A social preference for proportional (or simply increased) participation of minorities in labor markets implies a transition from a regime of segregation (intentional or not) to one of proportional (or increased) participation. In this paper we examine this transition in a formal model of a minority, an employer and an educator. We use the implications of our model to appraise the legal responses to unintentional discrimination, using examples primarily from gender discrimination. The law is found to inhibit this transition, to prevent operation of its own provisions favoring minorities in cases of past discrimination, to ignore means other than the elimination of structural discrimination for increasing minority participation, to prevent coordination of educators and employers that could further policy goals, and to prevent agreements that would provide the public good of integration. © 1999 by Elsevier Science Inc.

I. Introduction
The conventional view considers affirmative action to be a remedy for intentional discrimination. This paper examines the results of unintentional discrimination that arises if a minority has shorter careers due to factors such as women’s contribution to childbearing and rearing, or to challenges in education or opportunity among racial minorities.

We assume that society desires to increase the participation of a minority in the workforce. Any desired workforce composition can be used, but for simplicity we take proportional participation to be the target. We do not examine the forces, such as...
changes in homemaking technology or the transformation of minority education, that may cause a new target to be adopted.

The contributions of this paper in economic analysis offer insights toward the necessity and permanence of affirmative action. We find that to maintain the targeted workforce participation, a perpetual hiring bias in favor of the minority is necessary (perpetual affirmative action). If biased hiring is infeasible, we find that the targeted participation rate can also be achieved by biased admission policies in education. (affirmative action in education). When we study the elimination of affirmative action in education and the workplace, we find that workforce composition is subject to potentially significant short-term swings indicating that the removal of affirmative action must be gradual.

The contributions of this paper in legal interpretation flow from the conclusions of the economic analysis. Legislatures and courts have tried to end structural biases against minorities, but these efforts tend to be tailored narrowly around some gender issues. Holding affirmative action in education to be a violation of the equal protection clause of the 14th amendment prevents proportional workforce participation. Interpreting antitrust law to prohibit agreements between educators sets an equally bad precedent by foreclosing educational institutions from reaching an agreement to provide equal workforce opportunity through admissions and financial aid.

Section II develops the model and its immediate normative implications. Section III uses these conclusions to appraise antidiscrimination law. Section IV studies the transition from affirmative action to unbiased hiring and admissions. Section V concludes by highlighting the shortcomings of the current policy and the paths for further research. A formal appendix is available from the authors.

II. A Model of Minority Hiring and Admissions with Initial Policy Implications

To examine quotas and their removal in a simplified context, we consider a workforce of constant size. Initially, an employer hires the minority at a given constant rate. Workers may differ by class in the length of their careers but not in their skill. If the employer hires the minority at the rate that it has in the population (what may be called unbiased hiring), it is clear that minority participation in the long term can only be proportional if career lengths are equal. If the minority has shorter careers, it will be underrepresented in the workforce.

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1Retirements (quits) are blind to tenure, so that a new worker has the same probability of quitting with one employed for hundreds of periods. Some of the asymptotic results of the model are due to this assumption, but they are easy to discern, we point them out, and they do not interfere with the conclusions we draw. We could expand the model and allow temporary quits and re-entries into the workforce without changing our conclusions. Temporary quits could be modeled by incorporating a fraction of quits per class who reenter the pool of candidates. Workforce participation would still depend on total career lengths, but the class that reenters the pool more would be overrepresented in the pool of candidates and must be hired with that much greater intensity (as would be the case under blind hiring). In essence, however, our conclusions would not change.

Our quits from the workforce must be distinguished from quits to change employers. Thus, we are effectively assuming a single firm as the source of employment. We discuss problems arising from the competition of firms and educators in Section II and Section V.
PROPOSITION 1: Unbiased hiring will lead to proportional workforce participation only if minority and majority careers have equal length. The policy implication of Proposition 1 is that the targeted minority participation rate will only be achieved in the long term and only if career lengths are equalized. In the absence of permanent affirmative action in hiring, measures to equalize career lengths are necessary for proportional workforce participation.

It is intuitive that the minority’s workforce participation cannot reach its long-term target immediately. Under our analysis, which assumes tenure-blind retirements or withdrawals (quits) from the workforce, the minority’s participation approaches its long-term target asymptotically. If careers had some maximum length, then the long-term target participation would be reachable. It would be attained when the most senior worker had been hired under the unbiased regime. We omit hereafter this qualification of our asymptotic results.

