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A Dynamic Theory of Racial Income Differences

Glenn C. Loury

Introduction

The conventional wisdom regarding equal opportunity policy is that the elimination of racial discrimination will result in the eventual elimination of racial economic inequality. This view derives from traditional economic analyses of labor markets and racial income differences. The thesis of this paper is that traditional theory does not adequately reflect the impact of an individual's family and community background on his or her acquisition of labor market skills. Racial income differences will persist to the extent that the low level of education and earnings of blacks in today's labor market inhibit their children's ability to convert natural abilities into skills valued by employers.

The second section of this paper briefly examines the traditional economic analysis of labor markets and racial income differences. In the third section, the traditional theory is extended through analytical recognition of the effects of an individual's family and community background. This approach differs from the standard one in its treatment of the process by which workers acquire skills in that it considers the effect of parental economic status on a child's opportunity to acquire marketable skills as an intergenerational external economy.¹ The fourth section demonstrates that this classical market failure not only vitiates the efficiency properties of equilibrium in a competitive labor market, but may also render equal opportunity policy an ineffective tool for assuring equality in the long run. The final section assesses the implications of this analysis for public policy in regard to racial income differentials.

Conventional Theory and Its Problems

Conventional economic analysis has attempted to explain black-white income disparities by appealing to supply and demand factors. Arguments focusing on the supply side of the labor market center on the characteristics of black workers (that is, poor quality and limited quantity of education and work experience) which, on the average, are below those of white workers. Thus, even in the absence of discrimination, black earnings would be lower as a result of a lower investment in human capital. These factors, however, are not sufficient to account for the entire differential. When the quality and quantity of human capital are controlled, blacks still earn considerably less than whites.² To explain

this differential, economists have hypothesized that white employers or workers may harbor a distaste for association with blacks. The market implications of these tastes can be differential returns to otherwise identical black and white workers.³ Racial differences in incomes may thus be attributed to differences in the supply of market-valued characteristics (human capital) or to differences in the demand for workers due to a "taste for discrimination" against blacks.

Traditional economics suggests that two approaches can be taken to attack racial income differences. The first is to close the earnings gap by prohibiting the expression of discriminatory tastes, or at least, to neutralize the deleterious effects of discriminatory preferences. The second looks to the racial differences in the acquisition of market-valued characteristics. If these differences can be narrowed,⁴ further progress would be made toward the elimination of income disparity.

Important steps in both of these directions have been taken in recent years. Particularly noteworthy are the Supreme Court's interpretation of the Fourteenth Amendment's "equal protection" clause and the enactment of the Civil Rights Act of 1964.⁵ Together, these judicial and legislative actions embody the view that the expression of discriminatory preferences, whether private or public, cannot be permitted if the consequence is to limit the educational or employment opportunity of minorities.

Equal opportunity laws attempt to assure each individual the opportunity to develop his or her abilities to the fullest. If effectively enforced, equal opportunity would eliminate the expression of discriminatory preferences as a factor in generating racial income differences. Assuming that the distribution of ability among blacks and whites is the same, racial differences in the supply of market-valued characteristics would be expected to diminish over time. The traditional analysis suggests that, once established, equal opportunity would lead to the eventual elimination of racial income differences. This notion has gained widespread acceptance in the social sciences community.⁶

The complex problem of differences in the acquisition of market-valued characteristics, however, is not recognized in the traditional analysis. While economists have analyzed the impact of investment in human capital on earnings, the socioeconomic process underlying its acquisition has generally been ignored.⁷ Understanding this process is fundamental to understanding the persistence of racial inequality. As long as the social class and racial background of an individual influence the process by which he or she acquires marketable skills, group differences in the supply of market-valued characteristics will tend to persist. These socioeconomic effects are likely to be evident even in the presence of equal opportunity. Thus, the ability of the equal opportunity laws to guarantee (eventual) racial economic justice must be questioned.

The growing sociological literature on occupational mobility sheds some light on this issue.⁸ Of particular interest is the development of recursive, life-cycle models of individual achievement. These models enable the analyst to

focus successively on (1) the impact of family background variables (usually father's occupation and education) on educational achievement; (2) the effect of background and education on occupation; and (3) the combined effect of background, education, and occupation on income.⁹ Empirical tests have revealed several important relationships. They have shown that family background has a significant direct effect on the educational and occupational achievement of both blacks and whites. Yet, the effect of a father's occupation and educational attainment on his children's occupation and earnings differs appreciably between blacks and whites.¹⁰ Blacks suffer a relative disadvantage in occupational achievement even where their social background is favorable. Moreover, they tend to earn less than whites in the same occupations.¹¹

Fully effective enforcement of equal opportunity laws would lead to a world in which occupational achievement is determined solely by the ability of the worker. Similarly, earning differentials between equally well-educated blacks and whites in the same occupation would be eliminated. However, the influence of lower educational and occupational achievement of black parents on the opportunities of black children, relative to those of white children, implies a more subtle racial bias than that which equal opportunity laws are intended to eradicate.

In a racially stratified society where individuals place themselves in social groups along racial lines, the intergenerational influences for families of different racial groups can be expected to differ. However, racial differences of this sort are not recognized in the traditional economic explanation of discrimination on the basis of individual "tastes for discrimination."¹²

The conventional analytical framework used to study racial income differences is thus inadequate for forecasting the long-term consequences of particular policy alternatives. First, the traditional theory does not take into account the intertemporal consequences of racial discrimination which stem from the effect of parental economic status on opportunities available to offspring. Second, the theory is an individualistic one, ignoring group processes, that is, it conceives of discrimination as an act perpetrated by one individual against another. As such, the traditional theory views race relations in individual terms rather than social group interactions.

There are many reasons why a child's opportunities to acquire skills vary with the economic success of his or her parents. For example, the quality of schooling any child receives varies considerably across communities and tends to be higher in the suburbs than in the central city.¹³ Where there is housing segregation based on income, and the quality of neighborhood schools shows a positive correlation with the community's wealth,¹⁴ a child's educational opportunities can be expected to vary directly with parental economic achievement. Further, the absence of a perfect capital market for educational loans means that the opportunity for higher education and the quality of that education will be sensitive to an individual's socioeconomic background.¹⁵

The information about career opportunities and job requirements available to young people also depends on the socioeconomic status of their parents.¹⁶ Word-of-mouth referrals and informal contacts have always played an important role in the job allocation process. Prospective workers from high-income families are no doubt "better connected" than their low-income counterparts. Thus, the quality of career information, as well as the quality of education, varies with parental status for both blacks and whites.

Considerations such as these indicate that a careful analysis of racial economic differences must recognize both the ongoing effects of past discrimination and the role played by group processes in the perpetuation of black-white economic differences. The traditional theory of racial income differences is a theory of flow equilibrium.¹⁷ It determines income differences in the market today, given the existing stock of inequality. No attempt is made to explain the evolution of the stock over time, or to understand how a change in the stock might affect the flow equilibrium. Hence, the traditional view does not provide an adequate framework for the evaluation of long-run policy.

A number of writers have considered the possibility that whites might find it in their economic interest to act collectively against blacks.¹⁸ Where group behavior has been considered, it has been viewed as the outcome of rational coalition formation by individuals. However, this approach cannot explain why coalitions form along racial dimensions rather than some other lines. If collusive behavior for group gain were the only motive for discrimination, many possible criteria could be used to partition society into competing groups.

Social relations between racial groups thus have not been explicitly recognized by neoclassical economists. Yet, the social setting in which economic activity takes place has an obvious influence on market processes and outcomes. For example, Samuel Bowles argues that "[t]he legitimation of the hierarchical division of labor, as well as the smooth day-to-day control over the work process, requires the authority structure of the enterprise . . . [to] respect the wider society's ascriptive and symbolic distinctions. In particular, socially acceptable relations of domination and subordination must be respected: white over black; male over female; old over young; and schooled over unschooled."¹⁹ Such social distinctions are pervasive in our society. Their economic consequences cannot be adequately accounted for by the presence or absence of a "taste for discrimination" on the part of individual economic agents.

It is the thesis of this paper that a careful analysis of racial income differences must consider the effects of both parental economic status and social relations between racial groups on individual achievement. A simplified model of income determination which incorporates these effects is presented in the following section. Analysis of the model reveals that equal opportunity laws cannot be relied on to eliminate economic differences between the races, even over the long run.

A Socioeconomic Model of Income Determination

Preliminaries

The model of income determination developed here abstracts from all but the essentials of the problem. As such, it should not be viewed as an attempt to describe realistically the job allocation process. By removing complicating real-world factors, the roles of the basic forces that determine the evolution of income differences can be brought into focus.

An individual's economic life is assumed to consist of three stages: a primary socialization phase where the principal interactions occur within the family; the acquisition of educational characteristics and behavioral traits necessary for productive and satisfying employment; and, finally, the employment stage when the individual is involved in productive activity.²⁰ The hypothetical economic agent is assumed to possess innate capabilities, such as intelligence, as well as certain physical characteristics. Socioeconomic background is determined by race (black or white) and parental income. Thus, in the model an individual is completely characterized at the beginning of life by his or her innate endowment, race, and parental income.

