contracting and procurement. Although the small shares of government contracts that went to minority- and women-owned businesses prior to the implementation of Affirmative Action programs are consistent with such discrimination (Stephanopoulos and Edley, 1995, Ch. 9), it is conceivable that the problem was one of lower minority and female business ownership, rather than discrimination per se. Of course, since business formation likely depends on expected future revenues,

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[33]Cavalluzzo and Cavalluzzo (1998) report similar evidence from an earlier version of the same survey, and Cavalluzzo, et al. (1999) report similar evidence, plus additional analyses, using the 1993 survey. One problem with drawing inferences from difference in loan approval rates is selection in terms of who applies for a loan. As an example, Blanchflower, et al. (1998) report qualitative evidence indicating that black-owned firms are more likely to report being seriously concerned with credit market problems and hence are less likely to apply for credit out of fear that the loan would be denied (p. 1).

[34]Bates reports that "While the white business borrower gets $2.09 and $1.91 in debt capital per dollar or equity capital, other things equal, according to the equations for all bank loan recipients and exclusive bank loan recipients, the black business borrower generates only $0.69 and $0.74 in debt capital for a dollar of equity capital input" (1991, p. 72). Grown and Bates (1992) provide similar evidence in a study focusing on the construction industry, using the same data, while Bates and Bradford (1992) report similar results with regard to venture capital.

[35]A largely unexplored historical explanation of lower business ownership rates among women is that, prior to the enactment of the Equal Credit Opportunity Act of 1974, women faced unique problems, as single women were not considered credit-worthy, married women had difficulties establishing credit histories, and alimony and child support were not counted as income (Stephanopoulos and Edley, 1995, Ch. 9).

discrimination in contracting and procurement would be expected to hold down the formation of businesses owned by women and minorities, making it difficult to establish cause and effect.

Overall, in assessing whether the "playing field" is level, when it comes to university admissions and government contracting and procurement the evidence is weaker. We think it is fair to say, though, that there is clearly a history of past discrimination against some groups along both dimensions, and that the evidence is most consistent with continuing discrimination against blacks in business lending.

D. The Efficiency Effects of Affirmative Action in the Labor Market: Theory

A theoretical assessment of the efficiency effects of Affirmative Action requires both a model of discrimination, and a "form" of the policy. The discussion in this section is based on papers that have introduced discrimination and Affirmative Action in alternative ways–some leading to sharp predictions, and others less so. One implication of this variety of predictions is that it is important, as an empirical matter, to assess both the nature of discrimination and the workings of Affirmative Action. Throughout we assume that when we work with models of taste discrimination the utility or disutility generated by discriminatory tastes does not enter the social welfare function.

1. Becker-Style Models of Discrimination. The link between discrimination and efficiency is not as straightforward as it might seem. In a simple Becker-style model of racial wage discrimination stemming from employers' discriminatory tastes, discrimination need not be inefficient; instead it may leave total output and employment unchanged, while simply resulting in redistribution among employers and workers of different races (Arrow, 1972). In such a model, if production functions are identical, efficiency prevails as long as total employment is equally distributed among all firms. Inefficiencies can be introduced rather simply, however. For example, if we suppose that employers get no utility from hiring whites but suffer disutility from hiring blacks, and if some employers have more discriminatory tastes than others, the distribution of employment across plants is likely to be unequal, which will impair efficiency as long as there are not constant returns to scale.[36]

The simplest Becker-style model that Arrow develops is not particularly well-suited to thinking about inefficiency from the supply side; since it has a single labor input and inelastic supplies of white and black labor all labor is therefore employed despite the discrimination. However, if we introduce elastic labor supply functions, assumed to be the same for whites and blacks, then the lower market wage offered to blacks because of discrimination

[36]Kahn (1991) shows that in a model with customer discrimination an equilibrium may ensue with discriminatory wage differentials and an inefficient allocation of resources.

will cause them to undersupply their labor to the market; their marginal product exceeds the marginal value of their leisure. Such models are also less than ideal for exploring the relationships between discrimination, efficiency, and Affirmative Action. Typically in such models labor inputs from different groups are combined into a single labor input, often as perfect substitutes, with issues like promotion or hiring into more-skilled positions swept under the rug. Thus, it is more useful to sketch a model in which there is hiring or promotion into different positions, and explore the role of discrimination in generating inefficiencies in such a model. Models in which worker productivity is linked to the quality of the job match are more natural for this purpose.

2. Simple Job Matching Models. Rothschild and Stiglitz (1982) develop a model in which the output (Q) of an employee depends positively on his own ability (A), but negatively on the deviation between his ability and skill requirements (S), so that both over qualification and underqualification are costly:

$$Q(A,S) = \alpha + \beta A - \gamma(A - S)^2 \ .$$

We can modify this model slightly, normalizing the output price to one, and assuming that the firm's production function is simply the aggregation of individual outputs over a continuum of possible values of S:

$$Q = \int_S \{\alpha + \beta A - \gamma(A - S)^2\}\, dS \ .$$

When the firm hires a worker, its problem is to assign this worker to the optimal S, subject to paying that worker the wage he would expect in the competitive market. It is assumed that firms have some information (Y) about the worker which is informative about A. Risk-neutral, non-discriminatory employers maximize expected output, so that workers are assigned to jobs with $S = E(A|Y)$. In this case output of worker with characteristics Y is given by

$$Q(A,S|Y) = \alpha + \beta A - \gamma(A - E(A|Y))^2 \ ,$$

and the wage equals expected output and is given by

$$W(Y) = E[Q(A,S|Y)] = \alpha + \beta E(A|Y) - \gamma Var(A|Y) \ .$$

Discrimination in hiring and promotion (e.g., stemming from tastes) could be manifested as a refusal or reluctance to hire blacks (B) into high S jobs. Assume that this discrimination takes the form of employers assigning black workers to jobs with $S = E(A|Y) - (b/\gamma)^{1/2}$,[37] and that race is uninformative about A. Then output is

$$Q(A,S|Y) = \alpha + \beta A - \gamma(A - E(A|Y))^2 - \gamma[(b/\gamma) + 2A(b/\gamma)^{1/2} - 2E(A|Y)(b/\gamma)^{1/2}]$$

and expected output equals

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[37]This particular form of the constant leads to a simple form for the constant in the solution.

$$E[Q(A,S|Y)] = \alpha + \beta E(A|Y) - \gamma Var(A|Y) - b \ .$$

If all employers behave the same, expected output is lower by b everywhere, and the market wage is lower by the same amount, so expected profits are unaffected. If discriminatory behavior varies, then more discriminatory employers earn lower profits. Either way, output is lower than it would be in the absence of the discriminatory behavior, since blacks are assigned to jobs for which they are generally over-qualified, entailing inefficiency.

In this model, we can regard an "ideal" Affirmative Action policy as requiring employers to assign blacks to jobs with $S = E(A|Y)$. This would raise black wages, increase the assignment of blacks to higher-skilled jobs, and increase output.[38] However, perhaps driven in part by the view that taste discrimination is unlikely to persist in labor markets (e.g., Lundberg and Startz, 1983), most of the existing work on the efficiency effects of Affirmative Action has focused on models of statistical discrimination. Before describing this work, however, we consider some earlier work on models of Affirmative Action in which discrimination (taste or statistical) is not central.

3. Affirmative Action as Quotas. Welch (1976) considers a stark case of Affirmative Action, namely employment quotas for minorities.[39] He allows for the possibility of taste discrimination that lowers wages of minority workers, but because in his model taste discrimination results only in redistribution, this discrimination can be ignored when looking at allocative efficiency. More significantly, though, Welch's model does not allow discrimination of the type outlined above that might prevent the allocation of qualified minority workers to higher-skilled jobs.

In the model, employers need workers in different skill categories (call them unskilled and skilled), and average skill levels are lower for the minority than for the majority population. Skilled and unskilled workers each have a comparative advantage in the corresponding type of work, so the skilled vs. unskilled distinction is more than just a label. The quota requires that for every majority skilled worker hired, r (<1) minority workers must be hired in the same position. The minority proportion of the population is π, and the minority proportion with qualifications needed for the skilled position is π_m, with $\pi > \pi_m$ and $r > \pi_m$. The quota is assumed to be accompanied by an equal

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[38]Kahn (1991) also shows that in a model with customer discrimination, Affirmative Action–in the form of an equal pay constraint plus a requirement of proportional representation–can improve efficiency, replicating the same allocation of resources that is produced in the absence of discriminatory tastes. We pay relatively less attention to this model because, as Kahn points out, a relatively small share of employment in the federal contractor sector is in industries in which there is customer contact and in which customer discrimination is likely to be very important. But given the broader definition of Affirmative Action that we adopt in this review, customer discrimination should perhaps be given greater attention.

[39]Johnson and Welch (1976) explore similar issues in a closely-related analytical framework.

pay constraint for the skilled category. In such a model, employment quotas could result in too few skilled workers being hired, because the quota for minority workers cannot be met in the skilled category. This obviously increases production costs and hence entails inefficiencies. However, Welch points out that the costs may be mitigated (but not eliminated) by "skill bumping," which occurs when employers hire unskilled minority workers into the skilled category in order to be able to hire more skilled majority workers. This latter strategy may correspond to the assertion that Affirmative Action results in the hiring and promotion of unqualified minority (or female) workers.[40]

Welch's model leads to empirical implications that can guide the search for and interpretation of evidence on Affirmative Action. Affirmative Action results in some less-skilled minority workers being hired into skilled jobs. Also, to the extent that firms' production costs are increased, performance measures related to cost or profitability should decline. Hence, micro-level evidence regarding costs or profitability of firms, and the qualifications and performance of workers hired into particular jobs, comes to the fore. Of course, if empirical research fails to detect lower qualifications, lower profitability, or higher costs at the micro level, we would be more skeptical regarding aggregate efficiency effects. We assume that one cannot actually estimate the aggregate welfare losses associated with such a policy, although Welch does go through a simulation exercise to try to gauge these losses. This simulation does, however, make the important point that when skill bumping occurs (which depends on parameters of the model) the social inefficiency associated with quotas is driven primarily by the extent to which misallocated labor is less productive; in the specific model he uses, these costs are much greater if the lost productivity from placing an unskilled worker in a skilled job is high, and these costs can be quite low if this lost productivity is low.

Welch also anticipates an issue that later became more prominent, namely whether Affirmative Action might affect skill acquisition. In particular, because a quota raises the relative earnings of the minority group, the relative returns to investment in skill for minorities may rise, leading to skill convergence. Welch shows, however, that this result may not be so simple. First, in a two-sector model (with quotas applied in one sector, such as the contractor sector), the earnings of skilled workers relative to unskilled workers may fall in both sectors, so that although skill convergence may result, the average skill level declines.[41] Second, the returns to skill in a world with quotas depends

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[40]Welch considers a one-sector model, as well as a two-sector model in which Affirmative Action is imposed in only one sector. The productivity implications are similar, although the implications for income redistribution are not.

[41]For example, in the case without skill bumping, we can think about the first effect of the quota as leading to a shift of skilled non-minority workers to the uncovered sector, which raises skilled wages in the covered sector, lowers skilled wages in the uncovered sector, and raises unskilled wages in the uncovered sector. (Unskilled wages in the

on how majority and minority workers are matched, because with the equal pay constraint wages paid to minority workers are an average of skills of minority and majority workers with whom they are associated. Nonetheless, Welch suggests that quotas are indeed more likely to increase the wages of skilled minority workers relative to unskilled minority workers, and hence to increase the returns to skill and relative investment by minority workers.

In Welch's model, quotas and equal pay constraints induce inefficiencies. In a sense, it is no surprise that beginning with a model with perfect information and competition, such policies induce distortions. A more recent line of inquiry into the efficiency effects of anti-discrimination measures proceeds from the perspective of imperfect information in the form of statistical discrimination. In our view, the major contribution of this research is to suggest how Affirmative Action policies may enhance efficiency.

4. Statistical Discrimination. In early models of statistical discrimination (Aigner and Cain, 1977) racial wage differences emerge because the reliability of information about different groups varies. If, for example, information about blacks available to those making hiring decisions is less reliable,[42] then more-qualified blacks are paid less than comparable whites, less-qualified blacks are paid more than comparable whites, but average pay equals average productivity. Thus, there is no "group" discrimination, in that for each group average wages equal average productivity. However, Lundberg and Startz (1983) point out that if we take into account the response of human capital investment, then the lower returns to these investments in these qualifications for blacks can lead to underinvestment by blacks.[43] The result is group discrimination, because "groups with equal average initial endowments of productive ability do not receive equal average compensation in equilibrium" (Lundberg and Startz,

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covered sector could go either way, as marginal productivity falls but output price rises.) Equilibrium is then restored by the migration of labor. In particular, if unskilled wages have risen by more in the uncovered sector, unskilled labor flows to that sector, which reduces the marginal productivity of skilled labor in the covered sector. Welch shows that depending on the magnitudes of the elasticity of substitution between skilled and unskilled labor in the covered sector, and the elasticity of demand for the product of the covered sector, it is possible for the net result to be declines in relative earnings of skilled labor in both sectors.

[42]Reasons for less reliable information about minority groups, when a majority group is doing the hiring, are suggested in Lang (1986). Cornell and Welch (1996) formally demonstrate that in this type of situation majority group employers are likely to treat majority group workers favorably, even when they have no discriminatory preferences. Neumark (forthcoming) provides evidence consistent with employers having less accurate information about minority and female employees.

[43]If we think of investment solely in terms of easily observable characteristics like schooling, Lundberg and Startz note that it is not obvious why information should be less reliable for one group than the other. However, citing earlier work by Arrow (1973), they suggest that human capital investment be interpreted more broadly as a set of behaviors that lead to better performance on jobs, tests, etc., and hence is imperfectly observable.

1983, p. 342). Furthermore, they show that as long as the marginal cost of training or investment is increasing for each individual, this equilibrium is socially inefficient, because the cost of training the marginal white exceeds the cost of training the marginal black. A policy that forbids unequal wage schedules to the two groups shifts some investment to blacks for whom marginal costs are lower, and hence improves efficiency. However, such a policy corresponds more closely to equal pay laws than to Affirmative Action.

Lundberg (1991) extends this work in two important ways. First, paralleling Rothschild and Stiglitz (1982), she considers the efficiency effects associated with matching workers correctly to jobs, using a framework with heterogeneous jobs in which higher-skilled jobs pay higher wages. Given the imperfect information, employers make optimal decisions by allocating relatively more higher-qualified (in terms of unobserved productivity) whites than blacks to higher-skilled jobs. The anti-discrimination constraint in this model–which corresponds more closely to Affirmative Action–forces employers to place more blacks in such jobs, even though they have difficulty in assessing their qualifications, which generates some bad matches. This creates a tradeoff between increased efficiency in human capital investment and decreased productive efficiency; the anti-discrimination policy is more likely to increase efficiency when the cost of mismatches is low, and the costs of distorted human capital investment are high.[44,45]

When it comes to assessing empirical evidence on the efficiency effects of Affirmative Action, the results of these latter two papers are somewhat discouraging. We can perhaps hope to determine whether Affirmative Action leads to the hiring of less-qualified minority or female employees. What the models in these papers show, though, is that such evidence does not necessarily imply that Affirmative Action is on net inefficient. In the framework of these models, assessing efficiency also requires an empirical analysis of the allocation of human capital investment, a challenging goal that has not been seriously attempted.[46]

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[44]Lundberg also considers different types of anti-discrimination policies, in particular what she characterizes as Affirmative Action vs. a prohibition of disparate treatment. Because we do not draw as sharp a distinction between these types of policies in this review, we leave it to the reader to examine these differences further.

[45]Milgrom and Oster (1987) develop a model which similarly considers job assignment and investment decisions, but in which discrimination arises because promotion conveys information to the outside market and therefore leads to higher wages for employers. Those groups about whom outside information is the worst–which they presume to be minority and female workers–suffer the most promotion discrimination in this context, because there is an externality posed by promotion that the worker but not the employer captures, which is strongest for minorities and women. In this case, investment decisions *and* job assignment decisions are distorted, and a government policy that mandates the optimal promotion rate for each group can unambiguously increase efficiency. This differs from Lundberg's model in which employers make optimal job assignment decisions given the information constraint.

[46]However, Holzer and Neumark (1998) present some evidence on the relationship between Affirmative Action and

In the Lundberg and Startz model, the statistical discrimination takes the form of less accurate information about minority workers. In contrast to earlier work on statistical discrimination, an appealing feature of this model is that by incorporating human capital investment, this seemingly benign form of statistical discrimination leads to a discriminatory outcome. Coate and Loury (1993) consider a less benign form of statistical discrimination, specifically negative stereotypes about minority workers. This model extends Arrow's (1973) earlier work, with the most important difference being that employers' lower initial evaluations of minority workers' qualifications result in less-frequent assignments to more-demanding jobs, rather than wage discrimination. As such, the Coate and Loury set-up is more amenable to thinking about the effects of Affirmative Action.

