

Tracing the Economic Impact of Cumulative Discrimination

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An extensive literature in the social sciences seeks to identify the presence and extent of discrimination and its effect on social or economic outcomes. This literature typically focuses on investigating whether there are race-specific effects present for a particular outcome (years of schools, hiring, loan applications) within a particular domain (education, labor markets, housing markets) at a particular point in time. In this paper, I discuss the need to model and measure the *cumulative* effects of discrimination. For expository simplicity, I talk about black/white racial differences as the locus of potential discrimination, but the discussion can be applied to other group comparisons. The paper builds on the discussion of cumulative discrimination found in the National Academy of Sciences report on the measurement of discrimination ((Blank, Dabady and Citro, 2004).

Define cumulative discrimination as the measurement of discriminatory effects over time and across domains. Rather than focusing on the impact of discrimination on an outcome at a point in time (discrimination in wages, discrimination in medical treatment for heart disease, etc.), the study of cumulative discrimination looks at the cumulative effects of single or multiple incidents of discrimination across time and across societal settings. The emphasis is on dynamic and systematic processes. Some of these processes may perpetuate or reinforce discriminatory effects. Other processes may mitigate or offset the effects of discrimination over time.

Let me describe at least three ways to think about how cumulative discrimination might occur. First, one may observe the cumulative impact of discrimination that arises from multiple interactions within a single social domain over time. An example would be a study of whether and how discriminatory impacts might cumulate within the labor market from the initial hiring process, through multiple promotion, job change, and hiring

experiences over an individual's worklife. Second, discrimination in one social domain may over time affect outcomes in another social domain. An example would be a study of the effects of discrimination in housing markets, traced through to its effect on educational access, and on future earnings. Third, discrimination may have cross-generational effects. An example would be a study of how educational discrimination in one generation may (through effects on wealth accumulation or lifetime earning opportunities) affect the educational and earning opportunities in the next generation.

It is important to distinguish cumulative discrimination from cumulative disadvantage. Cumulative disadvantage measures the change in outcome gaps between a disadvantaged and an advantaged group over time. It may reflect the impact of explicit discrimination, but it is likely to also reflect other social and economic factors. For instance, differences in the extent to which wealth is transmitted between fathers and sons in black families versus white families would be a measure of cumulative intergenerational disadvantage. Changing black/white test scores among a group of children as they progress through elementary and secondary school is a measure of cumulative disadvantage within a domain over time. Cumulative disadvantage measures changes in black/white outcomes over time within a particular context, without ascribing cause. Cumulative discrimination tries to measure the causal effects of a particular set of discriminatory activities on particular outcomes over time.

A key reason to be concerned about racial discrimination is its potential to create cumulative disadvantage in black/white outcomes. If there is little evidence of cumulative disadvantage, then the motivation to search for evidence of cumulative

discrimination is reduced. Hence, I discuss below the importance of developing effective measures of cumulative disadvantage as well as cumulative discrimination.

Why Be Concerned with Cumulative Measures of Discrimination?

Studies of cumulative discrimination can provide a better measure of the impact of discrimination and the extent to which discrimination remains a salient social problem. Indeed, current social science efforts to measure discrimination at a decision-point within a specific domain may seriously understate the impact of discrimination. The primary problem is that measures of discrimination that focus on discrimination at a particular place and point in time may provide only limited information on the dynamic and cumulative nature of discrimination. Let me give two examples.

Example 1: Labor economists typically investigate discrimination in the labor market, while controlling as thoroughly as possible for the background characteristics and educational preparation of labor market participants. Conclusions about discrimination within the labor market are sought, untainted by the effects of any previous discrimination in education, housing, or health markets. This is a useful exercise and provides the answer to a particular question about discrimination in a specific labor market process. But it does not answer the broader question of whether or how much labor market outcomes are affected by discrimination. It is possible that two facts are simultaneously true: (1) initial hiring is unaffected by discrimination and (2) a substantial share of the difference in first jobs among blacks and whites are due to discrimination (where the discrimination is occurring in pre-labor-market processes.) While knowing the first fact is certainly useful, knowing the second fact seems highly

important as well. Yet, the vast majority of papers on labor market discrimination focus exclusively on identifying the first effect and only rarely on the second.