Temporally speaking, it is assumed that life occurs in two equal time periods, youth and maturity. The initial period, youth, encompasses the first two stages of the life cycle—socialization and education—while maturity is characterized by employment activity. The demographic structure of the model assumes that the population size is stationary, that only men participate in economic activity,²¹ that each family consists of two parents (but only one breadwinner) and two children (one male and one female), and that mating occurs randomly among the young at the end of the first period of life²²; the offspring of a couple are assumed to “appear” after mating (at the onset of maturity). These assumptions are designed for simplicity and play no substantive role in the model. Two other assumptions are also made. First, there is no interracial marriage, a phenomenon of minute empirical significance.²³ Second, and more crucial, the socioeconomic background of an individual depends only on the income of the breadwinner of his or her family. This assumption is strong, but is necessary for simplicity.

The acquisition of productive characteristics by a young person is modeled as a social process; that is, interactions of home, community environment, and an educational institution convert a young person's innate capabilities into marketable characteristics. The employment opportunities of a mature individual are determined by the characteristics acquired through this social process during youth. This specification recognizes that an individual's opportunities for achievement depend on his or her socioeconomic background.

The social structure of this economy may exhibit both racial and income

stratification, given the assumption that mature individuals tend to group themselves along these lines, both residentially and in terms of their informal social contacts. (Such groupings will be referred to hereafter as "communities."²⁴) Young individuals belonging to the same community will tend to have similar socioeconomic backgrounds to the extent that society is stratified along racial and income lines. They will attend the same educational institution provided by the mature individuals of that community, and the maintenance of this institution will be paid for by the levying of a poll tax on all parents in each period.

Equal Opportunity and Racism

Because society is composed of people with different innate capabilities, individuals will not offer equal qualifications for all jobs. The differences in qualifications or characteristics that justify differences in individual opportunity are termed "critical characteristics." The situation where any two individuals with identical holdings of critical characteristics are faced with the same set of employment possibilities is described as equality of opportunity.

Let " α " denote a young individual's innate capabilities and " x " the bundle of productive characteristics possessed by a mature individual. A young individual is assumed to exercise some discretion in choosing the productive characteristics actually acquired, though in general the array of possibilities from which he can choose depends on his innate capabilities or endowment, home, and community environment. Conceptually, genetic (that is, innate) influences are distinguished from environmental ones in individual achievement, though empirically this separation remains a serious problem.

Equal opportunity characteristics, innate or productive, may be conceptualized in two distinct ways, depending on whether α or x are considered to be critical characteristics. In the first case, equal opportunity exists if any two people with the same innate endowment face the same set of possible productive characteristics and the reward structure for these productive characteristics is identical for all individuals. With this definition, equal opportunity does not permit socioeconomic background (that is, family and community environment) to affect achievement independently of innate ability.

In the second case, productive characteristics are assumed to be critical. Here equal opportunity implies that individuals with the same characteristics should have the same employment opportunities and be entitled to the same rewards in the labor market. This definition of equal opportunity is consistent with, but does not imply, the first one; that is, equal opportunity with critical characteristics, x , allows family background to affect earnings through the skill acquisition process rather than in the labor market.

Current equal opportunity policy is characterized by the second of the two

definitions. The legislative mandate of the Equal Employment Opportunity Commission is limited to enforcing the laws against employment discrimination. While there has been much discussion of equal educational opportunity, the varying quality of public education across communities is widely acknowledged.²⁵ Further, as long as parents have the ability to allocate resources (including their time) and thereby affect the quality of both the home and the community environment, parental income and education can be expected to condition the opportunities of children of both racial groups. For these reasons the definition of equal opportunity in this model takes productive characteristics, x , as critical.

The quality of home (family) environment is indexed by parental income. If there is social stratification by income, parental income may serve as a proxy for the quality of the community environment as well. Now suppose that there is also social stratification by race. In this instance the racial composition of communities, while not necessarily completely homogeneous, will tend to be somewhat concentrated. Hence, the community environment of an individual will depend on the economic position of his or her racial group as well as that of his or her family. Here again, a history of discrimination against a particular group will impact the earning opportunities of young people in that group. Note that in this situation every person in the group will be affected, not just those from low-income families. This is because if a person belongs to a racial group that has been discriminated against, even though *his* or *her* parents may have been successful, the average income of the community to which he or she belongs is lowered by the past discrimination.²⁶

Racialism may be said to exist whenever the community environment of individuals with equivalent family environments but of different racial groups differs. No normative connotation is intended by use of the word "racialism." It simply means that people tend to group themselves socially along racial lines, a tendency that affects the opportunities of their offspring. It should be noted that equal opportunity, as interpreted here, is perfectly consistent with the notion of racialism. However, it will be demonstrated that the long-run success of equal opportunity laws in eliminating group economic differences depends on whether racialism prevails.

Market-Valued Characteristics and Earnings

The following provides a more detailed specification of how an individual's earnings are determined.²⁷ It is assumed that innate capability, α , may be measured as a non-negative number. This capability will vary among individuals, one person being "more able" than another if his or her innate endowment is greater. The distribution of innate capabilities among the young people of each generation is also assumed to be identical to, though independent of, that which

prevailed in the previous generation. A third assumption is that the distribution of innate capability is the same for each racial group.²⁸ Thus, the innate endowment of an individual is independent of his or her socioeconomic background.

For simplicity, the market-valued characteristics that an individual acquires in the first period of life is represented by a pair of non-negative numbers, $x = (x_1, x_2)$. As such, there are effectively only two types of characteristics, and the quantities of these characteristics acquired are represented by x_1 and x_2 . The acquisition of characteristics during youth may be described as an abstract interactive process involving the home, community, and social environments. The young individual decides the outcome of this process, within limits determined by his or her innate endowment and social and educational environments.

These constraints may be expressed by a set of attainable characteristic bundles from which the individual chooses. Two sets, representing the opportunities of two different individuals, are illustrated in Figure 8-1. The first individual, A , may choose among all characteristic pairs (x_1, x_2) that lie on or below the locus AB . The other individual, A' , can select any pair that does not lie above $A'B'$. It is apparent that the opportunities of A' are broader than those of A . This may occur for several reasons. First, A and A' , though facing identical social environments and educational institutions, may differ in their innate capabilities (that is, $\alpha_{A'} > \alpha_A$). A more favorable innate endowment means that

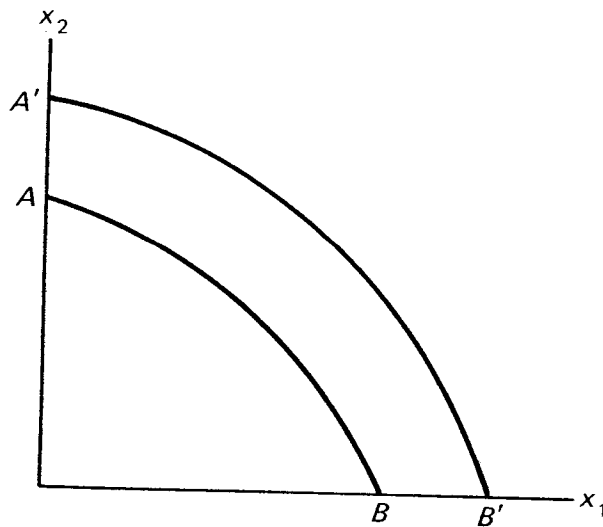


Figure 8-1. Characteristic Opportunity Sets

an individual has wider latitude in choosing the benefits he will derive from the education-socialization process. In addition, even if A and A' have the same innate endowment and are part of the same community, A' may have a "better" home environment than A (that is, a higher family income). Finally, opportunities may vary for otherwise identical young individuals living in different communities; that is, A' may come from a community with a higher quality educational institution or more favorable environmental influences than A .

The last effect assumes that social stratification exists. In the absence of stratification the composition of each community would mirror the composition of the population as a whole. Social stratification by income implies that families with similar incomes will gravitate to the same communities. This reinforces the influence of parental income on the child's opportunities (a greater family income would tend to be associated with a more favorable community environment as well as a better home environment). If social stratification also occurs on the basis of race, the community environment would depend on the average income of an individual's racial group as well as his parental income. Accordingly, two individuals—one black and one white—who are otherwise identical would face different opportunities, unless the economic positions of their respective groups were the same.²⁹ The extent to which these opportunities diverge, as measured by the "distance" between AB and $A'B'$ in Figure 8-1, would depend directly on the magnitude of existing racial income differences. The extent of racial income differences is indexed by the ratio, r , of mean black income to mean white income; r is assumed to lie between zero and one.

The demand side of the labor market is specified as follows. A large number of identical competitive firms are assumed to produce a homogeneous output under conditions of constant returns to scale and diminishing returns to inputs. Firms employ only skilled and unskilled labor. Output is perishable so that there is no accumulation of capital in the model.³⁰ The set of characteristic bundles that enables an individual to obtain employment as a skilled worker is called the *acceptance set*, and is denoted by A . The acceptance set functions as a rule that enables employers to determine whether or not a given employee can perform skilled tasks. If the employee has characteristics in the set A , $x \in A$, he or she qualifies as a skilled worker. On the other hand, if that person does not possess such characteristics, $x \notin A$, he or she can find only unskilled employment. The acceptance set is assumed to be time invariant and known to all firms and workers.