The Coate and Loury model is one in which employers have to optimally assign workers to jobs. Mismatches between workers and jobs–in particular the assignment of unqualified workers to the more-highly-rewarded jobs–are costly to the firm. Conversely, successful matches of qualified workers to these jobs entail a positive return to employers. As in the Lundberg and Startz model, workers invest in the qualifications needed to perform the more-demanding job prior to entering the labor market. Imperfect information is still important, because with perfect information (and no discriminatory tastes) employers would do this assignment based on individual productivity. As a result of the imperfect information, employers base expected productivity in each job in part on group membership. In this framework, it is straightforward to demonstrate the effects of negative stereotypes, by which Coate and Loury mean an overly-negative evaluation of the likelihood that minority workers are qualified for the more-demanding job. This negative stereotype results in minority group members facing lower returns from human capital investment, which leads them, in fact, to have weaker qualifications than the majority group.

In equilibrium, then, employers' negative stereotypes are confirmed, generating a "self-fulfilling prophecy." Coate and Loury also show that equilibria with self-fulfilling negative stereotypes are inefficient, entailing both lower rewards for workers and a smaller pool of qualified workers for employers. Note that, although the information structure is different than in Lundberg and Startz, the outcome is essentially the same. Minority workers have the same innate distribution of abilities (or costs of investment), but as an outcome of imperfect information coupled with human capital investment decisions, end up with different qualifications on average, and hence different pay as well.[47]

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training of different groups of workers.

[47]An interesting question that remains unexplored in the existing models is how the conclusions about efficiency change if part of the acquisition of skills occurs on the jobs to which workers are assigned, via training.

Coate and Loury also use this model to ask whether Affirmative Action is likely to break down employers' negative stereotypes (in which case an Affirmative Action policy would no longer be needed), by leading to an equilibrium in which employers' beliefs that group membership is *not* associated with qualifications are confirmed. Government intervention may be needed because no single employer in the "negative stereotype equilibrium" has an incentive to behave differently; a single employer deciding to assign more blacks to the more-demanding job would not change the incentives to invest, and would only lower profits by ending up with worse matches. But the equilibrium can potentially be changed by employers acting together, perhaps because of government.[48]

Coate and Loury conceptualize Affirmative Action as requiring that the rate of assignment to the more-demanding job be the same for the minority and majority group. This becomes a binding constraint on the employers' job assignment problem if employers initially hold different beliefs about the productivity of workers in different groups. They then ask whether under Affirmative Action there is an equilibrium in which employers hold homogeneous beliefs about the productivity of majority and minority workers, and whether all equilibria under Affirmative Action satisfy this condition. If this is true, then Affirmative Action moves the economy to an equilibrium with homogeneous beliefs, and upon its removal the economy stays there. Since the initial negative stereotypes are inefficient, Affirmative Action would increase efficiency by eliminating negative stereotypes.

The predictions of the theory are ambiguous. There are equilibria under Affirmative Action satisfying these criteria, but there are also equilibria in which negative stereotypes will not be eliminated, and may be worsened (resulting in a larger skill gap). Intuitively, Affirmative Action in this model affects the standard that is used to allocate people to different jobs. Given that the two groups may test differently, the standard need not be the same for the two groups, since it is the results (i.e., job assignments) that are constrained. When Affirmative Action changes the standard, the investment response depends on a number of things, including: the benefit the worker receives from being placed in the higher-paying job vs. the cost of acquiring skills; the change in the probability of being placed in

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[48]This is closely related to another potentially important type of inter-generational effect of Affirmative Action (pointed out by Kevin Lang), specifically the reduction of "social distances" or "transactions costs" between racial and ethnic groups. As employers and others are forced to learn how to evaluate individuals from these different groups in order to find qualified candidates, the "costs" of inter-group interactions (stemming, for example, from miscommunication or stereotypes) may fall. Such changes may have a public good component, making it unprofitable for a single employer to change his evaluation methods on his own, but leading to social gains if many employers do so as a result of government policy.

the higher-paying job conditional on the test (i.e., the change in rationing); and the change in the optimal level of investment as a result of the change in the standard.[49]

5. Summary of Results from Models of Discrimination and Affirmative Action. This concludes our review of theoretical papers on the efficiency effects of Affirmative Action in the labor market. As Coate and Loury state, the results of their study (and of the Lundberg and Lundberg/Startz studies) is to "give credence to both the hopes of advocates of preferential policies and the concerns of critics" (p. 1239). That is, *theoretical models of Affirmative Action types of policies yield ambiguous predictions regarding the efficiency effects of these policies.* This conclusion is documented in Table 4, which indicates the fairly wide class of models that lead to ambiguous predictions about the effects of Affirmative Action. Ultimately, then, it is a challenge for empiricists to assemble evidence that measures efficiency/performance effects of Affirmative Action, or tests some of the assumptions and conditions that these models suggest are important in determining whether Affirmative Action increases or decreases efficiency.

6. Externality Arguments. Aside from models that begin with discrimination in the labor market, there are some papers that suggest the existence of externalities that place us in a world of second-best choices in which a distortionary policy like Affirmative Action could increase efficiency. One example relates to the earlier discussion of unequal economic resources in black and white communities. Loury (1977, 1981) argues that, when coupled with racial segregation, initially unequal resources can lead to perpetual differences in economic outcomes for blacks and white under a regime of equal opportunity, even when the distribution of innate abilities is the same for the two races. This occurs because, given racial segregation, low-income black families impose a negative externality on higher-income families in the provision of community public goods such as schools; this externality reduces investments that affect individual productivity, essentially impeding the ability of the higher-income black families to catch up to higher-income white families. In such a case, it is possible that an Affirmative Action policy that boosts the incomes of blacks could, at least in principle, offset this externality.[50]

An alternative type of model with externalities concerns the effects of mentoring. Athey, et al. (1998) develop a model in which within-firm mentoring is more productive when mentors are of the same "type" as the

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[49]See also Foster and Vohra (1992) for a similar model developed concurrently that illustrates the ambiguity regarding whether Affirmative Action reduces or increases incentives for investment.

[50]The potential inter-generational effects of Affirmative Action to which this argument points may be central. To the best of our knowledge, there is no empirical work on this question, which we suspect might prove highly fruitful.

mentees; specifically, lower-level workers learn more when more mentors are of their same race, sex, etc. One implication of this model is that employers will consider a worker's race, sex, etc., in making decisions regarding whom to promote to positions in which they will serve as mentors. A firm may use a promotion rule biased in favor of minorities, although this need not occur. They also explore the dynamic implications of this model; they find that when history or initial conditions matter, and there are multiple equilibria, firms may stay in an equilibrium with little diversity even though per-period profits are higher with more diversity. In this case, a short-run policy of encouraging diversity–such as Affirmative Action–can move the firm to an equilibrium with higher per-period profits. Once this occurs, the policy can be dropped and the firm will stay in the "high-diversity" equilibrium.

Although this is not a general equilibrium model, and hence overall efficiency effects cannot be evaluated, the model does have two implications which are rather unfortunate with respect to assessing evidence on Affirmative Action. First, Affirmative Action may improve firm performance, although this may not occur in the short-run while the firm is moving to the new equilibrium. Second, firms may promote minorities or women who are less-qualified on some dimensions; the problem is that we may not pick up the increased productivity of mentoring associated with such promotions. Thus, in both cases evidence on firm performance or worker qualifications may be less than fully informative about efficiency effects of Affirmative Action. This also suggests that research on the nature of mentoring relationships may prove valuable in helping us interpret empirical tests of the effects of Affirmative Action.

A related possibility that we think merits some exploration is the potential externality entailed in role-model effects. If minority or female role models help to open up new occupations or sectors to minorities or women (by influencing, for example, the possibility that they would consider entering such an occupation), then there is a positive benefit derived from early minority and female entrants that the individual cannot capture.[51] This may provide another motivation for Affirmative Action, which may reduce the expected costs that these early entrants will have to pay.[52]

E. The Efficiency Effects of Affirmative Action in Education: Theory

When we turn to the analysis of the efficiency effects of Affirmative Action in education, we can adopt a similar perspective on alternative policies to that which we adopted in looking at labor markets. As before, we

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[51]For an example of this argument with respect to the legal profession, see Oko (1996).

[52]In the context of hiring by educational institutions, this could also be considered as a potential argument for Affirmative Action in university and especially graduate school admissions, since such admissions serve as the gateway to being trained as a professor. We therefore treat this issue of academic hiring in our discussion of Affirmative Action in education, rather than the labor market.

continue to view Affirmative Action broadly, as any policy that makes race or sex a factor in admissions; some of these were discussed earlier. Counter posed to Affirmative Action might be a strict anti-discrimination policy, as reflected in Title IX and Title VI of the Civil Rights Act.[53] Whereas in the labor market the application of a disparate impact standard to equal employment opportunity blurred the lines between anti-discrimination laws and Affirmative Action, the absence of such a standard with respect to educational institutions leaves the distinction sharper.[54]

1. Thinking About "Preferential Admissions." In order to analyze the potential efficiency implications of Affirmative Action in college or university admissions, we must consider the processes by which students might be admitted under a variety of assumptions, and decide whether or not such a process would be more or less efficient in the absence of Affirmative Action considerations. This is not an easy or clear-cut task; we have found little if any discussion in the literature of socially optimal admissions policies of universities, and a full-blown treatment of this issue is beyond the scope of this paper.[55] However, consideration of the issues involved leads to two conclusions:

1) Even in the absence of Affirmative Action, few universities would simply admit students above certain cutoffs of grades and test scores, which appears to be the "alternative" preferred by critics of Affirmative Action.

2) If universities did so, it would be unlikely to be socially efficient.

It is useful to begin by considering the outlines of what a "socially optimal" matching of students to universities would look like in a fairly simple and abstract setting, and whether or not Affirmative Action in admissions would necessarily result in a less optimal matching. In the abstract, we might assume that optimal matching would result from strict price-rationing of university positions, rather than rationing of slots based on grades and test scores. Under a price-rationing scheme, those who most value attending any particular university would be willing to pay the most for admission. The resulting equilibrium across a differentiated set of universities would

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[53]Title IX bars sex discrimination in any educational programs or activities receiving federal funding. Title VI more generally bars discrimination on the grounds of race, color, or national origin in *any* program or activity that receives federal funding.

[54]Bowen and Bok (1998) state that beginning in the 1970s "federal officials had incorporated reports on student enrollment into the affirmative action plans of universities" (p. 8). However, it is unclear if any actions were taken based on these reports; indeed, we have been unable to find any other documentation of the existence of such reports.

[55]The only paper we have found that even attempts to look at various admissions policies from the perspective of economic efficiency is Conrad and Sharpe (1996). Winston (1999) discusses some of the unique features of higher education that make standard welfare or efficiency analysis extremely difficult.

maximize social welfare. This assumes, of course, the existence of no other major market failures, such as capital market constraints, externalities, etc.; we will return to these issues below.

However, even aside from sorting on other institutional characteristics, it is not clear that returns from education across students are strongly positively correlated with previous grades and test scores, so it is not apparent that this simplistic social optimum would resemble what results from simple cutoffs based on grades and test scores. If there is a positive monotonic relationship between private returns and qualifications, and a negative monotonic relationship between qualifications and the costs of education (by which we mean the costs of "learning," rather than financial costs), then university admissions procedures based on admitting everyone above some threshold of qualifications may mimic the socially efficient outcome. But these are strong assumptions that need not hold.[56]

The discussion to this point assumes that universities have no preferences over which students to accept, and that students' preferences are independent of other students' attendance decisions. In reality, neither of these conditions holds. Both students and universities care about university *quality*, which depends to some extent on the academic quality of students admitted (and on the quality of faculty, physical facilities, etc.). Students may care about the quality of the institution because its reputation enters into their utility functions, or because the quality of education that they receive depends on the abilities of their fellow students.[57] The latter implies the existence of educational externalities in the classroom, a point to which we return below. Therefore, it makes sense that universities would ration their slots at least partly on the basis of student grades and test scores, as well as on the basis of price.

But even if quality of students is the central concern of universities and other students, socially optimal matching would not necessarily entail universities relying exclusively on grades and test scores for admissions. For one thing, these are imperfect measures of student quality. Thus, even highly competitive graduate and professional schools supplement the use of grades and test scores in the admissions process with consideration of personal essays, interviews, and the like, by which they presumably gain more information about student motivation, creativity, or

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[56]For example, Griliches (1977) develops a model in which higher ability individuals invest less in schooling than lower-ability individuals. Garrat and Marshall (1994) present a model in which a cutoff on achievement is optimal, but this rests on the assumption that the returns to college are increasing in achievement. Other empirical work (e.g., Blackburn and Neumark, 1993; Cawley, et al., 1998) explores whether returns to schooling are higher for higher-ability individuals.

[57]Rothschild and White (1995) analyze the education market when students are consumers as well as inputs in the production process. This and other issues related to the market for higher education are reviewed in Hoxby (1997).

intellectual depth. The result is likely that these admissions programs may improve matching, by admitting some students with lower grades and scores over those with higher ones, but with other positive characteristics.[58]

This point is even more salient when we consider the much wider range of student attributes that universities value. In reality, colleges and universities have very diverse and multi-dimensional objective functions (as do the students who apply to them). The result is no doubt a complex matching process between schools and students. Grades and test scores receive more or less weight in the admissions procedures of different schools relative to many other student attributes. For instance, prestigious private universities seem to value a wide range of characteristics and talents among their undergraduates, including some vaguely defined sense of future leadership potential. Many universities have historically valued student diversity along a variety of dimensions, including geographic diversity (e.g., Rosovsky, 1988; Bowen and Bok, 1998). For example, the most prestigious universities appear to value having the political leaders of poorer or more rural states among its alumni, along with professional athletes, actors, musicians, etc. Affirmative Action may be used out of a similar motivation, as those alumni who achieve positions of leadership and visibility within particular ethnic communities may be similarly valued.

2. Diversity. In addition to these motivations for adopting Affirmative Action, many educators believe that diversity enhances the quality of the education that undergraduates receive, as they learn from each others' experiences and perspectives. This argument is summarized in the following statement by the presidents of the American Association of University Presidents:

> We believe that our students benefit significantly from education that takes place within a diverse setting. In the course of their university education, our students encounter and learn from others who have backgrounds and characteristics very different from their own. As we seek to prepare students for life in the twenty-first century, the education value of such encounters will become more important, not less, than in the past. (Cited in Bowen and Bok, 1998, p. 252.)

This argument–like the earlier argument about why student quality is important–implicitly recognizes that students are not merely consumers of educational services, but are themselves inputs into the educational process. The gist of this argument is then that positive externalities from adding a minority student when such students are underrepresented may be larger than those from adding a non-minority student. Of course, a similar motivation may

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[58]Although not central to the argument here, if the predictive power of grades and test scores with respect to expected quality is lower for minorities, it might be optimal to allow admissions procedures to vary across these racial groups in ways consistent with Affirmative Action. There is a large set of questions concerning the definition of merit, the reliability of tests, etc., into which we do not delve in this section. Rather, we consider the economic issues that arise conditional on having a measure of merit or qualifications.

drive universities to seek out diversity along other dimensions, including geography, talents, interests, etc. Thus, many colleges and universities appear to choose some degree of Affirmative Action in their admissions processes, even absent any pressure from the Federal government (which, as we noted above, may not be a major consideration in admissions) or from other interest groups.[59] Whether they choose the socially optimal degree is difficult to assess, without a much clearer sense of what an optimal set of admissions procedures would be.

3. Imperfections in the "Market" for College Admissions. Imperfections in the "market" for college admissions may also be generating departures from efficient behavior that could be reduced by Affirmative Action practices. These include capital market imperfections and externalities for various communities, as described below:

a. Capital Market Imperfections. One argument offered in support of possible efficiency-enhancing effects of Affirmative Action in education is that capital market imperfections prevent lower-income individuals from taking advantage of a college education (Loury, 1977).[60] In terms of the framework outlined above, although the social benefit of education of some of these lower-income individuals exceeds that of the education of higher-income individuals who receive a college education, the private costs for the former are higher, and hence sub-optimal education decisions are made.[61] While it is true that minorities are more likely to come from low-income families, if access to capital is solely a function of socioeconomic background, this argument really pertains to income rather than race. As such, this argument might be viewed as providing a basis for granting preferential treatment to low-income students, rather than minorities per se (i.e., class-based rather than race-based preferences). On the other hand, access to capital may be limited by race discrimination. In addition, one might argue that the capital market problem can be addressed, and is at least to some extent addressed, via the capital market itself. For example, student loans, scholarships, etc., no doubt disproportionately favor lower-income students.

b. Community Externalities. The second externality argument concerns the positive externalities that educated women, minorities, etc., may offer to some communities. An example is the argument that black doctors will go back to their community to practice, and that this might be worth encouraging even if the cost is the denial of a

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[59]Pressure to engage in Affirmative Action in admissions may come from heavily politicized faculty members or from other organizations, if not from the government per se.