PROPOSITION 2: If careers have equal length, the minority’s participation in the workforce asymptotically approaches the proportion with which the minority is hired. The obvious policy implication is that, if careers have equal length, unbiased hiring is necessary for a proportional workforce. If career lengths are unequal, permanent affirmative action is necessary to achieve and maintain proportionality.

The relative representation of different groups in the set of candidates from whom the employer hires is an important component of the minority hiring rate. Basing our analysis on the composition of the candidate pool will allow us to examine issues of structural discrimination in consecutive career stages without being limited to a single-step education process of the type we examine. Because we examine this at a society-wide level, we assume that the number of jobs is inflexible. A minority’s participation in the pool of candidates is determined by an educator’s admissions policies. Employers are assumed to hire only educated candidates from the pool. This assumption may correspond only to the reality of the licensed professional disciplines (medicine and law, for example), where an employer cannot hire from the general population, and this may have significant implications. As in the case of quitting, hiring is assumed to be independent of candidates’ tenure, so that the recently educated have the same probability of being hired as those educated in the distant past. We can approximate the emphasis that employers may place on recent education by reducing the size of the pool of candidates.

The educator admits solely to replenish the candidate pool from its depletion due to hiring. Thus, the representation of the minority in the pool can only increase if more of the minority are admitted than are hired. Moreover, as long as minority hiring and admissions ratios are constant, the rate of increase in the minority representation will be constant in the candidate pool. Because quitting creates a constant flow of retirements, hires, and admissions, the pool will be replenished with new candidates at a constant rate.

2 Proof: Employers hire to maintain a constant total number of workers, \( W \), and they hire the minority, say workers subscripted \( F \) (female), with a constant proportion \( h_F \). Workers retire with quit rates \( q_F \) and \( q_M \), respectively for each group (each gender). The rate of change in the number of female employees, \( w \), is the difference in the proportion hired, \( q_Fw_F + q_Mw_M \), minus retirements, \( q_Fw_F \). Substituting \( w_M \) with \( \frac{1}{2}w_F \) and solving the resulting differential equation with initial composition \( w_F(0) \), the long-run equilibrium of this system, \( w_F^* \), is the limit of the solution for \( t \to \infty \): \( w_F^* = (1 + (1 - h_F)q_F)/(h_Fq_M) \), or, if hiring rates are equal, \( h_F = 0.5, w_F^* = (1 + q_F/q_M)^{-1} \). More extensive proofs are available from the authors.

3 Proof: The solution to the above differential equation gives the evolution of a workforce starting from any initial composition \( w_F(0) \): \( w_F(t) = w_F^* + (w_F(0) - w_F^*)exp[-h_Fq_M\cdot t] \), which simplifies considerably if we consider that quit rates are equal, so that \( q_F = q_M = q \): \( w_F(t) = h_F + (w_F(0) - h_F)e^{-qt} \).
which—because they are admitted with a constant quota—tend to change the composition of the pool at a constant rate. Unequal careers prevent constant change because as the group with shorter careers is hired more, quitting increases, which accelerates the approach of the workforce composition to that of the pool of candidates.

**Proposition 3:** Under constant ratios of admissions and hiring, the minority’s participation in the pool of candidates increases only if the minority is admitted to the pool at a rate greater than it is hired into the workforce. The policy implication flows from the hope that workplace affirmative action will be able to stop when careers are equal and minority workforce participation is proportional. For the pool of candidates to have more minority members at that time than when affirmative action started, the educators must have pursued a more aggressive affirmative action policy than employers. Therefore, whatever the affirmative action policy in employment, more activist affirmative action must be used in education.

If quotas achieve their purpose, minority participation will reach its target level. Presumably, the preferential hiring and admissions treatment must then end, or the minority will be overrepresented in the workforce. A world without preferential admissions and hiring implies that the educator admits minorities with the proportion that they occupy in the population and the employer hires them with the proportion of the candidate pool they occupy. This suggests a complex interaction. While the educator is increasing the minority’s representation in the pool of candidates, the employer is hiring the minority out of the pool at the increasing rate with which the minority participates in the pool. The educator replenishes the pool with the minority in its population proportion; hence, the pool composition approaches the population composition.