Factor markets are assumed to be competitive with workers receiving their marginal products. Skilled employees earn more than unskilled employees, but wages are the same for all workers within a given occupational class. \bar{w} denotes the wage of a skilled worker and w the wage of an unskilled employee. $w = \bar{w} - w$ represents the wage differential. In Figure 8-2 the acceptance set A is given by the collection of characteristic pairs on or below the locus BC . As can

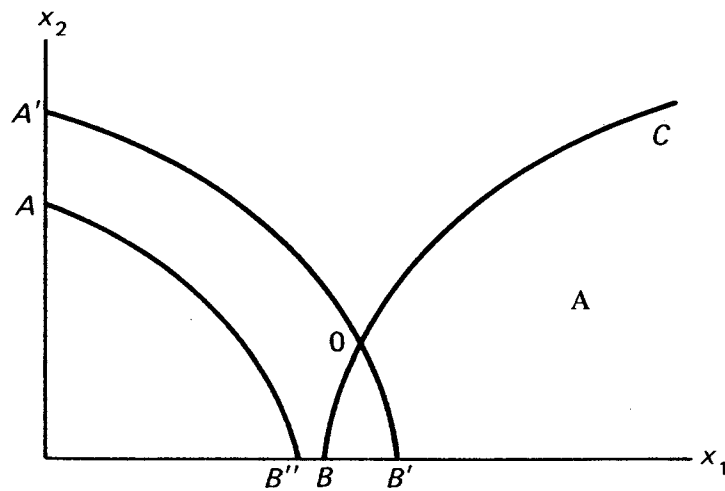


Figure 8-2. Individual Opportunities and the Acceptance Set

be seen, firms consider x_1 to be a positive characteristic for skilled work and x_2 a negative one. This may be inferred from the fact that the minimal level of the first characteristic necessary to qualify for skilled employment is an increasing function of the quantity of the second characteristic possessed by the worker.

Whether an individual obtains skilled employment depends on the characteristics acquired during youth. Figure 8-2 illustrates a case where an individual with possibilities AB'' cannot obtain acceptable characteristics for skilled employment, while the person with opportunities $A'B'$ can acquire the requisite skills by choosing a pair in the "triangle" BOB' . Because the array of possible characteristics varies with an individual's innate capabilities and socioeconomic background, these factors affect his or her chances of becoming a skilled worker, and hence earnings. To determine which people become skilled workers requires a consideration of the criterion used by young individuals in selecting characteristics. This is facilitated by assuming that only two occupational categories exist. Because an individual's socioeconomic background is defined by his or her parents' income and race, only four different backgrounds are possible for the members of a given generation. This permits an analysis of how the distribution of economic advantages evolves over time.³¹

Each individual is assumed to possess a set of preferences by which he or she evaluates his state of well-being. It is further assumed that these preferences are identical for all individuals.³² A person's well-being is determined by two factors: the bundle of characteristics acquired in the first period of life, and the level of income obtained in the second period. Each characteristic bundle may

be assigned a value that represents its dollar equivalent to all individuals. An individual's well-being may then be measured in dollar terms as the sum of the value of characteristics acquired during youth plus the wages earned in employment during maturity. An individual chooses a bundle of characteristics that will maximize his or her state of well-being, given the bundles attainable.

This choice is illustrated in Figure 8-3 for an individual with a set of attainable characteristic pairs given by all points on or below the locus $A'B'$. The acceptance set A is bounded from above by the curve BC . The individual's preferences among characteristics are depicted by a collection of indifference curves. The locus UU is a representative indifference curve. Characteristic pairs on an indifference curve have the same value to an individual. Characteristic bundles on an indifference curve that lies above another are more valuable than bundles on lower curves. A young individual thus makes his choice in two stages. First, he or she decides whether or not to become skilled. Second, given the decision, he or she chooses an appropriate bundle of characteristics. The second choice will be discussed first.

Given the set of attainable characteristics, the individual considers the bundle of characteristics whose dollar value is the greatest of all attainable bundles. For example, x^* in Figure 8-3 lies on the highest indifference curve,

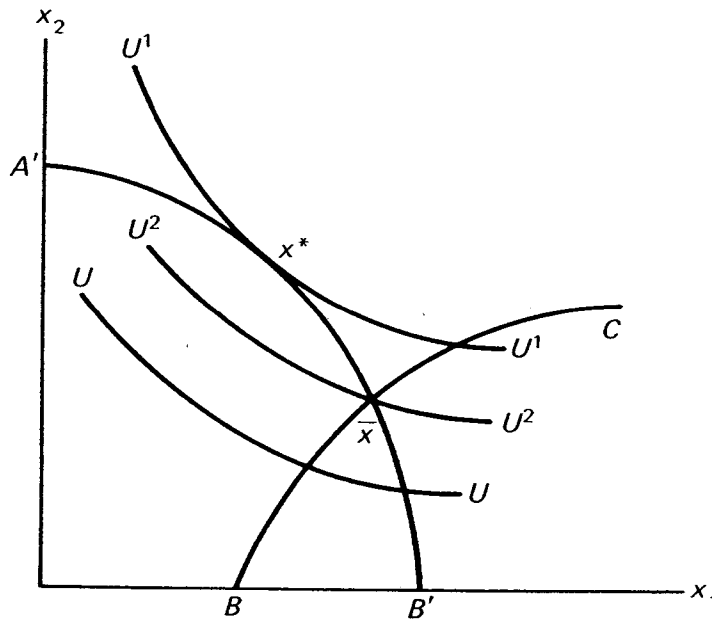


Figure 8-3. Selection of Optimal Characteristics

$U^1 U^1$, attainable to the individual (that is, it intersects the set of points on or below $A'B'$). If x^* is in A, the individual will select x^* , because this characteristic bundle gives the greatest income during maturity as well as the greatest value during youth. In general, however, these characteristics will be insufficient to qualify him or her for skilled employment. In this instance the individual will select x^* only if he or she decides to enter unskilled employment.

Next, the individual will consider the most desirable characteristic bundle that is both attainable and consistent with becoming a skilled worker. This assumes, of course, that such points exist. If not, the individual has no occupational decision to make. The set of all such points for the hypothetical individual in Figure 8-3 is bounded by the curve $B\bar{x}B'$. $U^2 U^2$ is the highest indifference curve that intersects this set and the most desirable bundle is \bar{x} . Thus, if the individual decides to become skilled, \bar{x} will be the chosen bundle. The difference between the value of the bundle x^* and the bundle \bar{x} is the cost of skill acquisition. If x^* is in A, this cost is zero. On the other hand, if an individual has no feasible points in A, the cost is infinite.

It is apparent from this analysis that the cost to a young person of becoming skilled depends only on his or her attainable set of characteristic bundles and preferences for characteristics during youth. Preferences are identical across individuals. However, the cost of acquiring skills varies with individual opportunities for acquiring characteristics. These opportunities depend on the innate endowment of the individual, α , and his or her socioeconomic background. It is natural to assume that the cost of becoming skilled will decline as α increases. Further, a more favorable socioeconomic background should also lead to a lower cost of acquiring skilled employment. Hence, higher parental income, with other things being equal, implies lower costs. Moreover, a given increase in parental income will reduce the cost to a young person of gaining skilled employment by more, the greater the degree of social stratification by income. This is because with greater stratification the community environment will change sharply with a change in parental income. Further, when there is racialism blacks will generally have higher costs than equally able whites with the same family income. The magnitude of this difference will increase with an increase in the degree of racial economic differences among mature workers (that is, with a decrease in r) as long as there is social stratification by race. Indeed, the greater the degree of racialism, the more the cost of becoming skilled increases for a black worker with a given decrease in r .

Figure 8-4 depicts the cost of acquiring skills as a function of innate capabilities for individuals of two different socioeconomic backgrounds. Each curve holds socioeconomic background constant and considers the effect of α on costs. The diagram illustrates that more capable individuals may acquire the characteristics of skilled workers at a lower expense than less capable individuals. As can be seen, the socioeconomic background corresponding to curve C^1 is more favorable for young people than that associated with C^2 . Holding the

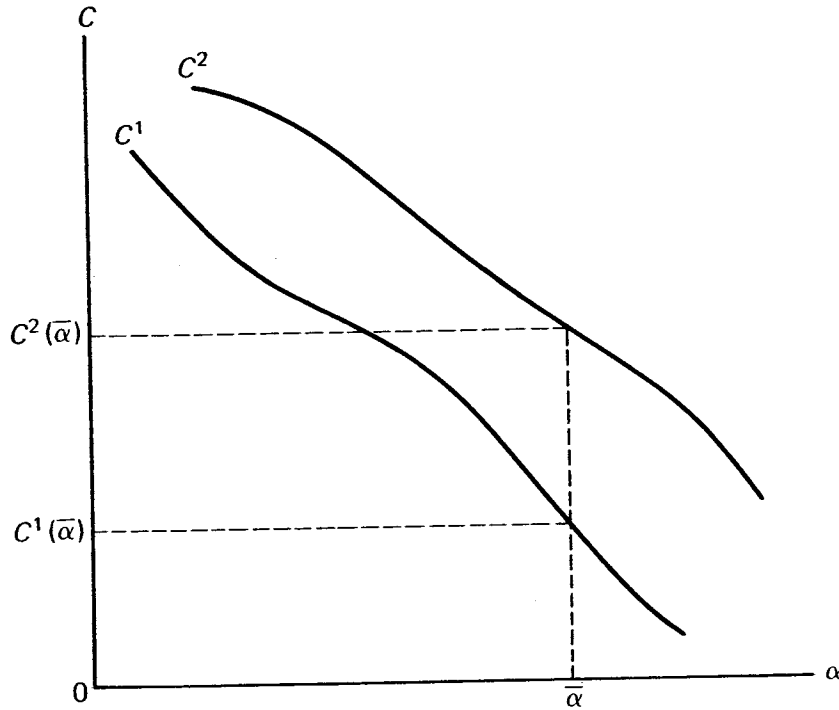


Figure 8-4. Cost of Becoming Skilled

degree of social stratification constant, this difference may reflect (1) the advantage of having greater parental income; (2) the advantage of being white rather than black in an environment where whites earn higher average incomes and racialism exists; or (3) the relative advantage of being black in a racist society when the extent of racial income differences has been lessened (that is, r has increased). In any event, a more favorable socioeconomic background will imply a decrease in cost for equally capable individuals. This is shown in Figure 8-4 by $C^1(\alpha) < C^2(\alpha)$.