[60]One possible reflection of this is the generally higher returns to education among blacks than whites (e.g., Bound and Freeman, 1992).

[61]Of course, there may be valid reasons for credit to be more expensive for children from lower-income families.

place in medical school to a more-qualified white candidate. This argument has two requirements (putting aside capital market issues). The first is that the social–but not the private–return to practicing medicine in the black (i.e., poorer) community is higher. Given possible imperfections in the health care market, this is conceivable. The second is that blacks are actually more likely to do this. Aside from the empirical evidence on either of these questions, one could again argue that this is primarily an issue of income, not race. Also, one might wonder whether there are other mechanisms to increase specific types of professional care for poorer communities.[62] Externalities may be conveyed in other ways, such as mentoring, role-model effects, etc., for which the social returns cannot be captured privately.

4. Arguments Against Affirmative Action: The "Fit," "Underperformance," or "Stigma" Hypotheses. Of course, other criticisms of Affirmative Action in education have been advanced that for the most part do not explicitly (but perhaps implicitly) address the issue of efficiency. D'Souza (1991) has articulated what Bowen and Bok label the "fit" hypothesis, arguing that the educational experience of minorities has suffered as university administrators have recruited and admitted such students into environments where they cannot compete. Instead, he suggests, they might be better off in universities where they can "compete against evenly-matched peers" (p. 43). Steele suggests that Affirmative Action may lead to underperformance, arguing that "The effect of preferential treatment–the lowering of normal standards to increase black representation–puts blacks at war with an expanding realm of debilitating doubt, so that the doubt itself ... undermines their ability to perform, especially in integrated situations" (p. 42). A third prominent argument against Affirmative Action is the "stigma" hypothesis proffered by Murray (1994), who suggested that the "evil of preferential treatment ...[is that it] perpetuates the impression of inferiority" (p. 207). A related argument that has more of an economic flavor is that preferential treatment for blacks lowers the incentives for high efforts, as minorities are rewarded for "factors independent of those efforts" (p. 451). Roughly speaking, there is a common implication of all of these hypotheses. Specifically, minority students who apparently benefit from preferential treatment will have worse performance than otherwise comparable non-minority students.

F. The Efficiency Effects of Affirmative Action in Government Contracting/Procurement: Theory

As with the empirical evidence on discrimination, and later the evidence on efficiency/performance effects of Affirmative Action, there is far less work on government contracting/procurement programs than on employment.

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[62]For example, the National Health Services Corps Scholarship Program offers tuition or loan repayments for medical school in return for primary care service in underserved areas ("health professional shortage areas"), which include both rural and urban settings (Mullan, 1997). However, although Congress has mandated preferential consideration for minority applicants to the program, rural placements predominate (Pathman and Konrad, 1996).

Indeed, there are virtually no theoretical treatments of Affirmative Action in contracting/procurement and its possible effects, although some issues have been raised in the literature.

Clearly if, as suggested by Chief Justice Burger in *Fullilove*, government agencies were discriminating in not giving business to minority- or women-owned firms, then Affirmative Action could increase efficiency by awarding contracts to lower-cost or higher-quality women- or minority-owned firms. In addition, the encouragement of minority ownership may spur minority employment, as there is some evidence suggesting that minority owners are more likely to employ minority workers (although this evidence is not directly linked to set-asides (Bates, 1994)).[63] This is not an efficiency argument per se, but given severe employment and crime problems in some minority neighborhoods, higher employment may entail positive externalities by discouraging non-market activities that have negative effects on others. Aside from any externality argument, Bates (1993, Ch. 1) also points out that anti-discrimination laws and Affirmative Action in hiring are targeted toward large businesses partly by law and partly because the costs and benefits of enforcement encourage a focus on large employers. Thus, Bates argues, encouraging minority ownership may be a complementary policy that promotes minority employment in small businesses.[64]

On the other hand, researchers have identified a few problems that may be created by using Affirmative Action in contracting and procurement to try to help develop women- and minority-owned businesses. One problem is that overall goals for shares of contracts going to minority- or women-owned businesses may lead government agencies to concentrate their contracting in fields where there are already a large number of such firms, which could not only fail to encourage the development of businesses in other fields, but even encourage disadvantaged groups to remain or start new businesses in these fields. Second, Bates and Williams (1996) have suggested that in some environments, set-aside programs for government contracts may lead business owners to overextend themselves, leading to a higher rate of failure. Third, these same authors have raised the possibility that programs for minority-owned businesses may have encouraged the formation of front companies for white firms that provide nothing but fees and perhaps a little income for those who represent the front company.[65] Such fraudulent behavior is likely to

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[63]Bates (1993) reports that this pattern persists for white-owned businesses in minority neighborhoods and minority-owned businesses in non-minority neighborhoods, so these differences in hiring patterns are not solely a reflection of the racial composition of the local labor market.

[64]Although Bates recognizes that jobs with large employers are preferable, he notes that small businesses have been and will continue to be a potentially important source of minority employment in urban areas.

[65]Denes (1997) suggests a similar problem for general small business set-asides under the 1953 Small Business Act.

introduce inefficiencies because it results in contracts being awarded for reasons unrelated to either the cost or quality of the goods and services provided, or the goals of Affirmative Action in contracting and procurement. Fourth, government preferences in awarding contracts may prop up weak companies, or breed dependence on government contracts, rather than furthering the overall goal of creating more independent women- and minority-owned businesses. Finally, by restricting competition and in some cases using explicit bid-price preferences, set-asides may raise the cost of government purchases of goods and services.[66]

One might argue that the true goal of Affirmative Action in contracting/procurement is to not raise the share of minority business with the government, but rather to boost minority (and female) entrepreneurship. An important barrier to this may be discrimination in credit markets, in which case increased contracting with the government may not be the best remedy. Instead, it may be preferable to combat the credit market discrimination directly. It is likely that standard discrimination in credit markets generates inefficiencies, although, as has turned out to be the case in theoretical analyses of labor markets, the question is probably more complex. We have uncovered only one study that looks at these questions. Loury and Weiss (1998) develop a model in which an original perceived (or believed) difference in investment behavior of blacks and whites can lead to an equilibrium in which whites receive what amounts to preferential treatment in credit markets, even in the absence of differences in ability or wealth or outright discriminatory tastes. The essence of this model is that there may be historical reasons for the perceived difference in investment behavior, but even if that difference no longer exists ex ante, it exists ex post in equilibrium; in other words, blacks get stuck in a "bad equilibrium." In this case, it is possible that government intervention requiring equal treatment of blacks and whites in credit markets can move blacks to the "good equilibrium" in which investment behavior is the same as whites. However, other outcomes are also possible–such as pushing whites to the bad equilibrium–so that the implications for overall output (and efficiency) are ambiguous.

IV. The Effects of Affirmative Action on Employment, Admissions, and Business Ownership and Success

An assessment of Affirmative Action requires an analysis of both distributive and efficiency effects. Our review has a heavy emphasis on the latter, simply because it has been studied less, review of research on this topic is lacking in the literature, and it is a central economic issue in the debate over Affirmative Action. However, in this section we briefly review the existing evidence on the effects of Affirmative Action in shifting patterns of

[66]Corns and Schotter (forthcoming) show that bid-price preference programs may under some conditions reduce rather than increase costs, because of their effects on the equilibrium behavior of bidders.

employment, enrollment, etc. This evidence simultaneously identifies some of the potential redistributive effects of Affirmative Action, and also reveals the extent to which Affirmative Action has real effects on these outcomes. To summarize briefly, there appears to be compelling evidence that Affirmative Action does increase employment, enrollments, and contracting for minorities and women in the ways we might expect.

A. The Effects of Affirmative Action on Employment

The effects of Affirmative Action on the employment of white males, white females, and minorities have been heavily studied by economists. Early papers include those by Ashenfelter and Heckman (1976), Goldstein and Smith (1976), and Heckman and Wolpin (1976). Jonathan Leonard's work (1984b, 1984c; reviewed in his 1990 article) is perhaps best known in this regard, though Smith and Welch (1984) analyzed many of these same issues concurrently with Leonard, and the earlier papers just mentioned also analyzed them. This work has also been updated to some extent by Rodgers and Spriggs (1996b). All of these studies use federal EEO-1 data on contractors and non-contractors to analyze the employment effects of Affirmative Action. In contrast, other studies (e.g., Holzer and Neumark 1998, forthcoming) use micro-level employer data from other sources. These studies generally involve some comparison of the shares of employment (or employment growth) accounted for by various demographic groups between establishments that practice Affirmative Action and those that do not. The key independent variable is usually a measure of whether or not the firm is a federal contractor, and therefore subject to Affirmative Action requirements. Establishment-level control variables are included for size, location, recent employment growth, etc.

Leonard's studies compare changes in employment shares of different demographic groups over the period 1974 to 1980 between contractor and non-contractor establishments. He shows that the shares of employment accounted for women and minorities rose at contractor establishments between 1974 and 1980, while those accounted for by white males declined. The magnitudes of these effects, however, are modest. For instance, differences in mean employment growth across establishments suggest that the share of employment accounted for by white males at these establishments declined by 1.5 percentage points, or 2.6%. The absolute magnitudes of effects estimated for white females are larger than those estimated for other minority groups, though in percentage terms they are smaller. Thus, the employment of white females appears to have risen by just over 2%, while that of black males and females rose by roughly 5% and 10% respectively.[67] Leonard's (1984b) regression results largely confirm these estimates. Leonard

[67]Absolute magnitudes of increases for these groups were .6, .3, and .3 percentage point respectively.

focuses on the period 1974-80 because he argues that enforcement of Affirmative Action before 1974 was relatively weak.[68] Yet its effects on overall employment shares in the two sectors in the late 1960s and/or early 1970s (as estimated by Ashenfelter and Heckman and others in the earlier studies) do not differ greatly from those that he estimates for the later 1970s, and Smith and Welch argue that the employment effects of Affirmative Action might have been even greater in the earlier period, despite its weaker enforcement. Thus, the cumulative effects of Affirmative Action on the distribution of employment are likely larger than those that appear in Leonard's work.[69]

Whether or not the contractor program contributed to rising inequality *within* the black community also remains somewhat unclear. In other work, Leonard (1984c) shows that contractor effects on employment are found across the entire occupational spectrum and did not increase inequality among blacks between 1974 and 1980. But Smith and Welch's results indicating rising black representation in professional and managerial occupations raise some questions about these findings.

Leonard (1990) also reports that his estimates of the effects of Affirmative Action on employment weakened in the early 1980s, as a result of lax enforcement of Affirmative Action regulations in the early years of the Reagan administration. Rodgers and Spriggs (1996b), comparing EEO-1 data between 1979 and 1992, report that differences in minority employment between contractor and non-contractor establishments were either comparable or somewhat larger in magnitude in the latter year, while those for white females had become a bit smaller.[70] Still, most of the shift in employment across these sectors appears to have been completed by the end of the 1970s.

The data and estimation strategies used in the Holzer-Neumark studies are quite different from those used by Leonard and the others, coming from surveys of establishments that (weighted by employee size) are more fully

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[68]To support this contention, Leonard cites reports by the United States Civil Rights Commission and United States General Accounting Office. The current enforcement structure, based in the Office of Federal Contractor Compliance Programs (OFCCP) in the Department of Labor, was established in 1978.

[69]Leonard argues that, while the overall employment effects are comparable between the earlier and later periods, Affirmative Action's effect on minority/female representation in highly-skilled jobs was greater in the latter period. But Smith and Welch present data that black representation in professional and managerial occupations, as well as in employment more generally, grew strongly in the contractor sector relative to the non-contractor sector in the early 1970s, and in the sectors covered by EEO-1 in the late 1960s as well. Unfortunately, Smith and Welch cannot distinguish contractors from non-contractors within the EEO-1 data during this earliest period, making it impossible to calculate an exact cumulative effect of Affirmative Action on employment shares.

[70]For instance, the share of employment accounted for by white women in the contractor sector declined by .5 percentage points and rose by 1.4 percentage points in the non-contractor sector. The relative shares of black men in each sector were roughly constant over time, while those of black women and Asians rose.

representative of the labor force than are the EEO-1 data (Holzer, 1996). Unfortunately, these data are drawn from just four large metropolitan areas (Atlanta, Boston, Detroit and Los Angeles), and provide only cross-sectional estimates of employment effects across establishments. The estimated effects for white males and females are therefore more likely to be biased due to unobserved heterogeneity across establishments, though the direction of this bias is not clear a priori.[71] The studies using EEO-1 data also limit the effects of Affirmative Action to those experienced by federal contractors, while the Holzer-Neumark studies use a broader, self-reported measure of Affirmative Action practice that includes firms that might use Affirmative Action for other reasons.[72]

Despite these differences, results from the two data sources are quite consistent in most regards. Holzer and Neumark's data suggest that the employment of white males in the Affirmative Action firms is lower by roughly 10-15%, which is redistributed mostly to white females and black males.[73] Although Holzer and Neumark's estimates might suggest somewhat greater redistribution of employment from white males to white females in firms practicing Affirmative Action, the estimates are not really comparable to those of Leonard and earlier researchers, which concerned employment flows rather than stocks. We think there are two points to keep in mind in interpreting how "big" this magnitude is. First, the findings from all of the studies imply that increases in the shares of employment in the Affirmative Action sector accounted for by minorities, who may have somewhat more limited skills and qualifications than the white males they replace, are quite modest.[74] The estimates for white females tend to be larger, but one might speculate that any impact of substitution of white females for white males is mitigated because these individuals often reside in the same households.

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[71]Interestingly, white and black women appear to be underrepresented among contractors in a simple cross-section of EEO-1 establishments; positive effects of such contractor status on their employment only appear in the difference-in-difference estimates reported by Leonard or in regression equations reported by Rodgers and Spriggs that include a variety of controls for location and establishment characteristics.

[72]The questions on which these analyses are based asked whether "EEO or Affirmative Action played any role" in the recruiting or hiring of the last employee at the establishment. Non-contractor employers might engage in Affirmative Action either as a court-imposed remedy for previous discrimination or to avoid "disparate impact" charges against them. Along many dimensions, such as the percentage of establishments reporting Affirmative Action and correlations with size and industry, the Holzer-Neumark data look similar to those used by Leonard.

[73]Other studies using micro-level employer data that find positive effects of Affirmative Action on the hiring of blacks include Block and Pennington (1981) and Hyclak, et al. (1992).

[74]While Smith and Welch argue that the share of all black employment accounted for by the EEO-1 covered sector grew from under 50% to almost 70% between 1966 and 1980, with most of this increase likely concentrated among contractors, their data still suggest that the shares of contractor employment accounted for by blacks rose by just a few percentage points in that period.

What are the gains enjoyed by minorities and females and the costs borne by white males from redistribution of employment across sectors? Even if we assume high labor supply elasticities across the two sectors and little net increase in overall labor demand for blacks (e.g., Brown, 1982), the wages of minorities and females are likely to be somewhat higher (and those of white males lower) than they would have otherwise been, because wage levels generally differ between the two sectors.[75] Relative wages of white males who maintain their employment within the contractor sector may be lower as well than they otherwise would have been, especially if the quality of their job assignments and their promotion rates are reduced as well.[76]

One final point worth emphasizing here is that the establishments that are most likely to engage in Affirmative Action are not necessarily those that are most likely to discriminate in the first place. For instance, contractors and other practitioners of Affirmative Action tend to be large establishments that appear to engage in much less hiring discrimination against blacks than do smaller establishments (Holzer, 1998; Carrington, et al., 1995; Chay, 1998). Leonard (1985) also notes that compliance reviews, which have particularly large effects on establishment hiring, are targeted towards establishments that already have relatively strong minority employment rates. This evidence has two implications. First, it suggests that to some extent Affirmative Action may not be a remedy for present discrimination at the establishment level, but rather work to counteract broader disadvantages in the economy facing blacks by improving their opportunities elsewhere in the labor market. Second, it suggests that the estimates we obtain from the types of evidence described in this section may understate what the causal effects of Affirmative Action would be if the policy were truly exogenous. This problem plagues the Holzer and Neumark studies most severely (since their measure of Affirmative Action is not based on exogenous contractor status), but it also plagues the EEO-1 studies to the extent that enforcement is targeted to select types of firms. This problem is endemic to research on Affirmative Action, as there is an absence of the types of evaluation studies that have become prominent in

[75]For instance, contractor establishments, or those that engage in Affirmative Action more generally, are likely to be much larger than non-Affirmative Action establishments, and larger establishments pay higher wages (Brown and Medoff, 1989).

[76]Smith (1993) argues that EEO and Affirmative Action policies together led to a dramatic increase in the relative demand for and wages of black college graduates in the late 1960s and early 1970s, which was later dissipated as their relative supplies rose in response to the early demand shifts. This argument, of course, implies very limited substitutability between young white and black college graduates.

other areas of labor economics research. Although it is difficult to conceive of a more compelling research design to study the effects of Affirmative Action,[77] this is one of the most prominent needs in research on Affirmative Action.