Workforce participation also changes in this blind-hiring regime. Because the employer is replacing the retiring workers using the composition of the candidate pool, the composition of the workforce will approach that of the candidate pool.

**Proposition 4:** Under equal career lengths and unbiased hiring and admissions, the composition of the workforce approaches asymptotically the composition of the candidate pool, which approaches asymptotically the composition of the population. Therefore, affirmative action in education can achieve a proportional workforce despite shorter minority careers. If the measures to equalize careers are ineffective, permanent affirmative action in education is necessary even if affirmative action in employment is abandoned.

Various public policy conclusions follow from the evolution of the composition of the workforce and the pool of educated candidates we describe. Career lengths and hiring

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The rate of change of the composition of the candidate pool is then \( \frac{d}{dt} c_F(t) = \frac{d}{dt} \left( \frac{a_F}{1 + q_M(q_F - q_M)w_F^*} \right) = \frac{d}{dt} \left[ a_F - h_F \right] w_F \left( 1 - q_M \right) \left( 1 - \frac{w_F(0) - w_F^*}{w_F^*} \right) \left( 1 - \exp\left\{ - \frac{q_M h_F}{w_F} t \right\} \right) \). Equal quit rates produce the much simpler \( \frac{d}{dt} c_F(t) = a_F - h_F \). Applying the same methodology, one can derive the evolution of the pool composition \( c_{F,u}(t) \) under unbiased hiring, i.e., where \( h_F = c_F \cdot c_{F,u}(t) = a_F + \left( c_F(0) - a_F \right) e^{-\theta t} \), which approaches asymptotically the admission ratio. Under blind hiring the rate of change of the workforce composition is the fraction of the minority hired, \( q_F(t) \), minus the fraction quitting, \( q_F(t) \). Solving the resulting differential equation using the evolution of pool composition under unbiased hiring obtained above, given an initial workforce composition \( w_F(0) \), produces the evolution of workforce composition under unbiased hiring: \( w_{F,u}(t) = w_F(0) e^{-\theta t} + q_F(1 - e^{-\theta t}) - \left[ c_F - c_{F,u}(0) \right] \left( 1 - e^{-\theta t} \right) e^{-\theta t} \).
biases will be discussed in Section III. The transition from a regime of affirmative action favoring a minority, to one of unbiased hiring and admissions will be explored in Section IV.

III. Career Lengths, Hiring Biases, and Basic Paradoxes of Discrimination Law

Our simplified analysis produces the intuitive result that a minority’s participation in the workforce depends on the length of its members’ careers. If, for example, the typical woman worked half as many years as the typical man, we should expect to see women underrepresented by 50% in the workforce. The quit rates of our model are the reciprocal of career lengths. To reach proportional representation in the workforce, even if minority members are hired with the proportion they occupy in the population, the minority’s careers must be equal to the majority’s. If career lengths remain different, proportional representation can only be achieved if employers favor the minority through affirmative action in hiring. Thus, the popular notion that affirmative action is a temporary measure must be challenged. Only affirmative action in favor of minorities with majority-length careers might be considered temporary.

The legal landscape in the field of discrimination is not hospitable to either the suggestion of equalizing quit rates or of favoring minorities in hiring. For instance, numerous measures exist that strive to make the workplace more appealing to women (such as pregnancy leave, policies against sexual harassment, and employer-provided childcare or its tax deductibility). These measures can be understood as seeking to reduce the difference in the quit rates between the sexes; but they must work perfectly to equalize quit rates. Because their target is equality, these measures are unlikely, either alone or in concert, to produce longer careers for women than men. Because enforcement is costly and imperfect, it should be doubtful that such measures can fully reach their targets. Thus, although fundamentally important, policies seeking to equalize quit rates are unlikely to be sufficient.

If careers are not equal, proportional representation can still be maintained by hiring that is biased in the minority’s favor. The current interpretation of Title VII of the Civil Rights Act, however, prevents unequal treatment in the form of biased hiring by private employers, whereas the Hopwood decision does the same for government hiring and admissions. Until recently, only if an entity admitted having discriminated in the past—and to all the liability such an admission would bring—could a bias in favor of a minority be used, but Hopwood casts doubt on the longevity of this interpretation. The 14th Amendment prohibits biased hiring of government employers.