It is now possible to determine when an individual will choose to become a skilled worker. As noted above, an individual with infinite costs cannot qualify for skilled employment while someone with zero costs will always be employed as a skilled worker. These cases, however, are not the norm.³³ Most people may obtain skilled employment if they are willing to make the necessary sacrifice during their youth. This necessary sacrifice depends on the individual's innate endowment and socioeconomic background, and is measured in monetary terms by the cost of becoming skilled. Suppose that at the beginning of each time

period firms announce the wages they will pay to skilled and unskilled workers, \bar{w} and w , respectively, in the subsequent period. The wage differential, w , is the payoff to a young person for incurring the cost of becoming skilled. Because people choose characteristics to maximize their well-being, they will become skilled workers if and only if the payoff exceeds the cost.

A young person's choice of characteristics involves the following. First, that person considers the most valuable of all his or her attainable characteristic bundles, and then considers the best bundle he or she can acquire that also qualifies him or her for skilled employment. The cost of becoming skilled is represented by the difference between the values of these two bundles. Only if the extra wages the person could earn by becoming skilled exceed this cost will he or she choose the bundle qualifying him or her for skilled employment. This situation is illustrated in Figure 8-5 where cost is measured on the vertical axis and capability on the horizontal axis. Figure 8-5 depicts cost curves that are representative of two distinct socioeconomic backgrounds. The wage differential announced by firms for next period's employment is given as w . Because cost declines with increasing innate capability, each socioeconomic background has a corresponding critical level of innate ability. Anyone of that background with a capability greater than this critical level will become skilled.

Obviously, this critical level of capability is determined by the requirement that the cost of becoming skilled to a person of the given socioeconomic background endowed with the critical level of innate capability be equal to the wage differential offered by firms. α^1 and α^2 satisfy this requirement for the socioeconomic backgrounds represented by cost functions C^1 and C^2 , respectively, in Figure 8-5. Hence, given an offered wage differential, in each generation young individuals with the same socioeconomic background (that is, race and parental income) will or will not become skilled on the basis of innate endowment. The dividing point—or critical level of capability—is determined once the cost function for this group and the wage differential are known. Because the distribution of innate capabilities in the population is identical for each generation, race, and social class, the number of individuals from this group who will become skilled workers can be determined.

This process is also illustrated in Figure 8-5. If $F(\alpha)$ is the cumulative distribution function of innate capability, then $1-F(\alpha)$, measured on the downward vertical axis, represents the fraction of the population with innate capability greater than α . Given the independence assumptions, this will also be the fraction of young individuals from a particular socioeconomic background with an innate endowment greater than α . Thus, for the socioeconomic backgrounds represented by C^1 and C^2 , the fractions of these groups that acquire skilled characteristics depend on w , the skilled/unskilled wage differential. These fractions are depicted by $V^1(w)$ and $V^2(w)$ in Figure 8-5. It is clear from the figure that V^1 and V^2 are increasing functions of w , and that for every w , $V^1(w) > V^2(w)$; that is, higher wage differentials for skilled workers will

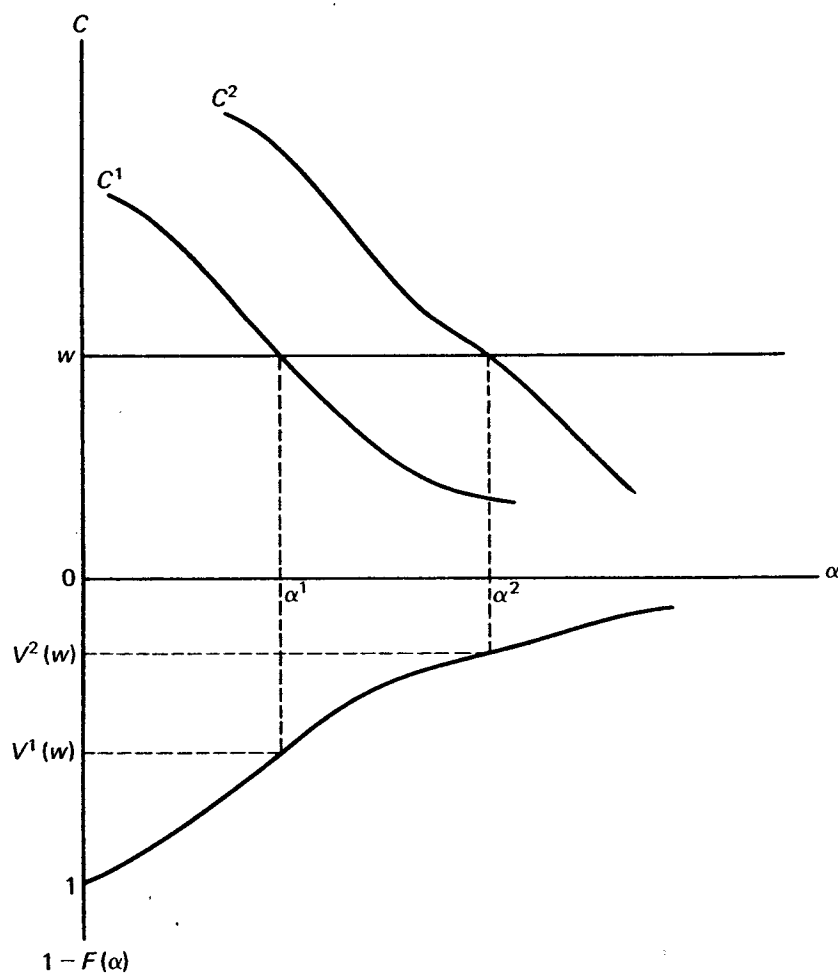


Figure 8-5. Critical Capability Levels

induce more young people to acquire the characteristics of skilled employees. Further, a group with a more favorable socioeconomic background than another will always have a larger fraction of its young people qualified for skilled employment.

Static Equilibrium

It is now possible to describe the static labor market equilibrium for a given generation. Equilibrium occurs when the supply of and demand for both skilled

and unskilled workers is equal. Although two kinds of labor are involved, the assumptions made earlier permit the equilibrium in the simple supply-demand framework pictured in Figure 8-6 to be analyzed. In Figure 8-6 the wage differential between skilled and unskilled workers is measured on the vertical axis while the aggregate ratio of skilled to unskilled employment, denoted by l , is given on the horizontal axis. The assumptions of competitive factor markets and constant returns to scale imply a downward sloping demand curve D . Firms can be on their demand curves for both types of labor if and only if the corresponding wage differential and employment ratio is on the curve D .³⁴

Because the decision of an individual to acquire skilled characteristics depends on his or her socioeconomic background, it is apparent that the supply of skilled workers will depend on the labor market equilibrium established during the previous period.³⁵ This is the result of the intergenerational externalities in the model. Accordingly, the static labor market equilibrium for any generation will always be conditional on the equilibrium obtained for the

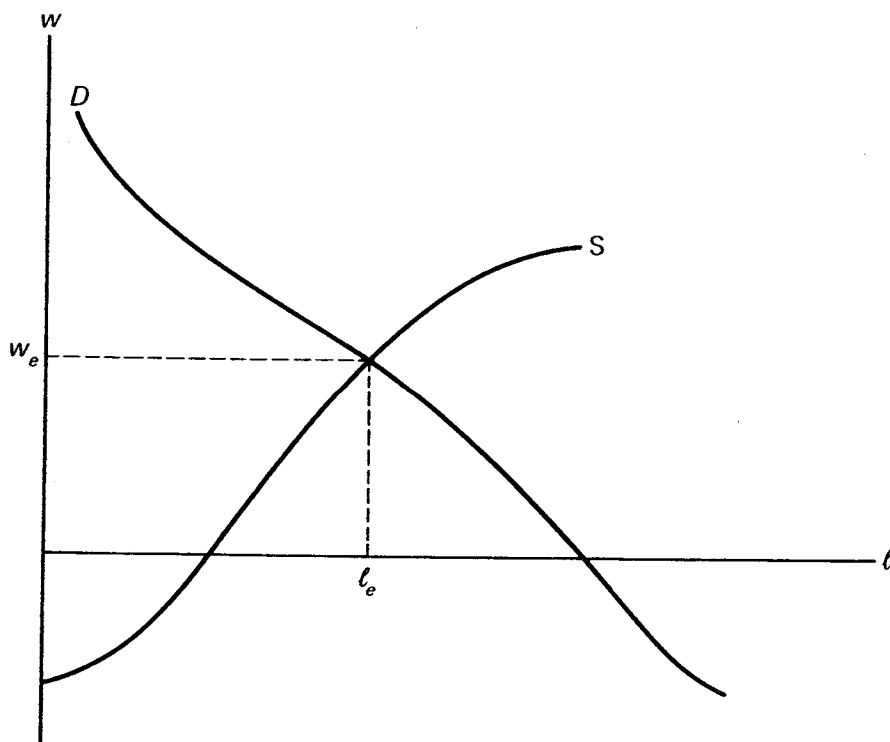


Figure 8-6. Labor Market Equilibrium

preceding period. The path that these equilibria follow over time is analyzed in the fourth section of this paper. However, the supply of skilled workers as a function of the wage differential (the *S* curve in Figure 8-6) can be specified, given the fractions of black and white workers who acquired skilled characteristics during the previous period. This information is sufficient to determine the socioeconomic backgrounds of all young individuals in the economy.³⁶