B. The Effects of Affirmative Action on Enrollment

The effects of Affirmative Action on college enrollments have not, until recently, received as much attention as its effects on employment. In addition, the existing research is somewhat less convincing in its ability to isolate the effects of Affirmative Action, because there is no explicit distinction (such as contractor status) with which to classify colleges or universities as bound or not bound by Affirmative Action. Indeed, we are not aware of any systematic information regarding colleges or universities that do not use Affirmative Action in admissions.[78] We suspect that less attention has been paid to Affirmative Action in education because there is little doubt among researchers that it played a prominent role in increasing admissions of minorities (e.g., Bowen and Bok, 1998). This may be a reasonable position. But since the period of rapidly rising enrollments (roughly the 1960s and 1970s) was one of rapid declines in poverty among minorities,[79] following closely upon the desegregation of public schools, and was accompanied by anti-discrimination forces in the labor market that likely affected the returns to higher education for minorities, simple time-series trends in minority enrollments may overstate the independent effects of Affirmative Action.

Nevertheless, the increase in minority college enrollments over this period is striking. Summarizing data from numerous sources, Thernstrom and Thernstrom (1997) report that black enrollments as a percentage of all enrollments in schools other than black colleges rose from 1.8% in 1960 to 4.2% in 1970, 8.2% in 1980, and 9.0% in 1994. Similarly, Bowen and Bok (1998) report that from 1960 to 1995 the percentage of blacks aged 25 to 29 who had graduated from college rose from 5.4% to 15.4%. Even sharper changes are evident for professional schools in this period, with the percentage of blacks growing from 1% to 7.5% in law schools, and from 2.2% (in 1964) to 8.1% in medical schools. Data for Hispanics do not go back as far, but also indicate sharp gains since 1970. Even if these increases overstate the gains due to Affirmative Action, the lawsuits over race-based preferences (e.g., *Bakke*) and

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[77]Holzer and Neumark (forthcoming) report on some attempts to do this based on firm-size cutoffs at which different Affirmative Action requirements become effective.

[78]There are, however, a handful of colleges that apparently resist Affirmative Action in admissions (as well as hiring, by refusing federal funds). One example is Hillsdale College in Michigan. In principle, a study of such colleges (assuming they are non-discriminatory) with other matched schools might yield useful information on the effects of Affirmative Action on enrollments.

[79]Thernstrom and Thernstrom (1997) provide tables summarizing these statistics.

evidence of stepped up recruiting of minorities (Bowen and Bok, 1998) strongly suggest that Affirmative Action played a major role.[80]

Finally, Conrad and Sharpe (1996) provide evidence at a point in time (1994) for the University of California system that more clearly indicates the role of Affirmative Action. In both undergraduate and professional graduate programs, a large fraction of students are admitted solely on academic credentials, while another group is admitted based on other criteria–including diversity–which in the period prior to Proposition 209 included race and ethnicity. The figures they cite show that minority representation is considerably higher in the latter group of admits than in the former, or that non-academic admission criteria are generally more important for minority students.

Another way to approach the issue is to look for evidence of the effects of Affirmative Action in current admissions decisions to undergraduate and graduate institutions by examining qualifications of minority admits. Datcher Loury and Garman (1993) find shortfalls in SAT scores among blacks even in schools with average quality below the median.[81] In contrast, Kane argues that college admission rates for blacks, controlling for high school grades, SAT scores and personal characteristics, are only higher for the top quintile of schools. These results are not necessarily inconsistent, though the exact reason for the racial gap in below-median schools is unclear.[82] There are also some related studies for graduate school admissions. Regarding professional schools, studies show that blacks admitted to medical schools (e.g., Keith et al., 1987; Davidson and Lewis, 1997) and graduate business programs (Dugan, et al., 1996) have lower grades and/or higher probabilities of being admitted, conditional on their grades, consistent with preferential treatment. In the only study of Ph.D. programs of which we are aware, Attiyeh and Attiyeh (1997) study admissions decisions in five disciplines (Economics, Biochemistry, English, Mathematics, and Mechanical Engineering) at 48 leading graduate schools that are members of the Association of Graduate Schools of

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[80]Naturally, such gains accrue disproportionately to those from better-off families, as minority students who meet criteria for admission under Affirmative Action programs come from such families. For example, Bowen and Bok (1998) report that in their sample for 1989, 15 percent of black matriculants come from families they classify as "high socioeconomic status," compared with three percent for the national black population (p. 48).

[81]For instance, their data show that almost 75% of whites, but only about 10% of blacks, have SAT scores above 850 in schools with average scores below 1000.

[82]Kane's data are based on self-reported applications to different colleges, while Datcher Loury and Garman look only at schools attended. The latters' results might reflect racial differences in decisions about which school to attend, conditional on acceptance, or racial differences in average test scores in the same schools, conditional on being above a common cutoff. Given the wide range of schools within the lower category of schools considered by Datcher Loury and Garman, it is also quite possible that blacks are concentrated within a different set of schools (with lower average test scores) than whites in this category.

the Association of American Universities. They estimate probit models for admissions decisions including demographic variables, information on GRE scores, college grades, selectivity of undergraduate college, other graduate degrees, major, and institutional characteristics (including institution dummy variables). Their results indicate modest preferential treatment of women in three out of five disciplines, and far more substantial preferential treatment of minorities relative to other U.S. citizens in all five disciplines. Thus, across these professional and academic fields, there is fairly straightforward evidence of preferential treatment of women and especially minorities.

Bowen and Bok (1998) provide a broader look at the evidence regarding undergraduate admissions. They first note the well-known statistics on differences in SAT scores between minority and non-minority students at the selective undergraduate institutions they study. However, they provide some important counterpoints to the typical claim that such differences unambiguously or solely reflect lower standards for minorities (e.g., Bunzel, 1996). First, they present a simple and clear exposition of the point that is obvious to statisticians, but not everyone else, that lower test scores in the minority population relative to the non-minority population imply that even if an identical cutoff is used in deciding whom to admit to a particular school, the average SAT score of non-minority admits will exceed that of minority admits (p. 16).[83] Thus, evidence of differences in SAT scores does not prove and almost certainly overstates the role of preferential treatment in admissions.[84] They also present two other striking statistics regarding SAT scores. First, they report that the black-white gap in SAT scores at a subset of four selective institutions with the requisite data narrowed between 1976 and 1989 (although it may have widened prior to 1976). Second, these same figures show that the average SAT score of black matriculants at these schools in 1989 was higher than the average SAT score of *all* matriculants in 1951 (although the average for white matriculants in 1989 was considerably higher). Again, these figures do not dispute the claim that there is preferential treatment in admissions for blacks and minorities generally, but they do suggest a more somber evaluation of the casual use of statistics on SAT scores in this debate.[85]

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[83]Think of estimating average height in two populations, one consisting of all men over six feet tall in the overall population, and another of all men over six feet tall in the NBA. Clearly, the second average would exceed the first.

[84]Bowen and Bok (pp. 37-8) provide some estimates derived from a study by Wightman (1997) that illustrate this point. Wightman studied 30 of the most competitive law schools, comparing the test scores and grades of black students with those of white students in the bottom decile of white admits. The notion is that these white students have characteristics close to those of the white students who were displaced by Affirmative Action admissions. While the overall difference in LSAT scores between white and black students was 24 percent, the difference between these least-qualified whites and the black students fell to 10 percent. This still indicates preferential treatment, but of a smaller magnitude.

[85]It is sometimes argued that test scores may be poorer predictors of college success for blacks than for whites, which

Bowen and Bok then move on to a more appropriate analysis of the impact of Affirmative Action on admissions, using data on five universities for which they have the needed data on applicants. Although future academic research will undoubtedly probe deeper into the details of their analysis, they attempt to carry out what is the correct approach. As they note,

> The best way to measure the degree of preference given is by comparing the credentials of those black students who presumably would not have been enrolled under a race-neutral standard ... with the credentials of an equivalent number of rejected applicants (mostly white) who would have been admitted under a race-blind procedure (p. 18).

Based on the estimation and calculation needed to answer this question–including the simulation of a race-neutral admissions policy–Bowen and Bok conclude that under a race-neutral policy the probability of admission for black applicants would fall to .13 (as compared with 1989 figures of .42 for black applicants, and .25 for white applicants). As confirmation that their estimation and simulation yield reasonable estimates, they also report on figures for the University of California-Berkeley before and after the adoption of race-neutral admissions because of Proposition 209. In 1997, when race-sensitive admissions were used, the admission rates were .485 for blacks, and .299 for whites. For the following year the rate for blacks fell to .156, and the rate for whites rose to .303 (pp. 32-3).[86]

C. The Effects of Affirmative Action on Contracting with Minority- and Women-Owned Businesses

Evidence on the effects of Affirmative Action on contracting with minority- and female-owned businesses is more sparse, although there is some evidence consistent with strong positive effects of these programs. In their *Review of Federal Affirmative Action Programs*, using information obtained directly from the federal agencies involved,

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could lead admissions officers to rely less on test scores for blacks, and would likely lower the test scores of black relative to white admits at comparable institutions. Looking at data for selective institutions, Vars and Bowen (1998) and Bowen and Bok (1998) find some evidence that test scores are worse predictors for blacks. Furthermore, Vars and Bowen also report that conditional on test scores there is a performance shortfall of blacks relative to whites–measured in terms of grade point average or graduation–that is larger for those with the highest SAT scores. Although it is not clear what explains the overall performance shortfall, a larger shortfall at the upper end of the test score distribution is expected if test scores predict white performance better than black performance. Thus, it is conceivable that worse information contained in test scores for black students explains lower average test scores of black admits. On the other hand, we might expect this to be offset by the overall performance shortfall of blacks, conditional on test scores, which might lead to *higher* test score standards for blacks than for whites.

[86]Of course applicant behavior might change in response to changes in admissions procedures; for example, blacks might begin to apply to more schools. As a result, these figures probably overstate the response to changes in admissions policies. Nonetheless, it is unlikely that for the relatively small subset of selective schools this could lead to very different conclusions with regard to student "yields," and Bowen and Bok present some simulations that confirm this (p. 35). At the same time, as hinted at by the small increase in the white admission rate at Berkeley, and indicated by other calculations Bowen and Bok present, the admissions taken from blacks under a race-neutral policy would result in only very marginally higher admission rates for whites.

Stephanopoulos and Edley report that between 1982 and 1991 there was a 24 percent increase in the dollar volume of all federal procurement contracts over $25,000. Over this same period, contracts awarded to firms owned by women increased by more than 200 percent, and those awarded to minority-owned firms increased by more than 125 percent (Stephanopoulos and Edley, 1995, Ch. 9, p. 5).[87] They also report strong gains in Department of Defense (DoD) contracting with small, disadvantaged businesses, with such contracting growing from 2.1 percent of DoD procurement in 1985 to 5.5 percent in 1994 (Ch. 9, p. 5). More generally, they report that by 1993 Affirmative Action in contracting and procurement had achieved near-proportional representation for minority-owned businesses, reporting that as of this year "prime contracts for minority-owned businesses were 6.4 percent of the total dollar volume. This approaches the proportion of minority-owned businesses among all U.S. firms" (Ch. 9, p. 5).[88] One problem with this evidence regarding federal programs is that it does not identify the independent effects of Affirmative Action; it is possible that other factors partly account for the growth in contracting and procurement with minority- and female-owned businesses.

Aside from the federal programs, state and local governments frequently favor minority-owned businesses. Bates and Williams (1995a), Bates (1998), Myers and Chan (1996), and Rice (1995) provide some summary information suggesting large impacts of local procurement programs on the minority share of contracting and procurement, in Atlanta and other cities. For example, in 1973, although the majority of Atlanta's population was black, black-owned firms received only one-tenth of one percent of the city's procurement business. But after implementing a program of promoting minority business ownership, this share rose to 19.9 percent by 1976, and 38.5 percent by 1978 (Bates, 1998, p. 11). Similarly, Bates (1998) reports that controlling for firm characteristics including size, industry, etc., minority-owned business are more likely to sell to government than are other businesses.

Overall, then, there is a prima facie case for concluding that Affirmative Action was responsible for the growth in government contracts with minorities and women. Of course the focus on government contracting to some

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[87]They do not explicitly state whether the figures for minority- and women-owned businesses also refer to contracts over $25,000.

[88]However, they are also quick to point out that minorities are underrepresented among business owners, so there is less evidence (indeed, none is discussed in this *Review*) that Affirmative Action has spurred minority and female entrepreneurship. On the other hand, although Stephanopoulos and Edley do not emphasize this point, they note that the receipts of women- and minority-owned businesses are typically much smaller than those of white-owned firms (in 1990, by a factor of more than two (Ch. 9, pp. 2-3)). Thus, one could argue that as a fraction of receipts of minority-owned businesses, federal programs have gone beyond proportionality.

extent misses the point, which is to help foster minority and female business ownership. Because this latter question pertains more to the "success" of Affirmative Action, we discuss related evidence below, where we turn to the efficiency/performance effects of Affirmative Action.

V. Beyond Redistribution: The Efficiency/Performance Effects of Affirmative Action

Although there are some remaining questions, the evidence reviewed in the previous section is most consistent with the conclusion that Affirmative Action succeeds in boosting employment of women and minorities, minority enrollment in universities, and government contracts for minority- and women-owned businesses. Consequently, the issue of the efficiency/performance effects of Affirmative Action comes to the fore. The potential efficiency effects were discussed in Section III. As explained there, economic theory does not make unambiguous predictions about the efficiency effects of Affirmative Action in employment. Nonetheless, in looking at labor market effects, economic theory at least offers some guidance as to the types of effects we should examine–e.g., productivity, profitability, unit labor costs, etc. With respect to education, theory provides even less guidance; as there is not a compelling case that university admissions policies in the absence of Affirmative Action are efficient, it is not clear what measures we should look at to try to infer whether Affirmative Action leads to deviations from efficiency. Rather, when we turn to education we examine evidence on specific hypotheses regarding the effects of Affirmative Action that might bear on efficiency (e.g., incentives, "fit," and externalities). Finally, we review the little evidence that exists addressing the efficiency/performance effects of Affirmative Action in contracting and procurement.

A. Efficiency/Performance Effects in the Labor Market: Evidence

Theoretical work on the effects of Affirmative Action in the labor market identifies a number of potential channels for efficiency effects, including influences on the qualifications of hires and on production costs, impacts on human capital investment, changes in information or beliefs about minority and female applicants, and externalities. Because the potential effects of Affirmative Action on the productive efficiency of firms depends in large part on how Affirmative Action affects employee or establishment productivity and performance per unit labor cost, most research has focused on this question in one way or another. However, because there are many settings in which it is not feasible to estimate directly the effects on productivity or costs, many empirical strategies aside from production or cost function estimation have been used, including: examination of company financial data; drawing inferences from employee performance ratings or attitudes; empirical or qualitative studies of specific sectors or firms; and studies of employee selection procedures. This evidence is described in the following subsections, and summarized in Table 5.

1. Production/Cost Function Estimates. For economists, estimates of production or cost functions should be the most straightforward way to infer the effects of Affirmative Action on worker or establishment productivity or costs, when the appropriate data are available. Leonard (1984a) estimated production functions at the level of state-by-two-digit industry cells, using data from the Census of Manufacturers and the Annual Survey of Manufacturers in the 1970s. He augments the labor input in the production function to include information on the fraction of establishments that are federal contractors, in order to estimate whether productivity of labor is lower in such establishments (actually, in the state-by-industry cells). While he found no negative effects on productivity of the presence of contractors in a cell, these findings are relatively uninformative, given the very aggregated level at which the analysis was performed.

More recently, Griffin (1992) estimated translog cost functions at the establishment level, using EEO-1 data merged with Compustat data. His results suggest that the constraints imposed on the labor demand choices of contractors raised their labor costs by roughly 6.5% relative to those of non-contractors. Moreover, in accordance with the LeChatelier principle, he finds that firms in the contracting sector have less elastic labor demands. However, there are two potential reservations regarding this conclusion. First, data on wages had to be imputed, based on race/sex/occupational cells within industries from the 1980 Census of Population. As Griffin notes, the use of his wage index as a firm-level labor cost measure requires the assumption that input markets are perfectly competitive (p. 254). The problem this poses is that wage differences by industry, union status, etc., are attributed causally to contractor status. Given that contractors are likely to be in high-wage industries, such as construction, this imputation procedure may well lead to upward-biased estimates of cost differences attributable to Affirmative Action.[89] Second, the very large elasticities of demand with respect to own wages estimated for these establishments (generally 1-2 for contractors and 2-5 for non-contractors) create some doubt about these results (see Hamermesh, 1993).

Overall, while the approach is promising and well-motivated by economic theory, the use of production and cost function estimates to infer Affirmative Action effects on productivity has so far generated inconclusive results.