Example 2: Labor market studies of discrimination tend to focus on one point in the labor market, such as hiring, wage determination, promotion, etc. Many of the best studies test for the presence of discrimination by comparing the actual data to the predictions of a credible model of non-discriminatory decision-making in the labor market, such as “wages should be equal to the marginal product of the worker.” If one has a good measure of productivity and finds that blacks are consistently underpaid relative to their marginal product while whites are not, this is highly suggestive evidence that discrimination is occurring. A finding of insignificant, or significant-but-small effects is typically interpreted as the absence of discriminatory effects. This is important information. But the following two facts could be simultaneously true: (1) at no decision-point are discriminatory effects large in the labor market; and (2) the cumulative effect of labor market discrimination may be quite large among older workers. Small effects that occur at many decision-points can cumulate to large effects over time. Again, studies that focus on the single decision-points are much more common than studies that try to measure the cumulative effects of multiple decision-points on labor market outcomes.

Of course, the cumulative effects of discrimination may be small. It may turn out that episodic point-in-time measures of discrimination adequately capture the whole picture, and the dynamic aspects of discrimination are relatively unimportant. The less prevalent discrimination is in any particular domain, the less one should worry about cumulative and dynamic effects. Furthermore, dynamic processes may *reduce* the impact

of discrimination rather than magnifying it; for instance, decision-making in one domain may compensate for discriminatory effects in another domain.

The primary motivation for economists to invest in studies of cumulative discriminatory effects, however, is the evidence that indicates racial disadvantage is very large in the United States. Black Americans have lower incomes, much lower wealth levels, poorer health, lower educational achievement, lower quality housing, etc. On virtually every measure, there are black/white outcome gaps and these gaps are large.

While one can conclude little about the presence or absence of current discrimination, per se, from the aggregate evidence on racial disadvantage, it is indisputable that extensive racial discrimination existed in the United States in the past. This past history raises two salient questions: (1) To what extent is current racial disadvantage the result of cumulative effects of past discrimination? The inability of past generations of African Americans to receive good educations, access higher-quality jobs, own houses, or accumulate wealth may have large impacts on today's generation of African Americans. The magnitude of the effect of past discrimination on today's racial differentials is highly important in the debate over whether there is an ongoing need to provide compensatory policy attention to black Americans in areas such as educational admissions or labor market representation. (2) Given a past history of discrimination, to what extent does that history still influence behaviors and decisions? The history of racial discrimination in the U.S., combined with large ongoing racial differentials in outcomes, places the burden of proof on those who argue discrimination is no longer important. It is precisely because of this past history of pervasive discrimination in

virtually all aspects of society, that the potential for significant cumulative discriminatory effects must be taken seriously.

How Might Cumulative Effects Occur?

The concept of cumulative discrimination is of limited interest if it simply refers to the additive effects from a variety of unconnected discrete instances of discrimination. In this case, we can add the measured effects from point-in-time studies of discrimination in different domains or at different points within a domain to estimate the aggregate cumulative effect of discrimination.

There are at least two more interesting possibilities, however, that would justify a research agenda specifically focused on cumulative discrimination. First is the possibility that the potential for future discrimination may be causally affected by past discrimination. Discrimination at one decision-point may increase the likelihood of discrimination at future decision-points. For instance, discrimination in housing that leads to racial segregation may in turn make it easier for mortgage-lenders to screen out black applicants through redlining, or it may facilitate discrimination among employers by allowing them to screen on addresses in the process of hiring. In another example, teacher prejudices may make them more likely to place young children-of-color in lower reading groups; if this lowers reading performance among these children this may reinforce stereotypes among junior high or high school teachers and increase discriminatory racial tracking in higher grades.