Assume that the extent of social stratification by income and race remains unchanged over time. The cost of becoming skilled can then be determined as a function of innate ability for individuals of the four possible socioeconomic backgrounds. Again, for whites this cost function depends only on parental income, while for blacks it depends on both parental income and the degree of racial income differences. The locus *S* shown in Figure 8-6 may be constructed. This supply curve may be traced given the fraction of young people from the four socioeconomic backgrounds who will acquire skilled characteristics at various wage differentials.³⁷

Equilibrium holds at the intersection of the demand and supply curves in Figure 8-6. Here the fraction of young people who want to become skilled equals the fraction of skilled employees to all employees required by each firm at a given wage differential.³⁸ Given the equilibrium wage differential, the fractions of black and white youths who will be employed in skilled occupations in the subsequent period can be determined. Knowledge of these fractions, in turn, enables the labor market equilibrium in the next generation to be determined. In this way a sequence of market equilibria and associated income distribution can be generated, starting from any initial situation.

In summary, this section has presented an economic model of individual earnings determination in which the social structure directly affects economic outcome. In preparing for employment, individuals weigh the costs and benefits of alternative actions, choosing the one that maximizes their well-being. Costs are directly influenced by an individual's innate capability and socioeconomic background. The impact of socioeconomic background on achievement is strongly conditioned by the degree of income and racial stratification in the society. If community associations tend to divide sharply along these lines, the relative lack of economic success by a young person's parents and/or racial group becomes a serious liability to that individual's own achievement. The more representative the composition of a community, the greater the importance of an individual's innate capabilities in determining his or her success. In any event, the distribution of economic advantage within any generation depends on the distribution that prevailed in the preceding generation. The dynamic implications of these observations are analyzed in the following section.

Dynamic Analysis of the Model

Equal Opportunity and Racial Income Equality

The determination of equilibrium wages and employment levels of skilled and unskilled workers of any generation was described above. Equilibrium is

determined by the fractions of black and white workers employed in skilled occupations in the previous generation. Analysis of equilibrium where equal opportunity prevails reveals a dynamic relation determining the fractions of blacks and whites in skilled employment in subsequent generations, knowing only the state in which the economy started.³⁹

The current observed earning differential between the races may be represented in the model in terms of a smaller initial fraction of blacks than of whites employed in skilled occupations. Accordingly, the future path of the black and white economic position can be traced. In each subsequent generation (the t^{th}), the index of racial income differences takes on a value ($r^t \cdot r^t$ represents the ratio of the average income of blacks to the average earnings of whites in the t^{th} generation). This ratio may be determined once the fractions of blacks and whites employed in skilled occupations in that generation are known.⁴⁰ Because blacks have been discriminated against in the past, r^0 will be less than one. As r^t approaches one, racial economic differences become negligible for t sufficiently large.

This analysis is illustrated by Figure 8-7, which summarizes the dynamic relation of labor market equilibria across generations. The horizontal axis represents the index of racial income differences in an arbitrary generation, t . The vertical axis measures the degree of racial economic disparity in the succeeding generation, $t + 1$. The locus AB summarizes the relationship between these indices. However, in order for this graphical analysis to be valid, this relationship must not change over time. This reflects the assumption that the social structure (that is, extent of income and racial stratification) remains unchanged over time. The analysis thus focuses on the impact of a *given* set of social relations on the evolution of racial economic positions.

Suppose that the current racial income differential is represented by the point r^0 on the horizontal axis in Figure 8-7. Following a vertical line from r^0 to the curve AB , it can be seen that r^1 indexes racial differences in the following generation. Similarly, the horizontal line from the point r^1 on the vertical axis to the 45° line determines the extent of racial income differences, r^2 , in two generations. The path of future relative economic positions may be determined in this manner. The path in the figure leads to the eventual elimination of racial income differences since r^t will eventually become only negligibly different from one. Moreover, inspection of the diagram shows that *any* initial position will determine a path with the same long-run consequence; that is, no matter how great the initial disadvantage of the black population, the dynamic process of income determination will lead to an eventual equalization of racial economic positions.

Another possibility is illustrated in Figure 8-8. Here the intergenerational relation of relative economic positions is depicted by the locus AD . Inspection of the diagram reveals that the long-run evolution of racial income differences critically depends on the starting position. If past discrimination has not been too severe, so that the initial index of racial earnings disparity is greater than \bar{r} ,

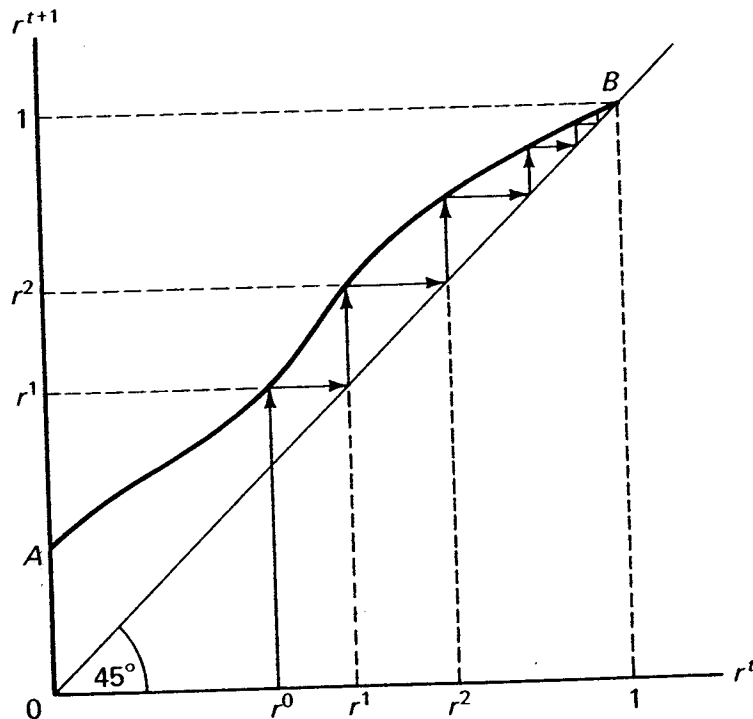


Figure 8-7. Long-Run Income Equality

eventual equality may be expected. A representative path, beginning at r_b^0 in the figure, illustrates this point. However, if the initial earnings gap is represented by r_a^0 , black-white income differences will persist indefinitely and may even increase over time. As can be seen, an initial earnings ratio less than \bar{r} , in the long run, will lead to the ratio r_p , which represents permanent inequality.

An extreme example of the failure of the equal opportunity to eliminate racial income differences is illustrated in Figure 8-9. If the locus AC characterizes the relation of relative economic positions across a generation, the slightest degree of initial inequality is sufficient to guarantee a permanent earnings gap. The social structure underlying the relationship depicted in the figure exhibits an inherent tendency toward inequality.

The Limits of Equal Opportunity

What are the reasons for these drastic differences in the long-run performance of a laissez-faire economy with no racial discrimination? What factors determine

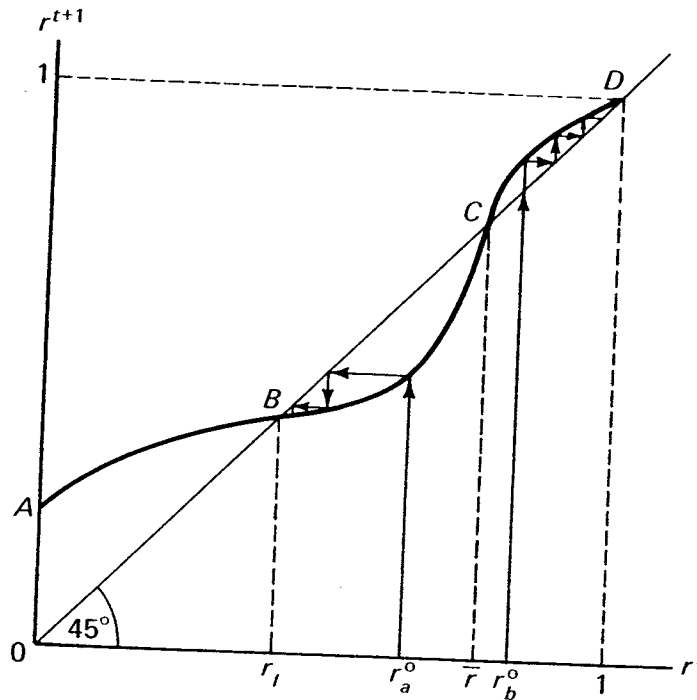


Figure 8-8. Long-Run Income Equality or Inequality Dependent on Initial Position

whether a benign structure such as that illustrated in Figure 8-7, or an inequality-preserving relation as in Figure 8-9, will hold? These questions are answered in the propositions presented below. Before discussing these, however, it is possible to gain some insight into the forces at work. Recall that there are three major influences that determine whether a young person can become a skilled worker—family background, community environment, and endowment of innate capabilities. Innate ability has been assumed to be identically distributed among blacks and whites. Hence, any persistence of racial income differences in the face of equal opportunity must result from family background and the community environment.