2. Company Financial Data. Another method which labor economists use to infer the effects of workplace practices on productivity is through the analysis of company-level financial data. Applying this method to the study of Affirmative Action, Wright, et al. (1995) carried out an event study that analyzes the responsiveness of stock prices (relative to the overall market) to announcements that companies had been cited by the Department of Labor for

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[89]This point is acknowledged explicitly in Griffin, et al., 1996 (footnote 1).

"Exemplary Voluntary Efforts" on Affirmative Action. Looking at 90-day periods that precede and follow such announcements, they find that stock prices react positively and significantly to such announcements, and conclude that the market views Affirmative Action as having positive effects on companies' profits. However, questions remain about the extent to which this result would generalize to a larger sample of establishments and to involuntary efforts based on contractor status.[90] There are also questions about the nature of the "event." In particular, the authors also find negative effects of announcements of discrimination settlements on stock prices (also see Hersch, 1991), suggesting that the positive effects of announcements of exemplary Affirmative Action efforts may simply provide information on "immunity" from discrimination suits. On the other hand, although the awards presumably confirm practices already in place, they can still convey information about these practices by reducing the uncertainty associated with this assessment. If discrimination is inefficient, reflecting non-profit-maximizing behavior, then the "event" that reveals non-discriminatory behavior to investors might be expected to result in higher rather than lower stock prices.

3. Employee Performance Ratings and Attitudes. An alternative approach examines performance ratings of individual employees, in Affirmative Action vs. non-Affirmative Action settings. Because these ratings are subjective and person-specific, they may contain classical measurement error across establishments and employees, and possibly systematic biases in favor of or against specific race/sex groups. Still, there is reason to believe that these performance ratings contain useful information on performance differences across individual employees.[91]

In one set of papers, Holzer and Neumark (1998, forthcoming) use a difference-in-differences framework to analyze supervisory performance ratings of white male and minority/female employees in establishments that do and do not practice Affirmative Action.[92] The difference in the gap between white males and other groups between the two sectors constitutes the difference attributable to Affirmative Action. They find that, on the one hand, the qualifications of minorities in Affirmative Action establishments (as measured by educational attainment) are relatively lower than in

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[90]The sample analyzed contained only 34 companies. Voluntary self-selection of Affirmative Action efforts might imply much lower efficiency costs than those imposed on an establishment by their "contractor status."

[91]In a National Research Council report, Milkovich and Wigdor (1991) argued that performance ratings by supervisors generally do not appear to be seriously biased by race and sex, based on evidence of positive correlations between ratings and both ability and objective performance measures, and on evidence of only moderate effects of race and sex on performance ratings (Lewis, 1997). However, Lewis contends that this is too strong a statement, as there is some evidence of bias in performance ratings against blacks and women. This suggests that cross-sectional studies may be biased towards finding worse performance for these groups. Abraham and Medoff (1981) were among the first economists to use these ratings as proxies for individual productivity.

[92]The data focus on the last worker hired in the establishment, and performance is measured on a 0-100 scale.

non-Affirmative Action establishments. But, on the other hand, there was little evidence of lower performance ratings of women/minorities in establishments using Affirmative Action (with the exception of Hispanic males). To the extent that performance was lower in establishments engaging in Affirmative Action, these findings were limited to establishments that used Affirmative Action in *hiring* as opposed to *recruitment* only.

Their findings also indicate that these establishments engage in a variety of human resources activities that apparently help them find minority/female employees for whom some easily observable qualifications (such as education) may be somewhat limited but whose performance is up to standards. For instance, establishments engaging in Affirmative Action recruit more extensively, attract more black applicants, pay less attention to various negative personal attributes during the screening process (perhaps because they uncover other, more pertinent or compensating information), rely more heavily on formal performance evaluations, and provide more hours of training to their new employees than do non-Affirmative Action establishments. These results are consistent with the finding that the Affirmative Action establishments either find minority applicants with above-average unobservable characteristics or manage to offset the observable deficiencies through extra feedback and training. Note that this extra training is consistent with the prediction of the Lundberg (1991) model of Affirmative Action.

These results are plagued by some statistical questions, including uncertainty over how the Affirmative Action status of establishments is defined and potential unmeasured differences in ratings across these establishments.[93] But the results of the studies are largely borne out by those of Lewis (1997), who analyzed differences by race/sex in performance ratings of workers in a 1% sample of all federal personnel records. Given that the federal government uses Affirmative Action in hiring, any observed differences in personnel ratings by race/sex might well be attributable to these practices, and the focus on one such very large employer eliminates concerns about unobserved heterogeneity across employers with different race/sex preferences and hiring practices.[94] His results show that, within occupational grade and controlling for differences in education and experience, white women are

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[93]The difference-in-differences estimation enabled us to eliminate average differences in ratings by race/sex in the non-Affirmative Action sector (which should remove any influence of bias in ratings, unless this bias differs in the two sectors), while fixed effects associated with individual supervisors across establishments is eliminated by using the deviation in performance ratings between the last person hired and the "typical employee in this position."

[94]Even without Affirmative Action, there are likely to be differences in average performance across race groups that reflect differences in educational quality and other measures of background. Thus, any estimated differences in performance ratings by race are likely to be upper bounds to the effects associated with Affirmative Action. The difference-in-differences estimation in the Holzer-Neumark papers overcomes this problem.

significantly more likely to receive "outstanding" performance ratings than white men (Table 2, column (4)). Black and Hispanic women are no more likely to receive such ratings than white men, indicating, in turn, that they are less likely to receive them than white women. The point estimates also indicate that black and Hispanic men are less likely to receive outstanding ratings than white men, although these differences are not statistically significant. Lewis obtains parallel results for the probability of receiving low ratings. Thus, Lewis's results correspond with those found by Holzer and Neumark in their analysis of mostly private-sector establishments. There is no evidence that white women hired under Affirmative Action perform worse, and weak evidence at best that minorities do so.[95]

4. Analyses of Specific Sectors. The effects of Affirmative Action on outcomes have been studied most extensively for two groups of workers: police and academics.[96]

a. Police. The representation of blacks on the police forces of many large cities has grown dramatically since the 1970s, particularly as minorities have become much larger fractions of these urban populations, but also as the local political landscapes have changed (Lewis, 1989). Lawsuits and consent decrees have, in many cases, contributed to the growing minority and female representation on many of these forces. Lovrich and Steel (1983, 1987) analyze differences in crime outcomes across cities with varying representations of women and minorities on their police forces. Defining "high Affirmative Action" and "low Affirmative Action" cities either by

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[95]Studies in psychology point to some potential problems with subjective assessments of hires if they are explicitly identified as "Affirmative Action hires." This literature, which is summarized in Campbell (1996), shows that the attitudes expressed towards Affirmative Action hiring and the hires themselves can vary widely depending upon how Affirmative Action is implemented. This research has the further implication that productivity or performance of workers hired under Affirmative Action may be influenced by how it is implemented. For example, Heilman (1997) and Heilman, et al. (1992) argue that labeling individuals as "Affirmative Action hires," with no qualifications or caveats, almost certainly stigmatizes minority/female applicants, and perhaps even reduces their own perceptions of their qualifications and productivity. On the other hand, these negative perceptions can be avoided when respondents are provided more information about the possible presence of discrimination in the absence of Affirmative Action and about the actual selection process (e.g., Graves and Powell, 1994; Konrad and Linnehan, 1995; Tougas, et al., 1996).

Research in management comes at essentially the same issue from the perspective of "procedural justice." This research suggests that employee perceptions of employer "fairness" have positive implications for firms by influencing workers' behavior (Greenberg, 1990; Leck, et al., 1996; Skarlicki and Folger, 1997). An important component of this perceived fairness is procedural justice, which refers to the fairness of the means used to determine what employees receive (as opposed to distributive justice, which refer to the fairness of the distribution of what is actually received (Folger and Konovsky, 1989; Skarlicki and Folger, 1997). However, while some research using hypothetical examples presented to test subjects suggests that how managers explain Affirmative Action-type decisions may influence perceived procedural justice (Bobocel and Farrell, 1996), we have not come across research that tests how perceptions of procedural justice or more importantly performance change with actual variation in implementation of Affirmative Action.

[96]Medicine has also been studied, but because the issue with respect to this field is couched in terms of medical school admissions, it is discussed in the following section on Affirmative Action in education.

current representation of minorities/females or growth over time, they find little evidence of differences across these cities in crime rates, successful arrest rates per crime committed, and per capita expenditures on crime control. Indeed, trends in all outcomes look very similar across the two categories of cities, regardless of how they are defined.[97]

Of course, growing minority representation on a city's police force may reflect local political/demographic factors rather than the effects of Affirmative Action programs per se. For example, a growing proportion of young blacks may be associated with both increased crime rates and increased minority representation. Alternatively, minority representation may be increased in response to increased crime, or blacks may be more heavily represented on the police forces of cities with larger minority populations and higher crime rates. All of these scenarios predict a positive association between crime rates and minority representation, and hence positive bias in the types of analyses Lovrich and Steel conduct. Lott (1998) uses presence of a consent decree and the length of time it has been in effect, as well as whether the city's mayor is black, as instruments for the race and sex composition of the police force. Upon instrumenting, Lott finds a large positive effect of minority police representation on the rates of incidence of some crimes (homicides and assaults). However, this study is plagued by a variety of problems concerning sample definition and specification of equations, making the conclusions unreliable.[98]

The issue of whether Affirmative Action leads to lower standards has been quite prominent with respect to police work. First, concurrent with increased efforts at raising minority representation have been increased educational requirements for police officers, which is more likely to disqualify minority than non-minority candidates (Carter and Sapp, 1991). However, as Carter and Sapp document, the courts have generally ruled that higher education is a bona

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[97]Donohue and Levitt (1988) focus more on the relationship between the racial composition of police forces and the racial patterns of arrests and crime. They find that own-race policing (by which they mean a better match between the demographics of a city's population and its police force) appears to reduce property crime and overall arrests, without influencing violent crime. They interpret the combined evidence as providing an "efficiency rationale" for Affirmative Action in policing, although their paper does not analyze Affirmative Action directly.

[98]The exogeneity of a consent decree is questionable in this context, as it may reflect underlying racial tensions and demographic/political forces that could be endogenous to the local crime rate. We are also concerned with how to interpret the very different results for different categories of crime, suggesting some spurious relationships in the data; for example, his results indicate that a higher black or minority presence is associated with more murders and assaults, and fewer rapes and car thefts. Most importantly, Lott makes a statistical error in the main results reported in his tables. His dependent variables in the second-stage regressions are crime rates, yet he includes these in the first-stage regression. In a footnote (number 22) he reports results when he (correctly) does not do this, finding much weaker and generally insignificant effects of sex or race composition on violent crime rates. These problems are reflected in the likelihood (for reasons explained in the text) that endogeneity of minority representation with respect to crime rates should lead to upward, rather than downward, biases in OLS estimates of the effects of minority representation on crime, though Lott finds the opposite.

fide occupational requirement. Interestingly, Carter and Sapp find that female and minority police are *more* likely than their male counterparts to have college degrees, though this could simply reflect their relatively younger ages.[99]

A second prominent issue has been that of "race-norming" of test scores, which has the effect of reducing standards for minority candidates. Carter and Sapp argue–apparently based on impressions gained from site visits, although the evidence is not presented–that race-norming is unnecessary, and that "qualified minorities can be identified and hired by law enforcement agencies without changing employment standards" (p. 20). However, they suggest that police departments pursued the latter strategy because they were skeptical that more aggressive recruitment would meet their hiring goals (p. 20). Gottfredson (1996) provides a detailed critique of the Nassau County Police Department's development–under court order–of a test designed to reduce disparate negative impact of testing on minorities. She shows that the overall test procedure downplayed cognitive tests relative to other tests. She also argues strongly that the tests that received increased weight were less job related, which reduced the overall validity of the test. However, although Gottfredson predicts dire consequences of this test for performance of the department, she presents no direct evaluation of evidence before and after the test's implementation.

b. Academics. As virtually all universities are federal contractors, most are bound by Affirmative Action requirements. Do the women and minorities who have been hired in greater numbers in academia over the past several years have lower productivity than their white male counterparts? Kolpin and Singell (1996) focused on economics departments in the late 1970s and early 1980s, finding that highly-ranked departments hired relatively few women in the 1970s, but those that did gained ground in rankings relative to those that did not. Furthermore, women had higher publication rates than did their male counterparts at departments with comparable ranks in the 1970s.

Other studies focus on salary differentials between different demographic groups, and therefore do not directly relate to Affirmative Action, although these studies sometimes present evidence on publication differences between white males and others. Focusing on academic departments more broadly defined than in the Kolpin and Singell study, Barbezat (1989) reports considerably lower publication of articles for women than men, and smaller differences in the same direction for books. However, these estimates do not control for field (and Barbezat claims that the average level of publication varies tremendously across fields). They also do not control for age or experience, which are lower for women in her sample. On the other hand, in salary regressions that control for age and

[99]They present only univariate analyses, arguing–for reasons inexplicable to us–that this is appropriate because "the findings represent the population studied, not a sample" (p. 7).

experience (but not field), adding publications reduces the positive male-female differential, consistent with lower publications for women conditional on the included variables. Barbezat does not report overall publication differences by race, but she does find that blacks were earning positive premia that grew after controlling for publications, consistent with lower publications for blacks (although again with no controls for field). However, there is contrary evidence regarding lower performance among black academics, as Elmore and Blackburn (1983) find comparable rates of publications between whites and blacks in Big Ten universities in the late 1970s.

The disadvantage of these studies relative to the Kolpin and Singell study is that they do not incorporate information on the quality of publications. In principle this could be done, although such information is likely to be valid only within fields. The Kolpin and Singell study implicitly incorporates information on the output of faculty members via department rankings. In general, research on academics is promising for two reasons. First, the debate about Affirmative Action in hiring in academia is particularly fierce (see, e.g., Etzioni, 1971, and the letters in response to this article). Second, much of individual output is observable in academia in publicly-available forms; although quality is harder to gauge, this can be attempted using either citations or rankings of journals.

5. Case Study/Institutional Evidence. Aside from quantitative evidence on the efficiency effects of Affirmative Action, there are some useful case studies that present qualitative or descriptive evidence, although these studies focus more on how Affirmative Action was implemented rather than on performance explicitly. For instance, Badgett (1995) reports on a very large nonunion manufacturer that implemented Affirmative Action for blacks as part of a settlement of a race discrimination lawsuit. The Affirmative Action plan entailed hiring and promotion goals, and technician training. Badgett reports that the hiring and promotion goals were met by the company expanding its recruiting efforts (as evidenced by large increases in the relative numbers of black applicants, as well as increased hiring).[100] This company was increasing skill requirements of workers, via both increased pre-employment testing and increased training, at the same time it was implementing Affirmative Action. Badgett argues that rather than these two goals competing with one another, they may have been at least in part complementary, because achieving them required similar tools (e.g., increased recruiting and training), although it is difficult to point to concrete evidence.[101]

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[100]The hiring comparison is based not only on changes over time, but also a comparison to hiring at similar employers in the same period.

[101]One finding illustrates how the company at least reduced the tradeoff between these goals (without demonstrating complementarity per se). Specifically, in order to reduce disparate impact from increased pre-employment testing, managers designed recruiting efforts to "oversample" blacks, so that "the actual numbers of minority applicants who

Vernon-Gerstenfeld and Burke (1985) studied nine companies during the 1980s, interviewing and surveying personnel and Affirmative Action directors. Although they were provided no data with which to assess the assertions these directors made, they report that Affirmative Action plans were viewed as more likely to be effective when they emphasized recruitment and training, and used ongoing performance assessment. Although the nature of "effective" is not specified, and there appears to be no comparison across companies based on the methods used to make Affirmative Action more effective, it is nonetheless of interest that these conclusions parallel the findings in Holzer and Neumark (1988) that firms using Affirmative Action report intensified recruitment, training, and performance evaluation. Similarly, Stoops (1982) stresses the successful recruitment campaign for minority police in Houston in the late 1970s and early 1980s, although the study contains no information on the qualifications of recruits. Hyer (1985) concludes that factors such as more extensive recruitment and strong leadership contributed to the success of Affirmative Action at the three academic institutions she studies, although in her case success is measured only in terms of recruitment of female faculty, and there is again no comparison group.[102]

Not all case studies describe positive programs. Espinosa (1992) studies the implementation of Affirmative Action in a California city, finding that goals were not met and that progress towards meeting those goals was exaggerated. Among other conclusions, this paper points to the importance of obtaining objective measures of the success of Affirmative Action, and suggests some caution in relying on subjective (or even ostensibly quantitative) assessments provided by those involved in the program.

Not surprisingly, these studies indicate that an emphasis on generating employees of high quality through a variety of means seems to contribute to "successful" Affirmative Action programs. In general, although we think the case studies provide useful descriptive information that might guide more systematic research, they do not lead to conclusive evidence on their own. Supplementing these studies with comparison groups of companies with less successful Affirmative Action programs, and looking at success in terms of worker or organizational performance

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pass the test remain high even though the group's pass rate is lower" (p. 503).