Even if admissions of past discrimination made for the purpose of supporting affirmative action were granted an evidentiary privilege, institutions would still see such

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8The “bias allowed if used to cure past bias” rule is reflected, for example, in Adams and Constructors, Inc. v. Penna, 115 S.Ct. 2097 (1995). This has recently been put into question with Hopwood v. Texas, 78 F.3d 932, 1996 U.S. App. LEXIS 4719 (5th Cir. 1996) (minority-preferring admissions violate the 14th amendment). In employment law, race or gender may be permissible factors as long as they are not controlling, see Johnson v. Transportation Agency, 489 U.S. 616 (1987).
statements as potentially very costly. Such an admission would identify discriminating institutions for plaintiffs’ lawyers, who would launch discovery expeditions to find admissible evidence. Even if they are unsuccessful, the burden of being a target of discovery can be substantial. The rule that only allows biased hiring to remedy past discrimination is bound to be under-applied. It can be invoked without cost only by firms or educators who have been subjected to liability for discrimination. This is almost pointless because one of the results of litigation would include an injunction against further discrimination and, probably, an order to try to achieve proportional representation (provided prior discrimination was systematic). A greater effort to find equally qualified minority candidates is the only means in favor of minority representation that current interpretation unambiguously allows. Effectively, firms and educators who want to contribute to the effort toward proportional representation are penalized by having to incur the additional cost to identify the hard-to-find qualified minority candidates.

Despite firms’ inability to hire while favoring the minority, one could argue that the educator might be able to skew the pool of candidates so as to present an overrepresentative pool and allow, thus, the firms’ blind hiring to be favorable to the minority. Such a scheme would allow the maintenance of proportional workforce representation in the long term despite shorter minority careers.

The legal treatment of the government educator, however, is identical to that of the employer. Outright biases, whether in admissions or in subsidies (such as financial aid or allocation of student housing), violate the 14th Amendment. Moreover, the political environment is inhospitable to overrepresentative admissions. This is shown in the contest about the affirmative action admissions policies of two public universities, the University of California at Berkeley and the University of Texas Law School.\(^\text{10}\)

Private educators are not constrained by the 14th Amendment but cannot be relied on to provide the social good of integration. Competition for students, prestige, and tuition imply that private educators face a collective action problem that probably prevents them from employing aggressive affirmative action. Schools may try to contain their competition through contracting, but the analogous scholarship allocation agreement of the Ivy League schools was held to be an antitrust violation.\(^\text{11}\) Moreover, the conditions for federal student loan guarantees hold private educational institutions to the same standard as their public counterparts. Thus, only schools that are able to forego federal assistance can engage in affirmative action. Of course, schools routinely condition the use of on-campus interviewing by employers on the employers’ commitment to equal opportunity hiring.\(^\text{12}\) A social policy-motivated boycott agreement would not violate the antitrust prohibition against agreements in restraint of trade under

\(^{10}\) *Hopwood v. Texas*, 78 F.3d 932 (5th Cir., 1996) *cert. denied*, 518 U.S. 1033 (minority-preferring admissions practices violate the 14th amendment).


\(^{12}\) The military (the Judge Advocate General Corps) was excluded from most law schools, see Thomas J. Feeney and Margaret L. Murphy, “The Army J.A.C.’s Corps,” *Military Law Review* 122 (1988); Comment, “Exclusion of Military Recruiters from Public School Campuses: The Case Against Federal Preemption,” *UCLA Law Review* 494 (1992). The “Solomon Amendment” forced schools to accommodate military hiring by making it a condition for federal funds. The University of Connecticut is one of the very few schools that were able, briefly, to resist the Solomon amendment. State antidiscrimination laws had been held to prohibit the military from using the public university facilities to recruit. *Gay and Lesbian Law Students Association of the University of Connecticut School of Law v. Board of Trustees*, 236 Conn. 455, 675 A.2d 484, 1996 Conn. LEXIS 80 (1996). State law (at least in Connecticut), and the rules of the Association of American Law Schools were amended to maintain federal funding. Private
the—fast-fading perhaps—exemption of *Claiborne Hardware*.\(^{13}\) Although an agreement between an educators and an employer to follow a certain hiring policy is unlikely to be an antitrust violation as a market allocation agreement (unless this agreement guaranteed employment for the school’s minority students, perhaps), employers who as a result discriminate against certain candidates will violate antidiscrimination laws.

