A Model of Segregation as a Source of Contextual Advantage

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A frequently-cited model of why segregation contributes to inequality is that segregation increases the level of contextual advantage experienced by members of advantaged segregated groups and the level of contextual disadvantage of disadvantaged segregated groups. This paper provides a formal demographic model of this process. The model begins with two groups that differ along a dimension of average advantage and disadvantage, for instance two racial groups that differ in their poverty rates. The model employs standard measures of segregation and contact from the segregation measurement literature and illustrates how the contextual advantages and disadvantages from segregation are affected by group size and rates of group advantage/disadvantage. It also considers complexities that occur when the characteristics that define advantage /disadvantage (e.g. income or poverty) have independent segregative effects. The paper's decomposition is applied to data on neighborhoods and friendships to illustrate its use.

Introduction

In the accounts of many scholars, segregation has long been an important process that contributes to inequality, especially racial inequality. This was most clear in the civil rights era, but many scholars continue to emphasize the importance of desegregation on the basis of race and class to achieve equality of opportunities (e.g. Massey and Denton 1993; Orifleld and Lee 2005; Kahlenberg 2001).

While a number of explanations are typically offered for why segregation may contribute to inequality, the predominate argument is that segregation produces contexts with high shares of advantaged persons for members of advantaged segregated groups and high share of disadvantaged persons for members of disadvantaged segregated groups. To the extent that experiencing contexts with advantaged members is itself a source of advantage, and experiencing contexts with disadvantaged members is itself a source of disadvantage, segregation then increases the on-average advantage of the advantaged and the disadvantage of the disadvantaged.

This theory has been most thoroughly developed in the situation of racial segregation and poverty. Massey and Denton (1993), for instance, develop a simulation model of how segregation on the basis of race results in higher neighborhood poverty contact for blacks than for whites, and of how this segregation is intensified when black poverty rates are high. Likewise, Orfield and Lee (2005) make the concentration of poverty in minority schools that result from segregation their central argument as to why school racial segregation is a serious problem of social concern. The poverty-concentrating effects of segregation have become the principal argument for why we should be concerned about segregation.

In my proposed paper for PAA, I will develop this model formally through a decomposition model of how segregation is related to contextual advantage for advantaged groups and contextual disadvantage for disadvantaged groups. A brief sketch of some of how this model works appears below. A more extensive discussion and accompanying empirical analysis will appear in the final paper.

Segregation and Contextual Advantage

To formalize the ideas, I start with a simplified situation. The initial model considers a society with advantaged or disadvantaged members of two social groups. For simplicity, advantaged individuals will be called rich and disadvantaged individuals poor. Each person is also a member of one of either of two social groups. While neither group is entirely rich nor poor, the group I shall call the advantaged group has a lower poverty rate (and thus a higher richness rate) than the disadvantaged group.

The disadvantaged group will be denoted g in our models, and the poverty rate of group g is Pov_g. The advantaged group will be denoted ng in our models for "not g", and the poverty rate of the advantaged group is Pov_{ng}. Following my definition of these groups as advantaged and disadvantaged, $Pov_g > Pov_{ng}$. The most obvious application are whites (for ng) and blacks or Hispanics (for g), but this conceptual model can apply to other situations as well.

Consider the relative contact that members of each group have with poor and rich persons in a social context. This context could be a context like a neighborhood or school or it could be the social network of an individual. For the ith context (school, neighborhood, social network) denote the number of poor persons in the context as p_i, the total number of persons in the context as t_i, and the number of group members in the context as gp_i. Denote the total number of poor persons summed across all contexts as P, the total number of persons across all contexts with T, the total number of group members as G, and the total number of group members who are poor all contexts with GP.

The average context of group poor persons with poor persons in their social context can be denoted using the P* index of contact popularized by Lieberson (1988) is:

$${}_{g}P^{*}_{p} = \sum_{i} \left(\frac{g_i}{G} \right) \left(\frac{p_i}{T_i} \right)$$

The theory that segregation increases contextual advantage effectively proposes that as segregation between group g and group not g (ng) increases, ${}_{g}P^{*}_{p}$ increases and the contact of the non-group with the poor, ${}_{ng}P^{*}_{p}$, decreases.

To formalize this relationship, we need to incorporate how segregation affects the average contact with contextual poverty of the poor and non-poor. The additive decomposability of P* indexes is useful in this regard. Average contact with poor in the social context is the sum of contact with poor of the disadvantaged group and contact with poor of the advantaged group (while the advantaged group has a lower poverty rate than the disadvantaged group, some members of the advantaged group are poor):

$${}_{g}P^{*}_{p} = {}_{g}P^{*}_{gp} + {}_{g}P^{*}_{ngp}$$

This formula includes two measures that are closely related to segregation: contact of group members with their own racial or ethnic group and with persons not of their own race or ethnic group. Segregation, however, is generally defined based on contact with all members of each group, not just their poor members. We want to introduce these terms but still get to a formulation with components that are substantively interpretable. In this case we get:

$${}_{g}P^{*}_{p} = {}_{g}P^{*}_{g}\left(\frac{{}_{g}P^{*}_{gp}}{{}_{g}P^{*}_{g}}\right) + {}_{g}P^{*}_{ng}\left(\frac{{}_{g}P^{*}_{ngp}}{{}_{g}P^{*}_{ng}}\right)$$