[102]More quantitative evidence on the important role of recruitment, training, and overall management strategy in Affirmative Action programs appears in a study of 141 manufacturing firms in Tennessee by Johns and Moser (1989), while many of the same factors are stressed by Butler and Moskos (1998) in their discussion of the success of Affirmative Action in the U.S. Armed Forces in leading to promotions of minorities into higher ranks (although these authors do not assess the performance effects).

would greatly increase the value of case studies, although they will always suffer from a lack of generalizability relative to more quantitative studies of larger, more representative samples.

6. The Employee Selection Literature. A very different and much more indirect approach to the study of Affirmative Action appears in the literature in industrial psychology and human resources management on selection procedures in employment. This literature, summarized in Campbell (1996), generally shows that cognitive test scores are correlated with a variety of measures of job performance at the level of .3-.6. Given racial test score gaps of up to a standard deviation between whites and blacks, comparable hiring standards across the two groups will lead to lower employment levels of blacks and lower average performance among black employees on jobs where such performance matters. Not surprisingly, simulations (with little economic content) suggest that lowering standards for minorities under Affirmative Action will lead to lower average performance among those minorities hired, and higher average performance among non-minorities, although effects on overall firm performance are likely to be modest unless goals for minority hiring far exceed the actual proportion in the relevant population (e.g., Silva and Jacobs, 1993).[103]

On the other hand, a broader range of tests (including psychomotor skills, personality tests, or other job-specific skills) indicate much smaller or no racial differences, and predicted racial differences in job performance will vary according to the extent to which these different measures of skills are relevant to any particular job. Indeed, multiple predictors generally generate more "valid" outcomes with less adverse impact generated against minority candidates (see the discussion in Gottfredson, 1996). Thus, successful Affirmative Action programs may require not a lowering of standards, but a careful evaluation of what appropriate standards are, how they are best gauged in minority candidates for employment, and how extensive recruiting and training can be used to generate such employees.

7. Administrative Costs. Aside from these influences on worker performance, there are also potential direct costs of administering Affirmative Action. Some estimates of these direct costs, based on a variety of surveys of

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[103]Generally, cognitive tests are as strongly related to performance among blacks as among whites. But even with fair tests any group with lower mean scores on a predictor variable will have a higher rate of false negatives (cases in which tests are not above a specified criterion, but actual performance would be), so long as the tests themselves are not perfectly correlated with the true "criterion" for which tests are administered; the less than perfect correlation implies that the race difference in hiring rates will exceed the difference in the population between the proportions of qualified whites and blacks. This has generated some calls for within-group race-norming of predictors, though not necessarily norming *between* groups. Within-group norming in this context means that results are adjusted so that the group differences based on the test are no larger than they would be based on the true criterion. For more discussion see Campbell (1996).

limited numbers of establishments, appear in Leonard (1985) and Conrad (1995). They cite surveys of very large companies from the mid-1970s, in which average annual compliance costs were $78 per employee in 1976-77 dollars, or roughly three times as much in current dollars. The variance in these estimates across companies was extremely high, and one could argue that average costs per firm today are either higher or lower than those estimated over twenty years ago.[104] The additional costs imposed on an establishment by a compliance review per employee are, in current dollars, roughly $2-15. Despite this wide range of estimates, it seems fair to say that the direct administrative costs to contractors of administering Affirmative Action programs raise their compensation costs by roughly 1% on average.[105] Of course, additional resource costs arise in the public sector from administering Affirmative Action.

8. Summary of Employment Findings. The studies summarized above, based on very different methodological approaches and frequently flawed in one way or another, do not generate a definitive conclusion about the efficiency/performance effects of Affirmative Action on employees and establishments. Still, a number of findings appear with some frequency, and the following generalizations are suggested by the data:

 There is virtually no evidence of significantly weaker qualifications or performance among women in establishments that practice Affirmative Action, especially within grade or at a given wage level.

 There is some evidence of lower qualifications for minorities hired or educated under Affirmative Action programs, especially when such qualifications are measured using test scores or educational attainment. Evidence of lower performance among these minorities appears much less consistently or convincingly, and to the extent that it appears at all, it is associated more with Affirmative Action in hiring than Affirmative Action in recruiting.

 Extensive recruitment and training are important ways of generating pools of qualified minority applicants and employees when using Affirmative Action.

 Careful evaluation of selection procedures for validity and fairness is important. It may be possible to broaden selection "standards" without necessarily lowering them.

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[104]On the one hand, Conrad argues that costs today may well be lower than those of twenty years ago, due to company learning over time. On the other hand, since these estimates focus only on very large companies that no doubt enjoy major economies of scale in human resource administration costs, administrative costs for a more representative sample of companies might be higher.

[105]Since median wages for these large companies will generally be above the economy-wide average of about $13 per hour, median annual earnings for most will be above $20,000, and mean earnings will be even higher. In current dollars, enforcement costs will be roughly $240-250 per year per employee.

B. Efficiency/Performance Effects in Education: Evidence

There is evidence on the effects of Affirmative Action in education that focuses on many of the specific hypotheses raised in the theoretical discussion in Section III, although there is, of course, no "omnibus" measure on the basis of which to assess the efficiency effects of Affirmative Action in education. The central issues in thinking about the efficiency consequences of preferential admissions, which include the "fit" and "underperformance" hypotheses, are whether blacks gain as much as whites from admission to selective colleges, and the relative performance of women or minorities admitted under preferential programs. Research has also addressed the questions of positive externalities in the form of service to underserved communities or role-model/mentoring effects, as well as what might be considered an externality from diversity in the classroom and in colleges in general.[106] The available evidence is reviewed in the following subsections, and summarized in Table 6.

1. *Relative Performance of Preferential Admits.* A couple of studies have focused on medicine and the relative performance of those who were likely initially admitted to medical schools under Affirmative Action, based on surveys of physicians who attended medical school at some point since the mid-1970s. Davidson and Lewis (1997) look at special admits–which include but are not limited to minorities–to a particular medical school, and find that these special admits have lower grades in core basic and clinical science courses (although no higher failure rates), slightly lower graduation rates, and lower scores and pass rates on board certification exams. However, there was no reported difference in the completion of residency training, the evaluation of performance by residency directors, or the likelihood of choosing primary care. In contrast, Keith, et al. (1987) look at minority vs. non-minority students, finding that minority physicians are more likely to choose primary care specialities and less likely to have board certification in their specialties, with the latter difference becoming smaller (but remaining) after accounting for the generally lower pre-medical school performance of minorities.

There is also some general evidence of lower performance of preferential admits in undergraduate institutions. Bowen and Bok (1998, Chapter 3) document the lower overall performance of black students relative to white students in the selective institutions they study. They also document (as in Vars and Bowen, 1998) that this performance shortfall exists even conditional on test scores. Bowen and Bok suggest that this might be taken as

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[106]One argument we do not address here is that raised by Loury (1977) regarding the potential efficiency gains from redistributing educational resources towards minorities from communities with underinvestment in public goods. Conrad and Sharpe (1996) offer this as an economic rationale for Affirmative Action as "reparations" for past discrimination (p. 19).

evidence in favor of the "fit" or "underperformance" hypotheses, but then dismiss this possibility based on the additional evidence that this shortfall is greater at higher test scores. They argue that these hypotheses are least likely to apply to the most academically talented black students. But we do not see why this follows, since the question concerns black-white differences *conditional* on test scores. The "fit" or "underperformance" hypotheses do not make any predictions regarding where in the test score distribution such effects should be strongest.

Indeed, it is not clear that looking at achievement conditional on test scores is the right way to test these hypotheses, since it is not obvious why blacks should feel less "qualified" or "deserving" than whites with comparable test scores and therefore perform worse, although stereotyping could cause this. Rather, the important question is whether black students at selective institutions–who do as a group have lower test scores–underperform relative to how they would have done in the absence of Affirmative Action, in which case some of them would have gone to less selective institutions. Bowen and Bok struggle with answering this difficult question. In particular, they show that conditional on SAT scores, high school grades, and socioeconomic characteristics, graduation rates of blacks were higher at more selective institutions (pp. 61-3), and thus reject the "fit" hypothesis. However, it seems likely that there are unobservables positively related to academic and economic success among those blacks who were admitted to the selective schools; even conditional on test scores, high school grades, etc., they were the students who were actually admitted. While this exercise is a useful first step, more research is needed to evaluate the "fit" hypothesis.

2. Gains Experienced by Beneficiaries of Preferential Admissions. Papers by Datcher Loury and Garman (1993, 1995) and by Kane (1998) analyze the SAT scores, college grades, graduation rates, and earnings of young whites and blacks, focusing especially on how these vary by college quality (measured by average SAT scores) for each racial group. Because Affirmative Action arguably only boosts minority enrollments at the most selective colleges (see also Bowen and Bok, 1998), differences in outcomes by race and selectivity of college are used to infer the relative gains to minorities and non-minorities from Affirmative Action. This is a slightly different question than that addressed in the previous subsection; even if preferential admits perform less well, the gains from preferential admissions may still be high, and could be higher than those for other admits. The former authors primarily use the data from the NLS Class of 1972, while Kane uses the High School and Beyond data.

Superficially, the results of the two papers appear to differ somewhat. While both show that blacks have lower GPAs and graduation rates, the Datcher Loury and Garman results imply that these findings are much more likely to hold among blacks with low SAT scores who are attending schools of above-average quality. Still, both

papers imply that, all else equal, whites as well as blacks benefit from attending more selective schools, in terms of GPA, graduation rates, and subsequent earnings. Thus, blacks with lower SAT scores are not necessarily worse off when they are admitted to a more selective college than they would have otherwise been; instead, their average gain from having been admitted is not as high as that observed among whites. Furthermore, Kane argues that the negative interaction between race and college selectivity on graduation disappears in equations that also control for whether the person attended a historically-black college, where average SAT scores are relatively low but graduation rates are high.

3. Externalities.

a. "Service" to Minority Communities by Preferential Admits. One potential positive externality from Affirmative Action in admissions is the creation of expanded service by professionals or others to traditionally underserved (typically minority) communities. This issue has also been studied with respect to the medical profession. The results show quite uniformly that "special admit" and even more so minority physicians are more likely to treat patients who are minorities, poor (especially those paying through Medicaid), non-English speakers, and/or those located in rural/inner-city (or "physician shortage") areas (Keith, et al., 1987; Penn, et al., 1986; and Cantor, et al., 1996; Komaromy, et al., 1996). Thus, the special admissions programs seem to be generating social benefits to disadvantaged groups that go beyond the physician in question. While this evidence bears on the externality arguments for Affirmative Action, which may compensate for the effects of Affirmative Action in admitting/producing less-qualified doctors, this evidence of course does not prove the existence of a market failure that is remedied by Affirmative Action's apparent redistribution of medical services from majority to minority communities.

b. Mentoring/Role-Model Effects. Another externality argument is that increased numbers of highly-educated women and minorities generate mentoring relationships or role-model effects that lead to better educational and professional outcomes for other women and minorities. This question has been addressed on two levels.

First, some research attempts to address whether the presence of female or minority students has beneficial contemporaneous effects for other female or minority students. Solnick (1995) studies whether women who attend women's colleges are more likely to major in traditionally-male fields. Because there may be selection into these colleges on the basis of preferred major, she studies changes from originally-declared major to final major, and how these transitions differ between women at women's colleges and women at coeducational colleges. She finds that at women's colleges, women are indeed more likely to switch to traditionally-male fields of study, but are no less likely to switch out of these fields. Constantine (1995) estimates the effects of attending an historically black college or

university (HBCU) on the future wages of black students, carefully trying to control for selection on unobservables, finding evidence of sizable positive returns. Both of these studies are consistent with positive effects on female or minority students of the presence of other women or minority students. However, these studies have some limitations with respect to drawing conclusions about Affirmative Action. First, they do not necessarily generalize to the effects of increasing female or minority enrollment at traditional coeducational institutions. Second, they do not separate out the effects of the students attending women's colleges or HBCUs from other differences in the environment of these schools, including the sex and race composition of the faculty, which is discussed below.

The second level on which the mentoring/role-model hypothesis has been addressed is with respect to faculty-student relationships. That is, does the training and subsequent hiring of female or minority faculty improve outcomes for subsequent female or minority students?[107] Looking at impacts of faculty on choice of major of undergraduates, Dynan and Rouse (1997) find that adding female faculty to economics departments has no effect on the likelihood that either men or women continue to study economics, while Canes and Rosen (1995) find no evidence that an increase in the proportions of female faculty in science or engineering departments leads to an increase in the share of female majors. Turning to choice of graduate study, Rothstein (1995) reports that having female faculty as an undergraduate has a positive association with the probability that female students would attain a graduate degree (although no effect on earnings). Finally, looking at graduate student success, Neumark and Gardecki (1998) examine whether increased hiring of female faculty results in more successful outcomes for female graduate students in economics. They find no evidence of beneficial effects on job placements from either additional female faculty or having a female dissertation chair, although they do find that adding female faculty appears to shorten completion times for female students.[108]

c. The Benefits of Diversity. The third type of externality argument invoked in favor of Affirmative Action in education is the positive benefits of diversity in the classroom and in college life.[109] As Bowen and Bok

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[107]As noted earlier, one might also consider this hypothesis as an argument for Affirmative action in faculty hiring in colleges and universities.

[108]Other papers address issues regarding graduate student-faculty role-model relationships, without explicitly considering the effects of changing the number of female faculty. Shelburn and Lewellyn (1995) describe some differences in the relationships of male and female graduate students to predominantly male faculty members. Gilbert (1985) provides descriptive information from an academic department on factors that were important (to students) determinants of same-sex student-faculty role-model relationships. Ehrenberg, et al. (1995) examine the effects of teachers' race, sex, and ethnicity among students between 8th and 10th grade.

[109]As noted by Conrad and Sharpe (1996), counter posed to this argument is the criticism that Affirmative Action reduces educational quality by "watering down the curriculum." Sandy Darity has pointed out that one instance in

note, however, there is little concrete evidence on the effects of diversity, "in part because definition, measurement, and analysis are very difficult in this area" (1998, p. 219). There is, indeed, little if any prior research that they cite.[110] However, they use their survey data to conduct some rather extensive new analyses of the role of diversity in colleges and universities, although in our view this evidence still falls short of establishing benefits of diversity.

First, they report that in their survey of 1976 college matriculants collected between 1995 and 1997, sizable fractions of both whites (42%) and blacks (74%) describe the "ability to work effectively and get along well with people from different races/cultures" as very important (the highest rating on a five-point scale). These percentages were higher (mainly for whites) in the survey of 1989 matriculants. Of course, as the authors note, this only establishes that students regard this ability as important, and perhaps of increasing importance. Even if we accept this as evidence that this ability has objectively become more important, this evidence does not in any way suggest that diversity in education produces this outcome.

Second, to assess the contribution of colleges and universities to this goal, they report evidence on respondents' perceptions of the contribution of colleges and universities to their ability to work effectively and get along well with people from different races/cultures. Here, they find that among 1976 matriculants sizable percentages of blacks and whites respond that college made a "great deal" of difference, with these percentages rising among 1989 matriculants. This evidence has two obvious weaknesses, however. First, it is not clear what the "control" group or "counterfactual" is. Since the survey respondents all attended college, we have no way of assessing whether they would have developed this ability, or regarded something else (such as work experience) as valuable in developing this ability, had they not attended college. Second, even if there is a causal effect of college, this positive effect of college need not be attributed to diversity in college, per se, rather than other aspects of college education. However, they also report a positive relationship between the relative size of the black student population and white students' perceptions that college improved their ability to understand and get along with people of other races/cultures (Appendix Table D.8.1), which is at least consistent with diversity having a causal effect. One could argue that students more sensitive to or interested in better understanding of other races/cultures are more likely to attend schools with more minority representation, but recall that here the students at these schools are reporting a positive effect of college on this

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which Affirmative Action/diversity clearly has affected the curriculum is in literature. There is, of course, a raging debate on whether this improves or dilutes the curriculum, but no evidence of which we are aware.

[110]Conrad and Sharpe (1996) cite a few studies–some older and unpublished–that address the diversity issue.

understanding, so the argument would have to be one about selection on the propensity to be influenced by diversity. Moreover, although the authors do not make this point, the same table reports *no* relationship between the relative size of the black student population and the proportion of white students who report that getting along with people of different races/cultures is very important, suggesting that this selection is not at work.[111]

Bowen and Bok's evidence on diversity is significant because our perception is that diversity in colleges and universities is a central argument for Affirmative Action in college admissions, and there is little other evidence on this question. However, the evidence is far from decisive. It does not establish a causal link from diversity to other outcomes, although it presents some evidence consistent with a causal link. More importantly, perhaps, it takes as the outcome of interest greater understanding of and interaction with people of different races or cultures. It is perhaps not surprising (nor uninteresting) that more racial/cultural interaction generated by diversity in college admissions breeds better racial/cultural understanding and further racial/cultural interaction, but using this finding to argue the benefits of diversity could be regarded as assuming the answer to the question.[112] The question is how these outcomes relate to educational quality and the efficiency of the educational system more generally. Given the multi-dimensional objectives of education, we do not want to claim that this outcome is irrelevant, or that we know which outcomes are most important. But additional evidence that attempts to link diversity in education to economic outcomes--such as reduced discrimination, higher wages, different occupational choices, etc.--would also be of great value.