**IV. Phasing Out of Minority-Favoring Biases**

If careers were equalized, once proportional participation was achieved, hiring and admissions decisions should revert to neutrality. This section examines the effects that can be expected when biases in favor of the minority are eliminated.

Minorities that cannot attain equal career lengths would need a permanent bias in their favor to maintain proportional participation in the workforce. A stronger bias may have been used in the short term to accelerate this minority’s participation. When some target participation rate has been achieved, the aggressive biases must be reduced to the level that will maintain proportional representation in the long term. Although only the elimination of biases is studied here, the analysis applies to any reduction in the favorable treatment of minorities.

The candidate pool of our model has a significant effect on the transition to gender- or race-blind hiring. Because the employers must hire from the pool of candidates, blind hiring will tend to match the composition of the pool instead of the composition of the population. This implies that in the short term the minority’s participation in the workforce will tend to evolve toward its participation in the pool. Only in the long term, when the educator’s blind admissions makes the pool match the population, will the participation of the minority in the workforce be proportional. Therefore, the observation that minority workforce participation has reached its target level is irrelevant in the short term. An unrepresentative pool of candidates will lead to an unrepresentative workforce. This feedback effect, which turns out to be quite persistent, is illustrated in Figure 1, which tracks the evolution of the minority’s participation in both the workforce and the candidate pool under different hypotheses.

Consider an example of a society with an equal number of two types of individuals, one of which (say, the females) has suffered discrimination in the past so that it did not participate at all in either the workforce or education (i.e., the proportional representation \( wF(0) = cF(0) = 0 \)). Structural discrimination has been eliminated so that both types of individuals have equal careers of 15 periods (i.e., the quit rate \( qF = qM = 1/15 \)). The workforce is slightly (10\%) larger than the size of the pool of candidates (\( r = 1.1 \)).

Under these parameters, an employer that adopts as a policy the hiring of the minority at a 50\% rate (\( hF = 0.5 \)) will see its participation in the workforce reach 45\% at time \( t = 34.5 \). At that point, both the employer and the educator cease their favorable treatment of the minority, so that the employer hires blindly from the pool of candidates (i.e., the minority is hired at the rate that it has attained in the candidate pool), and the educator admits applicants with the population rate of 50\% (\( aF = 0.5 \)).


\(^{13}\) *NAACP v. Claiborne Hardware Co*, 458 U.S. 886 (1982).

\(^{14}\) Quotas will be dropped when workforce participation reaches within \( x \) of its long-term target \( wF^* \). The solution for \( t \) of \( wF(t) = wF^* - x \) is \( t = \ln((b - wF(0))/(b + x - wF^*)))/q \). Using the values of the example and \( x = 0.05 \) gives \( t = 34.5 \).
the minority only slightly (1%) more than the employer \((a_F = 0.51)\). The similarity of the employer’s and the educator’s quotas causes the pool to be almost depleted from minority candidates. When the quotas are dropped, the underrepresentativeness of the pool of candidates causes the employment participation of the minority to decline (to a minimum of 31.5% at time 47.2). The workforce will return to within 5% of its target at time 84.3.

According to the second scenario, the educator has been much more zealous than the employer in the admissions policy for the minority, which it admits at an 80% rate \((a_F = 0.8)\). The excessive zeal of the educator causes the candidate pool to overrepresent the minority. Because blind hiring means disproportionate minority hiring in this case, when quotas are dropped, the minority’s participation in employment jumps (to a maximum of 62.5% at time 50.7). The workforce will only return to within 5% of its target at time 79.6.