Given the effect of family background on achievement, the fact that more black than white youngsters inherit poor family backgrounds due to past discrimination against their parents means that fewer blacks than whites will achieve skilled occupational status in the next generation. However, each generation's advancement, if indeed there is advancement, enables the next generation to start with a smaller relative disadvantage. The cumulative effect of this process could eventually eliminate differences in the average earnings of the two groups.

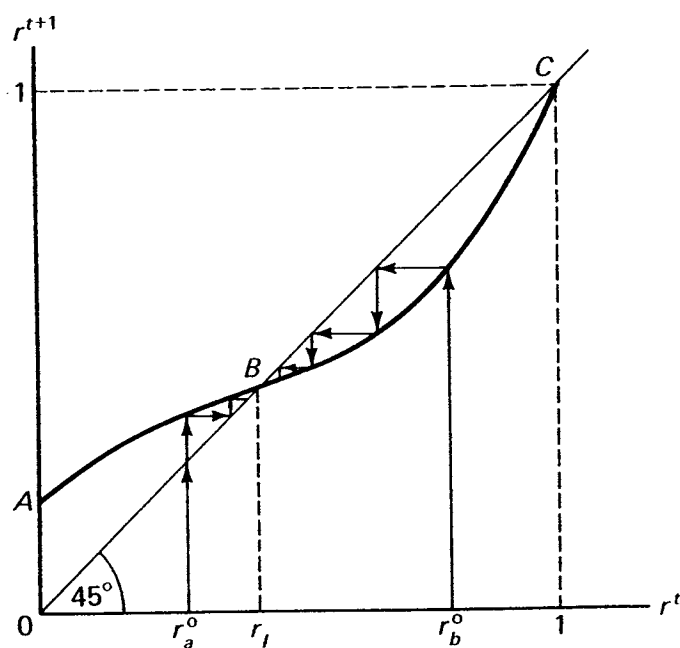


Figure 8-9. Long-Run Income Inequality

Community effects are important when there is some degree of social stratification. With stratification by income, a poor family background represents an even greater handicap than that discussed above. Moreover, historical discrimination implies that blacks will face this impediment more frequently than whites.

Social stratification by race leads to racially homogeneous communities. In this case if there has been discrimination, the community effects for blacks and white youngsters, even with the same parental income, will differ. Consequently, black parents who have succeeded will be less able than white parents to assure the success of their children. Again, however, if the racial earnings gap continues to narrow under equal opportunity laws, this effect will diminish over time.

Thus, there seem to be two separate though related elements that work to distinguish the dynamic relations of earnings over generations. The first is the extent of social stratification by income and race, determining the strength of the bond between parental socioeconomic status and offspring achievement. The other element is the ability of each generation of black workers to make progress with respect to the position of the preceding generation, allowing a

diminution of the handicap of historical discrimination over time. The significance of the social structure is illustrated in the following proposition:⁴¹

PROPOSITION I: Suppose there is no racialism in the society, so that social stratification occurs only along income lines. Assume that whenever a parent's income is increased by one dollar, the cost to his or her offspring of acquiring skilled characteristics is reduced by less than one dollar. Assume further that the greater a parent's income, the less a dollar increment to that income will reduce the offspring's cost of becoming skilled. Under these conditions enforcement of equal opportunity laws means that historical differences in earnings between blacks and whites will diminish and tend to zero over time.

The implication of this proposition is that in a society where one's race is socially irrelevant, and where the practice of racial discrimination in the labor market is prohibited, differences in racial economic positions cannot persist. This proposition is not transparent. Note the conditions under which it is true. First, it is required that parental economic position not be so important that a given increase in parental earnings leads to an even greater ultimate monetary benefit to the offspring. This would be a weak requirement if family environment were the only vehicle for the intergenerational external effect. If an increase in parental income is accompanied by a shift in community income and society is stratified by income, this condition could be violated.

The second condition requires that the marginal benefit to young people of parental income does not increase as parental earnings increase. This is a stronger condition and there is some evidence that it may not hold.⁴²

These conditions are sufficient, but not necessary, for long-run equality. However, even if they do not hold, in the absence of racialism, it is likely that equal opportunity will lead to the elimination of racial income differences. Faith in the free market is not without foundation.

Proposition I also addresses the question raised in the sociology literature of the late 1960s—specifically, whether the “inheritance of poverty,” which blacks face more frequently than whites, could cause persistent racial inequality. By considering linear models in which the assumptions of Proposition I are constrained to hold, the writers of this period answered with an unqualified “no.”⁴³ As stated, Proposition I gives a precise set of conditions under which this answer is correct.

The assumption of no racialism in Proposition I is very strong. However, racial stratification is widespread in our society. The true test of the efficacy of equal opportunity laws is how they stand up in the presence of antagonistic social relations among racial groups. In order to isolate the impact of racialism, the following proposition considers an economy without income stratification. Moreover, family background is assumed not to affect an offspring's opportunities; only community effects are assumed to be operative. As demonstrated above, under certain conditions parental income effects alone cannot sustain

racial economic differences. Unfortunately, the consequences of racialism are not so benign. This is demonstrated by Proposition II:

PROPOSITION II: Suppose there is no social stratification by income, and that family environment does not affect a young person's opportunities. Imagine, however, that social stratification by race is prevalent and that community external influences are present. In such a situation, equal opportunity laws need not ensure that any initial difference in group earnings will eventually become negligible. Further, eventual equality will result from establishing equal opportunity only if the relative economic position of blacks improves continually over time.

The first result of Proposition II is a negative one. It states that the presence of racialism implies that equal opportunity (as defined in this paper) will not necessarily lead to eventual equality for blacks. While the possibility that the favorable situation of Figure 8-7 obtains cannot be ruled out, no assurance can be given when there is racialism. What ultimately happens will depend on the strength of community external effects (the importance of school quality and job market information) and the extent of social stratification by race.

The final statement in the proposition yields further insights. It gives a specific test of whether racial income differences will eventually be eliminated in a given economy. If, through normal operation of the competitive labor market under equal opportunity, a worsening of the relative economic position of blacks should occur, there exists an historical disparity of sufficient magnitude that blacks will never gain equality if they start at any greater disadvantage. Given the simplicity of the model, however, this result is only suggestive of the more complex conditions under which equal opportunity laws may fail in reality. Particularly troublesome is the absence of unemployment and cyclical effects in the model. The comfortable long-run conclusions of the traditional liberal view may thus be called fundamentally into question.

Conclusion

Several preliminary conclusions about the process of personal income determination and related public policy may be drawn from this socioeconomic analysis. This discussion has considered the problem of income distribution in an explicitly intertemporal framework. By doing so it has shown that, even in the absence of transfers of physical wealth within families, the economic achievement of an individual will only partially reflect his or her innate productive capabilities. The overlapping of generations and the influences of the prevailing external environment on individual development mean that the present pattern of ownership of resources will influence the distribution of productive capabilities among succeeding generations of workers.

It thus follows that the creation of a skilled work force is a social process.

The merit notion, that in a free society each individual will rise to the level justified by his or her competence, conflicts with the observation that no one travels that road entirely alone. The social context within which individual maturation occurs strongly conditions what otherwise equally competent individuals can achieve. This implies that absolute equality of opportunity, where an individual's chance to succeed depends only on his or her innate capabilities, is an ideal that cannot be achieved. It has been shown here that the limited version of equal opportunity that *is* attainable does not have the desirable properties of the impossible ideal.

Traditional economic theory teaches that earnings differentials among workers may be understood on the basis of individual differences in amounts of education and work experience. The notion of "human capital" has been used to describe these investments in individuals. This focus on objective determinants of earnings disparities, while providing a convenient rationale for existing inequalities, ignores the process by which such investments are made. Thus, human capital theorists can accurately predict the consequence that an individual's dropping out of high school will have on his or her lifetime earnings, but such theorists have not analyzed *why* a given per capita expenditure yields a lower quality education in the ghetto than in more affluent communities of the same school district.

An individual's social origin has an obvious and important effect on the amount of resources that is ultimately invested in his or her development. It may thus be useful to employ a concept of "social capital" to represent the consequences of social position in facilitating acquisition of the standard human capital characteristics. While measurement problems abound, this idea does have the advantage of forcing the analyst to consider the extent to which individual earnings are accounted for by social forces outside an individual's control. However, for precisely this reason such analysis is unlikely to develop within the confines of traditional neoclassical theory.

Notes

1. Intergeneration externalities have been studied in a partial equilibrium context in T. Ishikawa, "Family Structure and Family Values in the Theory of Income Distribution," *Journal of Political Economy* 83 (1975): 987-1008; and E. Lazear, "Intergenerational Externalities," mimeographed (Chicago: The University of Chicago, February 1976). The distributional implications of these effects, however, have not been investigated.

2. See, for example, F. Welch, "Labor Market Discrimination: An Interpretation of Income Differences in the Rural South," *Journal of Political Economy* 75 (1967): 225-241; and R.D. Weiss, "The Effect of Education on the Earnings of Blacks and Whites," *Review of Economics and Statistics* 52 (1970): 150-159.