What this discussion makes most clear, perhaps, is the difficulty of thinking about how to obtain direct, objective measures of the contribution of diversity to educational quality. However, while the absence of concrete evidence regarding the gains from diversity might give some solace to critics of Affirmative Action in education, we should also recognize the absence of evidence indicating adverse effects from the pursuit of diversity.

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[111]To attempt to study the link between diversity and ability to get along with people of other races or cultures, Bowen and Bok study interactions between students of different races, among the 1989 matriculants. They report high degrees of interaction for black students and white students. They also report that this interaction is positively associated with the relative size of the black student population, consistent with diversity having some positive influence on interactions; again, this evidence is more compelling because those who value racial/cultural understanding are apparently no more likely to attend schools with relatively more black students, and there is no relationship between the racial mix of students' high schools and their reported racial interactions in college (p. 238). Finally, they report that white students who had interactions with students of opposite races were more likely to report that the ability to understand or get along with people from other races/cultures was very important.

[112]This same limited focus on racial cultural issues is reflected in Astin (1993), who reports evidence of a positive association among college students between socializing with students from different ethnic or racial groups, on the one hand, and commitment to promoting racial understanding, on the other.

4. Summary of Education Findings. The available research has begun to provide evidence regarding specific arguments for or against Affirmative Action in education. Even more so than for Affirmative Action in employment, the jury is still very much out, not only because researchers have generally not yet succeeded in garnering decisive evidence regarding these specific hypotheses, but also because there is generally less research, and because theory provides less guidance regarding the outcomes we should or can study to assess the efficiency/performance question. Nonetheless, there are a few areas in which some general conclusions can be drawn from the existing studies:

 Blacks admitted to college have on average lower GPAs and graduation rates. However, in the universe of colleges and universities excluding the historically-black colleges and universities, the race difference in graduation rates is no larger at the most selective institutions. In addition, blacks benefit from attending selective schools as do whites. Together, this evidence undermines the argument that Affirmative Action admission programs at selective schools result in poor "fits" or "mismatches" for black students, placing them in challenging academic environments where on average they are not able to compete and do worse as a result. However, it is difficult to establish a definitive conclusion regarding this question.

 Research on medical education finds evidence that minority students and in some cases "special admits" (a broader category) perform less well in school, and are less likely to achieve high levels of expertise. At the same time, this research also suggests that these students are ultimately more likely to serve minority patients, which may provide a positive externality that helps offset the lower qualifications or skill levels that these students attain.

 Evidence on whether female or minority faculty or students spur achievement or otherwise positively affect other female or minority students is mixed. There is some evidence that women's colleges and historically-black colleges have positive impacts of women and blacks, respectively. But evidence that female faculty at coeducational institutions either serve as role models or mentors encouraging women to study traditionally-male fields, or helping women to perform better, is mixed, with relatively more evidence indicating no positive effects.

 A case can probably be made that a diverse student body positively impacts inter-racial and inter-cultural relations. However, in our view the claims for the positive effects of diversity go beyond this in suggesting that diversity results in better education *overall*. This is a difficult question to assess, but perhaps no more difficult than in other areas of research on educational quality. There is as yet no evidence on this broader hypothesis regarding the potential benefits of Affirmative Action in college and university admissions.

C. Efficiency/Performance Effects in Contracting/Procurement: Evidence

As is the case for evaluating the efficiency/performance effects of Affirmative Action in employment and university admissions, there is no overall test for the efficiency effects of Affirmative Action in contracting and procurement. Rather, there is only sketchy evidence on some of the specific hypotheses that have been advanced regarding the potential negative side-effects of this form of Affirmative Action. The available evidence is discussed below, and summarized in Table 7.

1. Concentration in Industries with Strong Minority Presence. According to a General Accounting Office study (see Stephanopoulos and Edley (1995, Ch. 9)), agencies tend to concentrate their minority contracting in certain fields–such as construction–where there are a significant number of existing minority firms. As noted earlier, this suggests that these programs may not only fail to encourage business development in other fields, but cause minority- and women-owned businesses to be concentrated in these fields, possibly reinforcing historical forces that initially led to this type of concentration but were disadvantageous for minorities.

2. Cost Differentials. We have not found any work that examines relative costs of contracts awarded to minority- or women-owned businesses. However, Denes (1997) looks at bid price relative to government cost estimates comparing solicitations restricted to small businesses to unrestricted solicitations.[113] He finds that costs are no higher in the restricted bids, and that more bids are submitted for these solicitations, perhaps because some companies specialize in them. This study need not generalize to set-asides for minority- and women-owned businesses, and almost surely does not generalize to bid-price preference programs; but the study suggests that programs that ostensibly restrict competition do not necessarily result in higher prices. Moreover, the research design might be fruitfully applied to Affirmative Action programs in government contracting and procurement.

3. Propping Up Weak Companies. Another potential problem is that Affirmative Action in contracting and procurement may prop up weak companies. The available evidence suggests, however, that this is not the case. There are provisions built into some programs that try to avoid this problem. Most prominently, 1987 amendments to the statute establishing the section 8(a) program set a "graduation" period of nine years and require that, over time, firms achieve an "increasing mix of business from outside the section 8(a) program and outside federal contracting" (Stephanopoulos and Edley, Ch. 9, p. 3). There is evidence that this appears to be effective. As reported in

[113]In part to avoid very different types of goods and services provided, he focuses solely on dredging contracts.

Stephanopoulos and Edley (1995), Small Business Administration statistics for 1993 indicate that "of the 710 firms that were graduates in that or previous years, 56 percent were still fully operational, 6 percent had curtailed operations, 3 percent had been acquired by other companies, and 35 percent had ceased operations" (Ch. 9, p. 5). Further, comparisons with Census data indicate that the failure rates of graduated section 8(a) firms are about the same or better than those in small businesses generally. Moreover, they report that firms are quite successful at meeting the non-section 8(a) business requirement, noting that in 1995 nearly two-thirds of firms in the fifth through ninth year of section 8(a) participation met or exceeded the minimum requirements for non-8(a) business (Ch. 9, p. 6).[114]

Additional evidence on whether Affirmative Action props up weak companies comes from a study of procurement programs in New Jersey (Myers and Chan, 1996), which reports that the introduction of preferences for minority-owned businesses led to sharp involvement of such businesses in government procurement. But as Bates (1998) points out, their numbers also reveal that when these preferences were sharply curtailed, the share of procurement going to minority vendors was not affected (p. 24).[115] This evidence might be interpreted as consistent with preferential procurement programs providing a jump start to minority-owned businesses, but ultimately leading to businesses that could stand on their own. However, one unexpected finding casts some doubt on the data used in this study. Specifically, their estimates indicate that the advent of the set-aside program *reduced* the average number of awards for black contractors relative to white contractors, despite state figures indicating that the share of awards going to minority-owned firms rose sharply under set-asides (Myers and Chan, 1996). Interesting complementary evidence would be whether the firms that took a large slice of government contracts also experienced growing private-sector business, and continued to prosper after the preferential programs were curtailed.

Similarly, Bates and Williams (1996) report evidence indicating that minority business enterprises (MBEs) that derive a high percentage of their revenue from local government sales were more rather than less likely to go out of business. In particular, using the Characteristics of Business Owners data base of the U.S. Bureau of the Census and looking at survival over the 1987-1991 period, they find among all MBEs, as well as among the subset of MBEs with any government sales, those MBEs deriving at least 25 percent of revenue from local government sales were more

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[114]We fully recognize that much of this evidence comes from a political document, and it would be preferable to rely on evidence reported by independent researchers.

[115]In particular, the award/bid ratio was essentially unchanged when set-asides ended (Table 4 of Myers and Chan), and the average number of contracts reported by black contractors relative to the average number reported by white contractors rose slightly after set-asides were ended (Table 5).

likely to go out of business. One could read this evidence as suggesting that local government contracting with MBEs certainly does not prop firms up. However, Bates and Williams suggest that some of this may be spurious, especially because in their data government procurement seems to be targeted at MBEs in operation for one year or less. They suggest that "some of the young MBEs may be front companies. One variant of fronting entails setting up an MBE to participate–along with large, nonminority business partners–in a specific government contract or project; the MBE closes when the project ends" (p. 297).[116]

Bates and Williams also examine factors associated with successful MBE programs, based on evidence that comes from merging their data with profiles of MBE programs operated in more than 30 large cities. They point out that some MBEs operate in "an environment in which MBE certification is comprehensive, bonding and working capital assistance are available, and assistance is delivered by a staff dedicated to aiding potential and actual MBE vendors" (p. 3). Their evidence suggests that these types of assistance promote success and survival among MBE vendors, for MBEs deriving less than 25% of sales from government. They also note that these more beneficial program characteristics are associated with local procurement and contracting programs in cities with black mayors. On the other hand, they suggest that the absence of beneficial effects of these assistance programs for companies deriving at least 25% of their sales from government is attributable to the fact that more of these MBEs are front companies. The evidence for this claim is that among these latter companies, controlling for other characteristics, sales are lower under programs that use financial penalties and possible jail terms to punish fraudulent behavior; they interpret this finding as evidence that "[t]hese MBEs behave collectively as though front companies are operating in their midst" (p. 14). In contrast, among the MBEs with lower government sales, this relationship between penalties and sales does not appear. Although this is not direct evidence, it is a clever inference based on the available data.

4. Spurring Entrepreneurship. As pointed out earlier, the overriding goal of Affirmative Action in government contracting and procurement may be not to increase the share of business for minority- or female-owned firms, but rather to spur minority and female entrepreneurship. This question has received virtually no attention in the literature. However, a recent study by Chay and Fairlie (1998) asks whether the establishment of minority set-aside programs in large cities appears to cause increases in black self-employment, using CPS data for 1979-1989 (prior to the Supreme Court decision in *City of Richmond v. J.A. Croson Co.*). The advantage of the experimental design is that

[116]Bates and Williams (1995a) provide more details, and responses by other researchers in the same journal issue and a rejoinder by Bates and Williams (1995b) debate the issue of front companies.

it allows for growth over time in black self-employment, only attributing the causal effect of set-asides to differential growth in cities establishing set-aside programs. The authors report that city-level set aside programs appear to have generated growth in black self-employment, although they are somewhat cautious in their conclusions because of difficulties of pinning down the timing of the establishment of these city-level programs, and hence in determining whether the growth in self-employment came after the set-aside programs.

5. Summary of Contracting/Procurement Findings. Evidence on the efficiency/performance effects of Affirmative Action in contracting and procurement is limited. This area is ripe for further research, especially as recent court decisions generate variation in both the scope and mode of operation of these programs. The evidence to date suggests a mixed bag of conclusions, with some of the criticisms of these programs (such as those regarding fraud) borne out, but others (regarding higher costs and propping up weak companies) not supported as yet.

VI. Conclusions

We have tried to assess what we know about Affirmative Action from the perspective of economic theory and empirical evidence, with emphasis on both the efficiency and redistributive effects of the program. We have considered Affirmative Action defined broadly as any special efforts to improve the status of minorities and women in the labor market, educational institutions, or business procurement–whether these efforts result from requirements on federal contractors, court-imposed remedies, or voluntary efforts.

Not surprisingly, the theoretical literature from labor economics generates ambiguous results on whether or not Affirmative Action programs result in efficiency gains or losses; much depends on whether or not discrimination exists in the absence of these programs, the presence of other market failures (such as externalities, and capital market and information imperfections), and on how they affect human capital formation and job assignments among protected and unprotected groups. The theoretical literature regarding Affirmative Action effects in university admissions and business procurement is virtually nonexistent, although hypotheses have been advanced that are related to efficiency/performance effects, which we try to evaluate.

The empirical literature–both in economics and other disciplines–on the presence of discrimination and the effects of Affirmative Action is much more extensive. While it is impossible to assess the overall efficiency or welfare effects of Affirmative Action from this evidence, the following inferences pertinent to these effects seem justified:

 Significant labor market discrimination against minorities and women persists, as do other major forms of disadvantage for minorities in the attainment of human capital (which some refer to as "societal discrimination").

 Affirmative Action programs redistribute employment, university admissions, and government business from white males to minorities and women, though the extent of the redistribution may not be extensive.

 There is virtually no evidence of weaker educational or job performance among females who benefit from Affirmative Action relative to males, especially within occupational grade.

 The educational performance and labor market credentials of minority beneficiaries are weaker than those of their white counterparts. But evidence of weaker performance in the labor market among these groups is much less frequently observed or is less credible. Evidence on the performance of the minority businesses who benefit from special procurement programs is also mixed.

 The potential effects of Affirmative Action on performance, at least in the labor market, appear to depend heavily on how it is implemented. Employers that practice Affirmative Action can (and often do) mitigate its potentially negative effects on performance by extensive recruitment and screening before workers are hired, as well as special training and evaluation efforts afterwards.

 Although minority students admitted to colleges and universities perform less well, on average, than non-minority students, this evidence is generally no stronger at the most selective schools that have been the focus of the Affirmative Action debate. Both black and white students benefit from attending selective colleges and universities.

 There is some evidence consistent with positive externalities from admissions programs that benefit minorities, but not for each type of externality that has been posited by advocates of Affirmative Action. For example, minority doctors are more likely to treat minority and/or low-income patients than are other physicians. Evidence on role-model/mentoring effects in universities is weaker and more mixed, especially with respect to coeducational institutions. There is no evidence of positive (or negative) effects of a diverse student body on educational quality.

 There is probably not a compelling case to be made that Affirmative Action in contracting and procurement props up weak companies. In some studies, firms that initially benefit from these programs but then either "graduate" from them or because of policy changes move into an environment without set-asides do not appear to fail at higher rates than comparable firms.

 On the other hand, there is some evidence that minority business enterprises deriving a large percentage of their revenue from local government are relatively more likely to go out of business. Some evidence suggests,

however, that this phenomenon is attributable to the fraudulent formation of front companies for the sole purpose of qualifying for these programs. Local government programs with genuine assistance to small enterprises, and penalties for fraudulent behavior, appear able to promote success of minority business enterprises,

All in all, the evidence suggests to us that it may be possible to generate Affirmative Action programs that entail relatively little sacrifice of efficiency. Most importantly, there is at this juncture very little compelling evidence of deleterious efficiency effects of Affirmative Action. This does not imply that such costs do not exist, nor that the studies we review have captured the overall welfare effects of Affirmative Action. It does imply, though, that the empirical case *against* Affirmative Action on the grounds of efficiency is weak at best.

On the other hand, advocates of Affirmative Action might draw more encouragement from the existing evidence. Affirmative Action seems to have major redistributive effects that operate in markets in which discrimination still exists, and it may create some positive externalities; it *might* therefore lead to increased efficiency. A set of findings on efficiency effects that displays some variation but tends to be centered on little or no effect, as well as specific evidence pointing towards some of the benefits of Affirmative Action (such as externalities) might be interpreted as more favorable to this set of programs.

However, because there are resource costs associated with enforcement of Affirmative Action, some evidence of overall efficiency *gains* is probably needed to make a case for Affirmative Action on efficiency grounds, rather than redistributive grounds. Although we can by no means fully quantify these, it seems to us that there is not yet sufficient evidence to conclude that there are overall efficiency gains, although based on the evidence we think this is more rather than less likely. Thus, we regard the current state of the evidence as most consistent with the view that Affirmative Action offers significant redistribution towards women and minorities, with minimal efficiency consequences. A major outstanding question which could tip the scales more in the direction of efficiency gains is the extent to which this redistribution increases efficiency by countering discrimination in the labor market. We have argued that there is evidence of continuing discrimination against women and minorities. In this case it is possible that Affirmative Action generates additional efficiency gains, although theory does not necessarily imply this.

In any event, it is also clear that the research evidence to date on the effects of Affirmative Action also remains quite incomplete, especially regarding effects on efficiency and performance. To accurately evaluate the efficiency effects of Affirmative Action programs on establishments or other appropriate economic units, we would

likely need evaluations approximating random assignment, as are frequently used in the literature on employment and training; but politically it seems very unlikely that such programs will ever be allowed or implemented.

Perhaps the best we can hope for is the continued development of research that addresses more limited questions, but over time provides a collage of evidence that gives us a more thorough understanding of the effects of Affirmative Action. Included in this list would be additional sector-specific studies, like those that we have seen to date in the fields of medicine, crime, and academia, but in a wider variety of sectors, and with better measures of performance and cleaner comparisons across groups than we have seen to date. In addition, studies that test specific conjectures about Affirmative Action, like those we have seen to date regarding mentoring, externalities, job performance, and business survival, can generate a lot more added value even in the absence of "ideal" experiments.