This gives us of group contact with own group and the other group, and then ratios that indicate relative contact with poor members of disadvantaged group relative to all members of the group. We can improve the interpretation of these components further by norming them by the size of the group, which are just equal to the poverty rate of each group:

$${}_{g}P^{*}_{p} = {}_{g}P^{*}_{g}\left(\frac{\frac{{}_{g}P^{*}_{gp}}{{}_{g}P^{*}_{g}}}{Pov_{g}}\right)Pov_{g} + {}_{g}P^{*}_{ng}\left(\frac{\frac{{}_{g}P^{*}_{ngp}}{{}_{g}P^{*}_{ng}}}{Pov_{ng}}\right)Pov_{ng}$$

The two components in the large brackets both are equal to 1 if members of the group have contact with poor members of the disadvantaged group (left term) or the advantaged group (right term) at rates equal to the group poverty rate. On the other hand, if the disadvantaged group members whom group members are in contact with are more likely to be poor than the group average, then this number will be greater than 1; likewise, if the advantaged group members whom group members are in contact with are more likely to be nonpoor than the group average, then this number will be less than 1.

We can relate these terms mathematically to segregation by using the variance ratio index of segregation, a measure of segregation that is in the same family of measures as the exposure indexes. The variance ratio index is a well-established measure that fits key criteria desired in a segregation index (see James and Taeuber 1985). Like the index of dissimilarity, the variance ratio index varies from 0 (no segregation between groups) to 1 (perfect segregation). The variance ratio index of segregation is related to the P* contact index between group members and nonmembers by the relation:

$$ {}_{g}P^{*}_{ng} = p_{ng}(1 - V_{(g)(ng)}) \qquad [2] $$

where p_{ng} is the proportion of the population non-group and $V_{(g)(ng)}$ is the variance ratio index of segregation between the group of interest and non-group members.

Applying this to the above we get:

$$ {}_{g}P^{*}_{p} = (1 - p_{ng}(1 - V_{(g)(ng)})\left(\frac{\dfrac{{}_{g}P^{*}_{gp}}{{}_{g}P^{*}_{g}}}{Pov_{g}} \right) Pov_{g} + p_{ng}(1 - V_{(g)(ng)})\left(\frac{\dfrac{{}_{g}P^{*}_{ngp}}{{}_{g}P^{*}_{ng}}}{Pov_{ng}} \right) Pov_{ng} \qquad [3] $$

This last formula ([3]) allows us to understand group poverty contact in social context as a function of segregation (V) between the two groups and a series of other conditions: group poverty rates (Pov_g and Pov_{ng}), group relative size (p_{ng}), and two ratios shown in the big parantheses. The ratios each have substantive meaning and can be rewritten:

$$ {}_{g}P^{*}_{p} = (1 - p_{ng}(1 - V_{(g)(ng)})(GxGP)Pov_{g} + p_{ng}(1 - V_{(g)(ng)})(GxNGP)Pov_{ng} $$

In this formula, GxGP and GxNGP are both ratios. GxGP indicates disproportionality in contact with group poor for members of racial group g. If this component is greater than one, group members are disproportionately likely to have contact with poor group members relative to nonpoor group members. For instance, this would hold in neighborhoods if poor blacks have many more black neighbors than nonpoor blacks. Likewise, GxNGP indicates if group members are disproportionately likely to be in contact with the poor non-group members. If this ratio is greater than 1, then group members are especially likely to have poor non-group members in their social contexts. For instance, this would hold in neighborhoods if blacks are disproportionately likely to have poor white neighbors.

This last formula illustrates the complexity of how these relationships can work out in practice. Segregation does work out as proposed in the basic theory: segregation between advantaged and disadvantaged groups does increase the contextual advantage of the advantage and the disadvantage of the disadvantaged. But these effects are conditioned on other factors including group size, group poverty rates, and the effect that poverty itself has on contact with own-group members, plus possible effect of group poverty on the poverty status of other-group members.

Future Development

The last sections of the paper will calculate the components of this decomposition for a couple of contexts using data on social contexts and American racial groups, probably residential neighborhoods and friendship networks. This will discuss how the effects of residential segregation in creating social contexts with various levels of advantage and disadvantage matter for outcomes.

References

James, David R. and Karl E. Taeuber. 1985. "Measures of Segregation." Pp. 1-32 in *Sociological Methodology 1985*, edited by Nancy B. Tuma. San Francisco: Jossey-Bass.

Kahlenberg, Richard D. 2001. *All Together Now: Creating Middle-Class Schools through Public School Choice*. Washington, DC: Brookings Institution Press.

Lieberson, Stanley. 1980. *A Piece of the Pie: Black and White Immigrants since 1880.* Berkeley, CA: University of California Press.

Massey, Douglas, and Nancy Denton. 1993. *American Apartheid: Segregation and the Making of the Underclass*. Cambridge, MA: Harvard University Press.

Orfield, Gary and Chungmei Lee. 2005. "Why Segregation Matters: Poverty and Educational Inequality." Cambridge, MA: The Civil Rights Project of Harvard University.