3. This is, of course, Becker's idea, G.S. Becker, *The Economics of Discrimination* (Chicago: The University of Chicago Press, 1971). Whether or not differential returns will actually occur depends on how costly it is for employers to turn over their work force (K. Arrow, "Models of Job Discrimination," "Some Mathematical Models of Race in the Labor Market," in *Racial Discrimination in Economic Life*, A. Pascal, ed. (Lexington, Mass.: D.C. Heath-Lexington Books, 1972) and on the ability of nondiscriminating entrepreneurs to expand their numbers and scale of production (as emphasized by R.B. Freeman, "Labor Market Discrimination: Analysis, Findings, and Problems," in *Frontiers of Quantitative Economics*, M.D. Intriligator and D.A. Kendrick, eds. (New York: North-Holland Publishing Company, 1974). To the extent that labor turnover costs are high, or growth of the nondiscriminating sector is limited, the theory predicts protracted black-white wage differentials.

4. The term "market-valued characteristics" is used interchangeably with the more common term "human capital." This is done to avoid the possibly erroneous association of these characteristics with some objective notion of productivity. The empirical results of human capital theory are apparently consistent with the assumption that education per se does not appreciably affect job performance. See, for example, L. Thurow, *Poverty and Discrimination* (Washington: The Brookings Institution, 1969).

5. The development of this policy since 1964 has been summarized in P.A. Wallace, "A Decade of Policy Developments in Equal Opportunities in Employment and Housing," in *A Decade of Federal Antipoverty Policy: Achievement, Failure and Lessons*, R. Haverman, ed. (New York: Academic Press, forthcoming).

6. Consider: "... it appears that the absence of racial discrimination in the job market would not eliminate racial differences in occupations immediately, since there are broad societal processes operating to the disadvantage of Negroes. . . . Several generations would be necessary before parity was reached" (S. Lieberman and G. Fuguitt, "Negro-White Occupational Differences in the Absence of Discrimination," *American Journal of Sociology* 73, 1967: 188); or "But if there were remedies for all these forms of discrimination, so that the only handicap of family background remained, that handicap would be materially diminished in the next generation. It would be further attenuated in successive generations . . . and . . . would tend to disappear of its own accord" (O.D. Duncan, "Inheritance of Poverty or Inheritance of Race?" in *On Understanding Poverty*, D. Moynihan, ed., New York: Basic Books, 1968, p. 102), (emphasis added); or finally, "In other words, if we could eliminate the inheritance of race, in the sense of the exposure to discrimination experienced by Negroes, the inheritance of poverty in this group would take care of itself (Duncan, "Inheritance of Poverty," p. 103).

7. Possible exceptions to this statement are the recent literature on job market signaling. See M. Spence, "Job Market Signaling," *Quarterly Journal of Economics* 87 (1973): 355-374; D. Starrett, "Social Institutions and the

Distribution of Income: A Neoclassical Defense of Radical Positions," Technical Report #117 (Institute for Mathematical Studies in the Social Sciences: Stanford University, December 1973); and J. Stiglitz, "The Theory of 'Screening' Education and the Distribution of Income," *American Economic Review* 65 (June 1975): 283-300. The "radical" literature on education provides a totally different perspective. See, for example, S. Bowles and H. Gintis, "The Problem with Human Capital Theory: A Marxian Critique," *American Economic Review* 65 (1975): 74-82, and S. Bowles and H. Gintis, *Schooling in Capitalist America* (New York: Basic Books, 1976).

8. See especially, P. Blau and O.D. Duncan, *The American Occupational Structure* (New York: John Wiley and Sons, 1967); or O.D. Duncan et al., *Socioeconomic Background and Achievement* (New York: Seminar Press, 1972); or Duncan, "Inheritance of Poverty"; or Lieberman and Fuguitt, "Negro-White Differences." For a review of the intragenerational mobility literature, see D. McFarland, "Intragenerational Social Mobility as a Markov Process," *American Sociological Review* 35 (1970): 463-476. An interesting analysis of the intergenerational dynamic interplay of social mobility and educational opportunity is provided by R. Boudon, *Education, Opportunity and Social Inequality* (New York: John Wiley and Sons, 1973). A recent comparative study of intragenerational occupational mobility among young black and white males is R. Hall and R. Kasten, "The Relative Occupational Success of Blacks and Whites," *Brookings Papers on Economic Activity* 3 (1973): 781-798.

9. This is the analytic method of path analysis applied to life-cycle models of socioeconomic achievement. For a discussion of the development of this methodology, see Duncan et al., *Socioeconomic Background*, especially Chapters 1 and 2.

10. This was established early in the development of this research by sociologists. See Duncan, "Inheritance of Poverty" or Duncan et al., *Socioeconomic Background*, pp. 95-96, "... the (relatively few) Negroes who do have favorable social origins cannot, as readily as whites, convert this advantage into occupational achievement and monetary returns... (The Negro Family) is relatively less able than the white to pass on to the next generation any advantage that may accrue to substantial status achievement in the present generation."

11. This effect may be an artifact of the broad definition of occupation used in these studies. A more recent study of occupational achievement by R.M. Stolzenberg, "Education, Occupation, and Wage Differences between White and Black Men," *American Journal of Sociology* 81 (1975): 299-323, using much finer occupational categories, finds negligible intraoccupational earnings differences between blacks and whites, once education is controlled. However, he also finds that blacks tend to be concentrated in the lower paying occupations of each broad occupational category.

12. The term is Becker's, *Economics of Discrimination*, p. 6.

13. See, for example, U.S. Commission on Civil Rights, *Racial Isolation in the Public Schools* (Washington: U.S. Government Printing Office, 1967), Vols. I-II.

14. That this is the case has been firmly established. See, for example, M. Feldstein, "Wealth Neutrality and Local Choice in Public Education," *American Economic Review* 65 (1975): 82, Table 1; or A.E. Wise, *Rich Schools, Poor Schools: The Promise of Equal Educational Opportunity* (Chicago: The University of Chicago Press, 1968), p. 125, Table 2.

15. In their provocative book, Bowles and Gintis give data that support this argument. For example, in 1971 the ratio of the number of students with family income over \$20,000 to the number of students with family income under \$8,000 was nine times greater in private universities than in public two-year colleges, p. 210, Fig. 8-1.

16. The importance of imperfect information in determining the distribution of income is also emphasized by Starret, "Neoclassical Defense of Radical Positions."

17. It has recently been argued that this very omission in macroeconomics lies at the heart of the differences between Monetarists and Kenesians over the long-term effects of fiscal policy. See A. Blinder and R.M. Solow, "Does Fiscal Policy Matter?," *Journal of Public Economics* 2 (1973): 319-337.

18. See, for example, Arrow, *Racial Discrimination in Economic Life*, pp. 98-100; Freeman, "Labor Market Discrimination," pp. 525-529; or R. Marshall, "The Economics of Racial Discrimination: A Survey," *Journal of Economic Literature* (September 1974): 849-871.

19. Samuel Bowles, "Understanding Unequal Economic Opportunity," *American Economic Review* 63 (May 1973): 352.

20. This temporal sequence is merely Duncan's socioeconomic life cycle mentioned earlier. See Duncan et al., *Socioeconomic Background*.

21. In order to consider the dynamic implications of racial discrimination we must (regrettably) neglect the problems of sexism. The economic consequences of the interaction of these two important social forces provide a formidable agenda for future research.

22. The possibility of assortative mating, which could slow considerably the convergence of black and white incomes, is not analyzed here.

23. There are not national estimates of the frequency of interracial marriage. Casual empiricism suggests that the incidence of the phenomenon, while limited, has been increasing in recent years.

24. The term "community" is used here in a generalized sense. Its connotation is intended to be broader than the ordinary notion of the residential neighborhood.

25. See note 22, *supra*. It must be acknowledged that recent judicial efforts toward school desegregation exemplify how the equal opportunity law might be used to limit *some* of the effects of social stratification by race on young people's opportunities. Note, however, the hesitancy of the courts to consider this issue along class as well as racial lines.

26. One instance of this phenomenon is that in many large cities the residential areas of middle- and lower-class blacks are contiguous, with the obvious spill-over effects.

27. For ease and clarity of exposition, many technical details of the specification of the theory are omitted here. Further, no attempt is made at mathematical rigor in the arguments. Readers interested in a more general and completely rigorous derivation of results cited here are referred to G.C. Loury, "Essays in the Theory of the Distribution of Income" (Ph.D. dissertation, Massachusetts Institute of Technology, May 1976).

28. This analysis thus explicitly disregards the arguments of Herrnstein, Jensen et al. that the heritability of IQ has a major role in sustaining racial income differences. This omission may be justified on two grounds. First, nearly all of the racial differences in performance on IQ tests may be accounted for by the difference in family environments (R.H. Gordon, "The Influence of a Father's Education and Occupation on his Offspring's IQ Score," mimeographed (Cambridge, Mass.: Massachusetts Institute of Technology, 1975) and hence are already considered here. Second, the relationship between IQ and earnings is extremely tenuous at best (see Bowles and Gintis, *Capitalist America*, Chapter 4), and thus could hardly explain the magnitude of observed racial earnings differences.

29. A subtle point is that the equal opportunity does not imply complete racial equality of opportunity unless either (1) an individual's ability to acquire characteristics is independent of his or her community environment; or (2) the economic status of blacks and whites is on the whole equalized. Apparently, condition (1) requires a great deal more than integrated education.

30. The model abstracts from physical capital and the existence of a propertied class. Racial income inequality derives primarily from the relatively poor position of the black worker. Consequently, nothing fundamental is lost by our assumption. A full investigation of the determination of the social relations that obtain among various groups must incorporate this factor.