Of course, it is certainly possible that other remedies for the disadvantages experienced by women and minorities are equally or more desirable than those provided by Affirmative Action. For instance, Shelby Steele (1990) writes, instead of Affirmative Action, "Give my children fairness; give disadvantaged children a better shot at development–better elementary and secondary schools, job training, safer neighborhoods, better financial assistance for college, and so on (p. 124)." Virtually no one would argue against the notion that efforts to enhance human capital formation among minorities are extremely important as a means of improving their relative economic status, and are probably more desirable over the long run. But these efforts are quite costly and generate few returns in the short run, and there are many disagreements about exactly how to achieve the desired skill enhancement.[117] Race-neutral employment and training programs for the disadvantaged may generate more immediate gains, though the magnitudes of the improvements generated are frequently low and the costs of effective remedies quite high (e.g., Lalonde, 1995). In any event, none of these are necessarily incompatible with ongoing Affirmative Action programs.

Some also argue against the notion that Affirmative Action should be based on race or sex, and instead argue for income- or class-based remedies. While one might be better able to support these arguments on equity grounds, it should be recognized that because there are many non-minorities in lower-income or lower-class groups, such programs would likely result in significant reductions in the proportions of minorities that benefit from Affirmative Action programs (Cancian, 1998; Kane, 1998).[118] Of course this fact, in an of itself, is not a criticism of class- or

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[117]For recent research on the consequences school-finance equalization, see Card and Payne (1998), Murray, et al. (1998), and Fernandez and Rogerson (1998).

[118]Cancian considers classes defined based on poverty status, parents' education, and family structure. She also

income-based preferences, since the whole point would be to open up some preferences for disadvantaged non-minorities. But in assessing class- or income-based policies, we should not be under the illusion that we would get approximately the same outcome, under a more "acceptable" ostensible set of criteria for receiving preferential treatment. Furthermore, this policy alternative appears to ignore the potential role of Affirmative Action in countering discrimination and other disadvantages faced by women and minorities in the labor market and elsewhere, even controlling for family background. And, to return to a point made earlier, it seems difficult to construct race- and sex-blind anti-discrimination policies that might instead be used to address these latter issues. Finally, any negative effects of Affirmative Action on efficiency, employee performance, or student quality that we currently experience might become even more serious under such a scheme, as low-income white males replace middle- (or upper-) income women and minorities in universities and workplaces.[119] In addition, income-based Affirmative Action schemes may create disincentives to increase income, either directly via labor market decisions, or indirectly via decisions regarding family structure.[120] On the other hand, disagreements over exactly which ethnic groups should have "protected" status, and for how long, are certainly legitimate,[121] and are likely to continue to provide a rationale for considering income- or class-based remedies. We expect research on such remedies to become quite prominent.

Our overall goal in this review is not to offer a set of policy recommendations regarding Affirmative Action as it is currently practiced, or alternatives to it. Rather, our goal is to convey to the research and policy community what we know about Affirmative Action, and to point to the important unanswered questions. The fulfillment of both of these goals would better inform the debate over Affirmative Action.

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documents that these alternative methods of classifying individuals and their families is likely to result in very different sets of individuals eligible for Affirmative Action, highlighting the political difficulty of agreeing on a class or income criterion to use. Conrad and Sharpe (1996) cite similar evidence based on simulations carried out by the University of California system.

[119]Simulations of the effects of Proposition 209 in the University of California system, as reported by Conrad and Sharpe (1996) suggest that income-based admissions policies will lower median SAT scores among admitted students.

[120]We find it ironic that many conservative critics of Affirmative Action fail to note these potential incentive effects of income-based policies, despite emphasizing such incentive effects with respect to other social programs.

[121]Furthermore, the original notion that Affirmative Action was meant to be transitional rather than permanent deserves some consideration.

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Table 1: Key Executive Orders, Regulations, and Court Decisions Regarding Affirmative Action in the Labor Market

1961: Kennedy Executive Order 10925	Required government contractors not to discriminate against employees or job applicants, and mandated that contractors "take affirmative action to ensure that applicants are employed and employees are treated during employment without regard to their race, creed, color, or national origin."
1965: Johnson Executive Order 11246	Reiterated Executive Order 10925.
1967: Johnson Executive Order 11375	Amended Executive Order 11246 to cover women.
1968: Department of Labor Regulations governing Executive Orders 11246 and 11375	Requires federal contractors with 50 or more employees or contracts of at least $50,000 to identify underutilization of women or minorities and establish corrective goals and timetables.
1970: Department of Labor Philadelphia Plan	New regulations under Orders 11246 and 11375 establishing goals and timetables for employment of minorities in construction.
1979: United Steelworkers of America v. Weber	With regard to an in-house training program reserving 50% of spaces for blacks, U.S. Supreme Court ruled that Title VII "does not prohibit such race-conscious affirmative action plans." Defined "permissible" plans as those that break down existing patterns of racial segregation, do not "unnecessarily trammel" on the interests of white employees nor create an absolute bar to their advancement, and are temporary, intended to "eliminate a manifest racial imbalance," rather than "to maintain racial balance."
1984: Firefighters Local Union No. No. 1784 v. Stotts	U.S. Supreme Court stated that court-authorized affirmative action plans were authorized by Title VII to provide relief "only to those who have been actual victims of illegal discrimination."

Sources: Bloch (1994); Edley (1996); Radford (1997).

Table 2: Key Court Decisions and Referenda Regarding Affirmative Action in Universities

1978: Regent of the University of California v. Bakke	Court agreed that special admissions program reserving spaces for minority students violated Title VII and 14th Amendment.
1995: Podberesky v. Kirwan	U.S. Supreme Court let stand a ruling of the U.S. 4th Circuit Court of Appeals that the Banneker scholarship program at the University of Maryland violated the 14th Amendment.
1996: California Proposition 209	Prohibited discrimination or preferential treatment in public employment, public education, or public contracting on the basis of race, sex, color, ethnicity, or national origin.
1996: Hopwood v. State of Texas	U.S. 5th Circuit Court of Appeals ruled that an Affirmative Action Plan at the University of Texas Law School that admitted some minority students with lower grade-point averages and test scores than white applicants who were not admitted violated the 14th Amendment.

Sources: Bloch (1994); Edley (1996); Radford (1997); Civil Rights Monitor Leadership Conference on Civil Rights Online Center.

Table 3: Key Court Decisions Regarding Affirmative Action in Contracting

1980: Fullilove v. Klutznick Transportation	U.S. Supreme Court upheld provision in federal Surface Act setting goal of 10 percent of contract dollars for "disadvantaged business enterprises" (principally minority-owned). Applied "intermediate scrutiny" to federal race-based Affirmative Action programs, requiring that they serve "an important governmental interest" and be "substantially related" to that interest.
1986: City of Richmond v. J.A. Croson Co.	U.S. Supreme Court applied "strict scrutiny" in striking down a city ordinance establishing a 30 percent target for the proportion of city contracts awarded to minority businesses. The strict scrutiny criteria established were a "compelling government interest" (remedial response to past discrimination and its lasting effects) and that a program be "narrowly tailored" to achieve that interest.
1990: Metro Broadcasting, Inc. V. FCC	U.S. Supreme Court upheld congressional measures to increase minority ownership of broadcast licenses, on the grounds of advantages of diversity in viewpoints expressed, rather than remediation for discrimination.
1995: Adarand Constructors, Inc. v. Pena	U.S. Supreme Court overturned *Fullilove* and *Metro Broadcasting* in ruling that strict scrutiny apply to congressionally-authorized race-based programs, in this case a Department of Transportation program encouraging contractors to sub-contract with firms owned by "socially and economically disadvantaged" individuals.

Sources: Bloch (1994); Edley (1996); Radford (1997); Civil Rights Monitor Leadership Conference on Civil Rights Online Center.

Table 4: Main Theoretical Results on the Efficiency Effects of Affirmative Action in the Labor Market

	Nature of discrimination	Effects of Affirmative Action
Welch (1976)	None, or taste discrimination	Reduce efficiency in production
Lundberg and Startz (1983)	Statistical discrimination (worse information about minorities)	Increase efficiency in human capital investment, decrease efficiency in production, net effect ambiguous
Milgrom and Oster (1987)	Promotion discrimination, to maintain "Invisibility" of minorities and women	Increase efficiency in production and human capital investment
Lundberg (1991)	Statistical discrimination (worse information about minorities)	Increase efficiency in human capital investment, decrease efficiency in production, net effect ambiguous
Coate and Loury (1993)	Negative stereotype about skills of minorities	Ambiguous

Table 5: Summary of Studies on Effects of Affirmative Action in the Labor Market on Efficiency/Performance

Studies	Data	Results/Conclusions	Comments
1. Production/Cost Function Estimates			
Leonard, 1984	State x industry cells, Census of Manufacturers, Annual Survey of Manufacturers; EEO-1 averages	No negative effects of contractor status.	Highly aggregated data.
Griffin, 1992 Griffin, et al., 1996	EEO-1 merged with Compustat; imputed wages from Census of Population	Contractors have 6.5% higher costs.	Questionable wage imputations, implausible own labor demand elasticities.
2. Company Financial Data			
Wright, et al., 1995	Daily stock valuations for 34 companies	Announcement of award for Exemplary Affirmative Action practices raises company value.	Small and self-selected sample, questionable interpretations.
3. Employee Performance Ratings			
Holzer and Neumark, 1998 Holzer and Neumark, forthcoming	Survey of employers in four metropolitan areas	Minorities have lower educational attainment but generally not lower performance ratings under Affirmative Action. Lower performance evident only for Hispanic males, and in establishments using Affirmative Action in hiring rather than recruiting.	Self-reported EEO/Affirmative Action status, subjective outcomes.
Lewis, 1997	1% Sample of Federal personnel records	Women receive higher ratings than men; minorities ratings are a bit lower (within grade).	Subjective outcomes not necessarily linked to Affirmative Action.
4. Analyses of Specific Sectors			
A. Police			
Lovrich & Steel, 1987 Lovrich & Steel, 1983	254 cities: Crime rates, arrests, demographics of police	No relationship between police demographics and crime/police outcomes.	Affirmative Action defined on basis of police demographics.
Lott, 1997	Homicide rates and police demographics for cities	Affirmative Action for blacks raises homicide rates.	Unusual sample of cities; questionable specification and use of instrumental variables.
Carter and Sapp, 1991	Survey of 700 police departments, large cities and counties, and site visits to selected departments	Black and female police officers more likely to have BAs, education is bona fide occupational qualification.	Descriptive study, little description of actual evidence.
Gottfredson, 1996	Nassau County Police Department test results, studies, and description	Attempts to reduce disparate impact reduced importance of cognitive test, reducing test validity.	No information on performance of recruits under different testing regimes.

Table 5 (continued)

Studies	Data	Results/ Conclusions	Comments
B. Academics			
Kolpin and Singell, 1996	Economic Departments: Guide to Graduate Study in Economics; Economists: AEA Directory	Women had better publication records than men in top departments in 1970s.	Data for 1970s; quality of publications?
Barbezat, 1989	Carnegie Council Surveys Surveys of American Professoriate	Women paid less than men, controlling for publications; blacks paid more than whites and have fewer publications.	Data for 1970s Quality of publications?
Elmore and Blackburn, 1983	Surveys at Big Ten universities	Whites and blacks have comparable publication records.	Quality of publications?
5. Case Studies/Institutional Evidence			
Badgett, 1995	One large non-union firm	Recruitment and training efforts lead to Affirmative Action success.	Qualitative study.
Vernon-Gerstenfeld and Burke, 1985	9 large companies	Recruitment training, leadership commitment, incentives for managers lead to Affirmative Action success.	Qualitative study.
Stoops, 1982	Houston Police Department	Recruitment is important for Affirmative Action success.	Qualitative study.
Hyer, 1985	3 universities	Leadership commitment, monitoring of performance, participation of women, and more extensive recruitment lead to Affirmative Action success.	Qualitative study, measures of "success"?
Espinosa, 1992	Demographic information and Affirmative Action reports for California city	Goals and timetables, not met; exaggerated progress.	Descriptive study.

Table 6: Summary of Studies on Effects of Affirmative Action in Education on Efficiency/Performance

Studies	Data	Results/Conclusions	Comments
1. Gains Experienced by Preferential Admits			
Datcher Loury and Garman, 1993 and 1995	NLS Class of 1972	Blacks have lower GPAs and graduation rates, especially those with low SAT scores at better institutions. But blacks still benefit from selective institutions.	Careful attempt to address relative gains of black and white admits at selective institutions.
Kane, 1998	High School and Beyond	Similar results, but worse performance of blacks at selective institutions disappears when account is taken of attendance at historically-black college.	Undermines claim that black preferential admits gain less.
Bowen and Bok, 1998	College and Beyond Surveys	Conditional on test scores, etc., black students at most selective institutions graduate at higher rates.	Inconclusive evidence on "fit" hypothesis.
2. Relative Performance of Preferential Admits			
Davidson and Lewis, 1997	Survey of Graduates from UC Davis, 1968-87	Lower scores and grades for minority doctors; small differences in outcomes.	Special Admits: only half are minority.
Vars and Bowen, 1998	College and Beyond Surveys	Lower GPAs and graduation rates of blacks conditional on test scores.	Unclear applicability to "fit" or "underperformance" hypothesis.
3. Externalities			
A. Service to Minority Communities			
Keith, et al., 1987	Survey of all minority physicians in U.S., from class of 1975 and a sample of non-minority physicians	More minority/poor patients; more primary care specialties; fewer with board certification.	Large sample.
Penn, et al., 1986	Survey of 113 graduates from UCSD	More minority patients, more primary care, more rural/inner-city practices.	Small sample.
Cantor, et al., 1996	1987, 1991 Surveys of Young Physicians	Minority doctors serve more minority/poor.	Large sample.
B. Mentoring/Role Model Effects			
Solnick, 1995	Data from 15 women's and coed colleges including anticipated and final majors of individual students	Women at women's colleges more likely to switch into traditionally-male majors.	Does not isolate effect of students, or necessarily generalize to effects of Affirmative Action.
Constantine, 1995	National Longitudinal Survey of Class of 1972	There is a large positive labor market return to black students attending historically black colleges and universities.	Does not isolate effect of students, or necessarily generalize to effects of Affirmative Action, and does not address other educational outcomes.
Dynan and Rouse, 1997	Data on Harvard undergraduates	Having female faculty in introductory economics courses did not affect the probability that males or females majored in economics.	Limited sample.

Table 6 (continued)

Studies	Data	Results/Conclusions	Comments
Canes and Rosen, 1995	Panel data on science and engineering departments at three institutions	An increased share of women on the faculty did not lead to an increase in the share of female majors.	Limited number of schools.
Rothstein (1995)	National Longitudinal Survey of Class of 1972	Positive association between female faculty and probability that female students attain graduate degree.	Large, representative sample.
Neumark and Gardecki, 1998	Data on female hiring and female graduate students in economics over 18 years	More female faculty and female dissertation chairs do not improve female students' job placements, but more female faculty results in shorter completion times.	Limited to one academic field.
C. The Benefits of Diversity			
Bowen and Bok, 1998	College and Beyond surveys of 1976 and 1989 matriculants	Greater percentage black among college students is positively associated with perceived effect of college on racial understanding, and inter-racial during and after schooling.	First systematic evidence on this issue.

Table 7: Summary of Studies on Effects of Affirmative Action in Contracting/Procurement on Efficiency/Performance

Studies	Data	Results/Conclusions	Comments
1. Concentration in Industries with Strong Minority Presence			
Stephanopoulos and Edley, 1995	GAO report	Agencies concentrate their minority contracting in fields such as construction where there are a significant number of existing minority firms.	Not peer-reviewed study.
2. Cost Differentials			
Denes, 1997	500 dredging contracts supplied by U.S. Army Corps of Engineers	Costs no higher for bids restricted to small businesses.	May not generalize to preferential programs for minorities or women.
3. Propping Up Weak Companies			
Bates and Williams, 1995a and 1996	Characteristics of Business Owners data base, profiles of local procurement programs	MBEs with large share of revenues from local government sales more likely to go out of business, although some of this may be a spurious result of front companies. Programs with that impose penalties for fraud, and that provide assistance, promote success and survival.	Useful introduction of institutional evidence. Evidence of fraudulent front companies is indirect.
Myers and Chan, 1996	Survey of contractors in New Jersey	Award/bid ratio was unchanged when set-asides ended, and average number of contracts reported by black relative to white contractors rose slightly after set-asides ended.	Data do not indicate greater success of minority-owned firms under set-asides.
4. Spurring Entrepreneurship			
Chay and Fairlie, 1998	CPS, 1979-1989	Black self-employment appears to rise in cities as a result of establishment of minority set-aside programs.	Addresses key question. Difficulties in establishing timing of effect and hence causality.