A second possibility is the potential for discriminatory events to produce feedback effects by influencing the behavior of those who experience them. Discrimination may

discourage certain types of investment, or it may encourage certain types of socially less productive behavior. Over time, racial differences may grow because the behaviors and characteristics of black Americans are negatively affected by their experiences of past discrimination and/or their expectation of future discrimination. An example may be students who expend less effort in high school because they expect their race will limit their job or college choices upon graduation. Another example might occur if anger at repeated discriminatory experiences (perhaps in domains entirely unrelated to the labor market, such as traffic stops) creates suspicion and communication problems between black and white workers, making black workers less likely to be hired or promoted by white employers.

Let me illustrate these possible feedback effects through a simple model. Let an initial outcome at time zero be characterized as

$$(1) X_{0j} = X(Z_{0j}) - d_{0j} \text{ where } d_{0j} = 0 \text{ if } j = w$$

$$\text{and } d_{0j} = \beta \text{ if } j = b$$

where j indexes individuals of type w (white) or type b (black). Z_{0j} represents the personal characteristics of group j at time 0 that affects outcome X . d is a potential discriminatory effect. I assume $\beta > 0$ and the presence of discrimination in some way worsens outcome X .

In a simple two-period model, the question is how discrimination in period 0 might affect outcomes in period 1. In a world without any feedback effects, outcome Y_{1j} in period 1 is affected by previous outcome X_{0j} , and by the characteristics of the relevant population in period 1, Z_{1j} . Note that Y_1 can represent the same outcome as X_0 (i.e.,

hiring in period 1, conditional on hiring in period 0) or it can be a different outcome (hiring in period 1, conditional on education in period 0). Thus,

$$(2) Y_{1j} = Y(X_{0j}(Z_{0j}, d_{0j}), Z_{1j}) - d_{1j}, \text{ where } Y_1 \text{ is increasing in } X_0.$$

Assume there is no discrimination in period 1, so d_{1j} always equals zero. In this case, the only impact of past discrimination (d_{0j}) is through the impact of past outcome X_{0j} on Y_{1j} . Typically, we would expect the effect of past discrimination to decline over time; that is, the difference between Y_{1b} and Y_{1w} is less than d_{0b} (the difference between X_{0b} and X_{0w}), holding all else constant.

Now consider two possible additional effects. First, it is possible that discrimination in period 0 affects the likelihood of discrimination in period 1. In this case we have the model

$$(3) Y_{1j} = Y(X_{0j}(Z_{0j}, d_{0j}), Z_{1j}) - d_{1j}(d_{0j}) \text{ where } d_{1j} = 0 \text{ if } j=w$$

$$\text{and } d_{1j} = g(d_{0j}) \text{ if } j=b, \text{ where } g \text{ is increasing in } d_{0j}$$

In this case, the magnitude of discrimination in period 1 is directly impacted by the level of discrimination that occurred in period 0.

An alternative feedback effect would function through the behavior of the discriminated-against group. Discrimination could change the choices of this group in a way that disadvantages them in the next period. Discrimination by teachers may discourage individuals from pursuing higher education (even beyond any direct effect on learning opportunities). Discrimination in the labor market may result in reduced effort by employees that lowers their productivity and reduces their wages, beyond any direct effect on hiring or past wages. In this case, outcome Y_{1j} can be characterized as

$$(4) Y_{1j} = Y(X_{0j}(Z_{0j}, d_{0j}), Z_{1j}(d_{0j})) - d_{1j}(d_{0j}) \text{ where } Z_{1j} \text{ is decreasing in } d_{0j}.$$

Now discrimination in the first period also affects outcome Y_{1j} through the behavioral changes that impact Z_{1j} , changing the characteristics of persons subject to past discrimination.

When these feedback effects operate, it can be come very complex to “untangle” the effects of discrimination on outcome Y in period 1. Past discrimination can influence period 1 outcomes through the direct effect of past outcomes (X_0), through changes in the likelihood of current discrimination (d_1), and through changes in the characteristics that persons of type b present to the world in period 1 (Z_1).