31. The method employed here could be used as the basis for a large-scale simulation effort with considerably more detail in the characterization of the occupational structure and the family and community background. The simple framework, however, lends insight into the qualitative properties of the system. Such insight should be useful in the formulation of policy, and in the eventual construction of more elaborate empirically based models.

32. Thus, Moynihan-Banfield "culture of poverty" effects are neglected to

the extent that they require the poor to have a greater preference for leisure, or to be more "present oriented." Hence the assumption is made here because we seek to show that even under the most favorable of conditions, the equal opportunity may fail to achieve its goal.

33. If almost all people had zero costs, nearly everyone would become skilled. If both types of labor were necessary to production, diminished marginal productivity would eventually lead to the unskilled wage rising relative to the skilled wage. Because the initial designation of occupational categories as "skilled" and "unskilled" was arbitrary, this assumption is effectively innocuous.

34. Let $F(L_1, L_2)$ be the production function of a representative firm where L_1 (L_2) is the number of skilled (unskilled) employees. Let Y denote output. Then constant returns to scale imply:

$$Y = L_2 \left(\frac{Y}{L_2}\right) = L_2 \left(\frac{1}{L_2} F\right)(L_1, L_2) = L_2 F\left(\frac{L_1}{L_2}, 1\right) = F_2(F(l)).$$

35. This analysis is based on the implicit assumption that jobs and wages are settled in the labor market for any generation in the period before these agents become employed.

36. Let M_B (M_W) denote the fraction of the black (white) mature population with skilled characteristics in the previous period. Let b denote the constant fraction of the population that is black. Then the socioeconomic backgrounds of the t -generation young people are determined as follows:

$$l^{t-1} = \frac{bm_B^{t-1} + (1-b)m_W^{t-1}}{1 - [bm_B^{t-1} + (1-b)m_W^{t-1}]} \quad (8.1)$$

gives the ratio of skilled to unskilled mature workers. Thus, by the analysis of note 34 above (assuming equilibrium in the previous period),

$$\bar{w}^{t-1} = f^1(l^{t-1}), \underline{w}^{t-1} = f(l^{t-1}) - l^{t-1}f^1(l^{t-1})$$

and

$$w^{t-1} = \bar{w}^{t-1} - \underline{w}^{t-1} \quad (8.2)$$

may be determined from the technology of production. The degree of racial income differences may also be determined.

$$r^{t-1} = \frac{\bar{w}^{t-1}m_B^{t-1} + \underline{w}^{t-1}}{\bar{w}^{t-1}m_W^{t-1} + \underline{w}^{t-1}} \quad (8.3)$$

37. Let $C(\alpha, y, r)$ represent the cost of becoming skilled for a black with parental income y , and $C(\alpha, y, 1)$ be the similar function for whites. Note that when $r = 1$ there are no racial income differences and the cost function is the same for blacks and whites. This is also true if there is no social stratification by race, since in that case

$$\frac{\partial c}{\partial r} = 0.$$

Now, let $v(w, y, r)$ be the fraction of individuals with socioeconomic background (y, r) who acquired skilled characteristics in the t^{th} generation when the offered wage differential is w . From Figure 8.5 and note 36 we have that if (m_B^{t-1}, m_w^{t-1}) are given in the mature population, then the fraction of young blacks who would want to acquire skilled characteristics at the offered wage differential w is simply

$$m_B^t(w) = m_B^{t-1} V(w; \bar{w}^{t-1}, 1) + (1 - m_B^{t-1}) V(w; \bar{w}^{t-1}, r^{t-1}). \quad (8.4)$$

Similarly, the fraction of whites who will desire to qualify for skilled employment is

$$m_w^t(w) = m_w^{t-1} V(w; \bar{w}^{t-1}, 1) + (1 - m_w^{t-1}) V(w; \bar{w}^{t-1}, 1). \quad (8.5)$$

Now the supply curve S is given by

$$S(w) = \frac{bm_B^t(w) + (1 - b)m_w^t(w)}{1 - [bm_B^t(w) + (1 - b)m_w^t(w)]}. \quad (8.6)$$

The t -generation supply curve (and hence equilibrium) depends upon the $(t - 1)$ -generation equilibrium

$$(m_B^{t-1}, m_w^{t-1}).$$

38. In the language developed in the last few footnotes, the equilibrium (l_e, w_e) must satisfy

$$w_e = (1 + S(w_e)) f'(S(w_e)) - f(S(w_e)), \text{ and} \quad (8.7)$$

$$l_e = S(w_e).$$

The fractions of black and white young people who become skilled are then determined (using the notation of note 37):

$$m_B^t = m_B^t(w_e) = m_b^{t-1} V(w_e; \bar{w}^{t-1}, r^t) + (1 - m^{t-1}) V(w; \underline{w}^{t-1}, r^{t-1}) \quad (8.8)$$

and

$$m_w^t = m_w^t(w_e) = m_w^{t-1} V(w_e; \bar{w}^{t-1}, 1) + (1 - m_w^{t-1}) V(w_e; \underline{w}^{t-1}, 1). \quad (8.9)$$

39. Mathematically, this relation is obtained by combining Equations (8.1), (8.2), and (8.4)-(8.9) of notes 36, 37, and 38 above.

40. To do so one need only combine Equations (8.1), (8.2), and (8.3) of note 36.

41. While logically valid under the assumptions already made, these proposition proofs involve mathematical techniques beyond the scope of the present work. The interested reader is referred to Loury, "Theory of the Distribution of Income."

42. Consider the analysis of the Survey of Educational Opportunity data conducted by the United States Civil Rights Commission in the late 1960s (*Racial Isolation*, Vol. 1, pp. 80-85). The commission found that grade-level performance of twelfth-grade students varied significantly by the individual student's social class, as well as by the average social class attending the school. Middle- and upper-class students did consistently better than lower-class students. However, there were some interesting differences in the patterns between blacks and whites. While white gains from increasing student's social class diminished as one moved first from lower to middle, and then from middle to upper class (Figure 1, p. 80), blacks gained little in moving from lower to middle class but made quite significant gains when background was advanced to upper class (Figure 1, p. 80 and Figure 3, p. 85). Similar nonconvexities for blacks in the effect of social class on achievement on IQ tests have been uncovered by Gordon, "Influence of a Father's Education." In his work, piecewise linear regression of IQ performance on socioeconomic background variables reveals significantly greater marginal effects for parent's income in the range \$7,500 to \$10,000 than for either lower- or higher-income classes.

43. See Duncan, "Inheritance of Poverty" and Lieberman and Fugitt "Negro-White Differences." See also the passages from these works quoted in note 6.

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Comments

Lester C. Thurow

These comments are not so much a critique of what Glenn Loury has done as they are suggestions for various ways in which the paper could be extended. The thesis of the paper is that economic equality cannot be achieved unless the social context as well as the economic context is free of racism. "Equal opportunity" in the economic sphere alone will not solve the problem, even over time.

This conclusion is even stronger than the powerful case presented by Loury. Imagine for the moment an atrophied market for human capital loans where each person or family must internally generate all of the funds necessary for his or her or its human capital investments. In this case, each person invests in his or her own human capital to the point where the marginal rate of return on human capital investments is equal to his or her own marginal rate of time preference instead of some common market rate of interest.

Marginal rates of time preferences decline with rising income levels. The man on the edge of starvation has a rate of time preference approaching infinity; the millionaire has a rate of time preference approaching zero. Thus, high-income individuals will rationally accept investment projects that would be rejected by low-income individuals. Further, human capital goods are joint products—partially investment goods and partially superior consumption goods with a high income elasticity of demand. Once again the high-income individual or family will rationally purchase more human capital goods than a low-income family or individual.

In this imaginary world an unequal start with respect to budget constraints can perpetuate itself indefinitely, even though each individual has identical preferences and there is no racism—economic or social—in the system. As a result, any low incomes produced by discrimination will tend to be perpetuated, even though discrimination has ended.

If this conclusion holds in our imaginary world, the real question is the extent to which the real world is like this imaginary world. To what extent are educational investments joint products with important high-income elasticity of demand consumption elements? It would appear that they have this aspect to a great extent. To what extent is the human capital market atrophied so that individuals must internally generate their own funds for human capital investments? A few years ago human capital loans were very limited. With government loans they are now more available, but it would be interesting to investigate the extent to which government loan policies have improved the human capital funds market. Even if these two factors are not at the extreme levels where they would prevent an eventual equalization of incomes at infinity, they could easily be in a range where the time necessary to achieve equality becomes so long as to be infinity for all practical purposes.

Loury analyzes the impact of "social" human capital investments in individuals, but the concept of "social" human capital investments is greater than this. Analysis indicates that a substantial fraction of all human capital investments are made on the job rather than in some formal educational institution. This immediately raises the question of how these private human capital investments are allocated. Does the individual allocate investments to himself or herself by being willing to pay for them? Or does the employer allocate investments to those individuals he or she thinks will make the "best" employees. If the latter is the case, a much larger fraction of the total human capital stock than a simple analysis of public education would indicate is out from under the control of the individuals who receive it.

While this is not the place to argue whether employees could really be implicitly paying for their on-the-job human capital investments, it is clear that they do not explicitly pay for them in a bidding market where they can signify their willingness to make human capital investments by accepting wages below that of other employees who are not making human capital investments. The lack of an explicit market means that the allocation process, at the very least, is rather inefficient. Thus, some substantial fraction of on-the-job investments are not being made in accordance with the personal tastes of the work force. Employers are doing some of the allocation, and the Loury proposition with respect to "social capital" applies to private firms as well as to public agencies.