This setting also highlights the significance of the educators’ admissions policy regarding minority representation. When employers are forced to hire educators’ graduates, as they are in many licensed professional disciplines such as law and medicine, society may be able to overcome structural discrimination faster if educators

\[ C = W/r \]

\[ (1 - h_F)q_M/C = (1 - h_F)q_M \]

\[ 15An admissions rate equal to the employer’s hiring rate would result in no minority candidates ever being left in the pool. Any lesser admissions rate and the employer would be unable to fulfill the hiring ratio.

\[ 16If the quotas persisted, the pool would soon be depleted from majority candidates. The pool will have insufficient candidates when it has less than the employer demands. The employer seeks \((1 - h_F)q_M W/c\) candidates of type \(M\). Because the candidate pool is of size \(C = W/r\), the candidate pool must have \((1 - h_F)q_M W/c = (1 - h_F)q_M c\) candidates of type \(M\) to meet the employer’s demand. In the case of the example that is approximately 3%.\]
provide a representative pool of candidates. By contrast, in those disciplines in which the employer hires from the general population, structural biases are likely to persist. Let us return to the example of gender discrimination and compare law school and business school admissions. Both types of professional schools have seen increases in the representation of women in their graduating classes. If we compare the participation of women in the ranks of partners at large law firms to the participation of women in the equivalent positions in investment banks, we find that their participation rates differ significantly (Table 1). If the quit rates of women are equal in those two types of careers—something that is far from certain—the greater participation of women in the senior ranks of the legal profession may be due to “forced” hiring of the educators’ graduates and to the educators’ admissions policies. An even slightly discriminatory structure of hiring and promotions may strongly hinder women from reaching senior managerial ranks directly from the population.

V. Conclusions

This article has studied the implementation of a social preference for increased minority participation in the workforce. Legislative measures that make the workplace more hospitable to women seem justified from the emphasis that the model places on equal career lengths as a condition for proportional employment. Little else in the law, however, seems to facilitate increasing minority participation. A bias in favor of the minority in (public) education, which the model indicates is necessary given unequal careers (and would accelerate the approach to proportionality under equal careers), has been banned under the Hopwood constitutional interpretation of the 14th Amendment. In light of the necessity for affirmative action in education, this interpretation seems to be the Lochner-ism of the late 20th century. Even the Coasean remedy of private contracting turns out to be unavailable to private universities that may contract to produce the public good of integration (and which would not be directly bound by the constitutional mandate). Agreements between educational institutions regarding admissions and financial aid have been struck down as antitrust violations.

The methodology of this article suggests numerous avenues for further research. Even this simple setting of an employer and an educator allows policy insights after the assumptions, such as that of equal quality of candidates, are relaxed. If, for example,

<table>
<thead>
<tr>
<th>Role of Women</th>
<th>1980 (approximately)</th>
<th>1988</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partners in top 250 law firms</td>
<td>&lt;1%</td>
<td>8%</td>
<td>14%</td>
</tr>
<tr>
<td>Membership in American corporate counsel</td>
<td>&lt;1%</td>
<td>18%</td>
<td>30%</td>
</tr>
<tr>
<td>Partners in top investment banks</td>
<td>&lt;1%</td>
<td>1%</td>
<td>8%</td>
</tr>
</tbody>
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Estimates are used for 1980, which was selected as the approximate time at which significant numbers of women started graduating from top graduate schools. The data for 1988 is found in Jill Abramson, *For Women Lawyers, an Uphill Struggle*, N.Y. Times (Mar. 6, 1998) s. 6 p. 36 c. 4. The 1996 data are in Claudia H. Deutsch, *Women Striving to Make it Rain at Law Firms*, N.Y. Times (May 21, 1996) p. D1 c. 3; and in Peter Truell, *Success and Sharp Elbows*, N.Y. Times (July 2, 1996) p. D1 c. 2 (on women in investment banking).
affirmative action leads to negative stereotypes,\textsuperscript{17} or to the erosion of self-esteem of one class, our framework suggests that the solution is to use one hurdle for all classes and to randomly and uniformly across acceptable skills reduce the number of the overrepresented classes (as opposed to hiring the same percentile from each group, the previously prevalent “race-norming” that the 1991 amendments to the Civil Rights Act prohibited). The resulting cross-section of employees would give no reason to expect different performances between groups. The framework we use also opens several paths for further research into the consequences of the existence of multiple stages in careers, akin to a sequence of hiring pools and workforces leading to the top jobs in a particular echelon. Particularly interesting is the role of education as a shortcut up this ladder and the possible compounding effect that sequential pools have on even slight biases. The results of the model can be easily accentuated by including feedback effects designed to capture the importance of senior minority employees as role models or mentors and as contributors to the hospitality of the work environment toward the minority.