Measuring these Effects

Credibly identifying the presence of discrimination is difficult even in cross-sectional studies; most social science studies of discrimination seek evidence consistent with a theory of discrimination, but do not provide direct measures of actual discriminatory behavior. (Blank, Dabady, and Citro, 2004, provide an extensive discussion of the various approaches to measuring discrimination and the problems that are imbedded within these different approaches.) In addition to the problems in credibly identifying something that can be labeled “discrimination,” measures of cumulative discrimination face three additional difficulties: (1) It is hard to model cumulative, dynamic processes; (2) In the absence of good models (and even sometimes when a good theoretical model is available), it is difficult to design research methodologies that credibly measure cumulative effects; and (4) Even with good models and good methodologies, this work requires longitudinal data with multiple observations over time and with adequate samples to investigate comparative outcomes between minority and

majority groups. All of these problems indicate the difficulties of seeking to identify and measure the effect of cumulative discrimination.

One might start with a more modest goal, namely, the measurement of cumulative disadvantage. As noted above, research on cumulative disadvantage might provide indirect evidence of areas within society where cumulative discrimination may be more likely to occur. For instance, if one finds that racial wage disparities grow within a cohort of workers within white collar jobs, that would be a reason to look more closely for evidence of cumulative discrimination within white collar employment. If one finds that gaps in homeownership between blacks and white have shrunk less across successive generations than gaps in wages, that might be motivation to focus attention on potential cumulative effects of discrimination in housing markets.

There is growing attention to the measurement of racial outcome gaps over time and across generations, although (like all research on dynamic processes) this literature remains relatively sparse. Let me provide two examples of good recent work that adds to our knowledge of cumulative racial disadvantage. In each case I will try to indicate how (with appropriate data) this research could move from measuring cumulative disadvantage to measuring cumulative discrimination.

Example 1: Phillips, et. al. (1998) does a credible job of nailing down a measure of cumulative racial disadvantage over time within elementary and secondary schools. They use cross-sectional and longitudinal data from eight national surveys to examine black-white differences in academic achievement across grades. They observe how the race effect is reduced at any point as other variables and their coefficients are included, and trace the remaining racial difference over time among cohorts of children. Black

students who start school with academic skills comparable to those of the average white student in first grade learn less than the average white student, resulting in larger and larger negative gaps for black students through the 12th grade. During every year of schooling, black students learn less than their white counterparts.

This paper provides a nice example of how cumulative racial disadvantage might be studied. These results cannot be interpreted as the effect of discrimination, however; many causal factors that lead to this result could be occurring within families and neighborhoods and outside of the schools. If it were possible to decompose these annual learning differences into within-school versus outside-school effects, the within-in school effects could be interpreted as a measure of differential racial treatment within the school over time. Such a decomposition, however, would require longitudinal data on multiple groups of students within multiple schools or school districts.

Example 2: Card and Krueger (1996) investigate the effects of differences in school resources among black and white schools in the south, and the impact of these differences on future earnings. As the law required an end to segregation, relative spending in the schools attended by blacks and whites grew more equal. Card and Krueger trace out earnings changes among successive cohorts of whites and blacks, and show that the 28% decline during the mid-20th century in pupil-teacher ratios in southern schools attended by blacks following desegregation can account for 5% growth in black earnings.

Although Card and Krueger are primarily interested in the labor market returns to increases in school resources, their data also provides information on the extent to which changing racial disadvantage across cohorts is causally related to changes in educational

policy. One could use their data to directly identify racial discrimination in education if one is willing to assume that the differences in spending between white and black schools within the same school district are primarily due to discrimination in the early part of this century. If they had data on the school district where adults attended school, one could directly measure the over-time effect of reductions in discrimination in education on earnings outcomes (or other outcomes) later in life.

This estimate is identified by looking at black/white differences in comparable institutions during a period of legal discrimination and investigating the changes in outcomes that occur as discrimination is prohibited and these racial differences in institutional treatment are reduced. Studies like this provide a way to measure the impact of anti-discrimination policies across domains or successive generations, and can provide information on the extent to which anti-discriminatory policies reduce black disadvantage. From such information, one can draw conclusion about how much black disadvantage was due to direct discrimination in the past.

Beginning a Research Agenda

Developing a research agenda around cumulative disadvantage and cumulative discrimination is a daunting task. Nonetheless, if we are to understand discriminatory processes and to measure their impact on current outcomes, it is important to think in more dynamic ways. At least three suggestions seem important.

Focus first on models of cumulative disadvantage. Given the paucity of literature measuring cumulative disadvantage, it may be reasonable to expand that literature before trying to causally separate discrimination as one component of disadvantage. For instance, studies of the dynamic patterns of racial disadvantage in key outcomes seem

important, including intergenerational patterns of housing, wealth accumulation, health, and geographical location. This should also include studies of racial disadvantage across time for cohorts of individuals, within the educational system, the labor market, the health care system, or the criminal justice system. This means more than just tracking raw racial differentials, but also trying to identify effects that are associated solely with race, controlling for other differences in starting positions and characteristics of black and white populations. More evidence on the patterns of disadvantage across and between different groups over time can enhance the development of models of how racial disadvantage is cumulated, which can in turn lead to better models of racial discrimination as a component of racial disadvantage.

Give greater attention to dynamic modeling of these processes. Theoretical attention to dynamic models of racial disadvantage and racial discrimination has been limited. Much of the empirical work is more focused on data analysis than on theoretical modeling. (There are of course exceptions to this statement; many of these are outlined in the review by Altonji and Blank, 1999.) For instance, a few interesting economic models of labor market behavior have included behavioral feedback effects of the sort that might magnify discriminatory effects.

Of particular interest might be models that investigate the role of public or institutional policies in mitigating or reducing racial differentials over time. (Of course, many critics of affirmative action argue that these policies actually worsen the differentials. This is an empirical question that can be addressed with appropriate models and appropriate data.) The development of complex systems analysis elsewhere in the

social sciences might provide new tools for understanding racial disadvantage and racial discrimination.

Collect More and More Detailed Longitudinal Data. Any empirical analysis of these issues must require credible longitudinal data, following the same individuals (and even their children!) for many years. Indeed, one reason for an increase in attention to these issues in recent years – as witnessed by recent work on intergenerational wealth and income differences between blacks and whites – is the availability of extended longitudinal panel data from the Panel Study of Income Dynamics (PSID), allowing us to compare fathers and sons. Of course, not all data analysis requires longitudinal data; sometimes cohort analysis from multiple cross-sections is adequate. But the more that we want to move from observing group differentials to actually studying causal factors and over-time processes, the more important it will be to have detailed longitudinal data on a panels of individuals over time.

Conclusion

How big might these cumulative effects be? I close with a back-of-the-envelope calculation based on recent evidence on differences in intergenerational income transmission between blacks and whites. Hertz (2002) finds much greater economic immobility among the sons of low-income black fathers than among the sons of low-income white fathers. His evidence suggests that black sons have 40% less income than whites who grow up in families with identical long-run average incomes. Based on his evidence from sons born as part of the baby boom generation, he concludes that race is a large determinant in intergenerational (im)mobility for this generation. Of course, this evidence on cumulative disadvantage provides little direct evidence of discrimination, per

se. It does provide evidence of the upper bound of discriminatory effects, however, and suggests that it could be quite large.

If we take Hertz's estimates seriously, black sons of fathers in the bottom quartile, have a 63% probability of remaining there, while white sons have only a 32% probability of remaining in the bottom quartile. This is a big difference one generation later, but it is still consequential even three generations later. All else equal, great grandsons of these bottom-quartile black men would have a 25% probability of being in the bottom quartile, while the great grandsons of the white men would have only a 3% probability of being there. These numbers emphasize the magnitude of the racial difference in intergenerational mobility. Although no one expects a stable process across generations, these estimates indicate the extent to which past discrimination could still have significant impacts on today's differences in racial outcomes. Back-of-the-envelope simulations like this also indicate the extent to which today's differences in racial outcomes are not likely to disappear quickly, but can recreate ongoing racial differentials far into the future.

The challenge of this work is clear. It will not be easy to build the models, develop the methodologies, and collect the data that identify cumulative racial disadvantage, much less racial discrimination. Such evidence, however, can provide a second generation of evidence that pushes beyond the more limited point-in-time snapshots many of our current studies provide.

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