

**Change in Racial and Ethnic Residential Inequality
in American Cities, 1970 to 2000***

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Abstract

Scholars interested in racial and ethnic residential inequality frequently focus on intercensal change in levels of segregation. However, prior scholarship has not estimated effects of theoretically important variables on changes in segregation over a relatively long period of time. In this paper I use hierarchical linear modeling (HLM) techniques to estimate segregation growth trajectories for a sample of U.S. cities from 1970 to 2000. In these models, repeated observations of urban areas, comprising metropolitan areas, central cities, and suburban rings, are nested within those areas. The results will provide information about indicators of four measures of segregation in 2000 and the city-level predictors of those indicators. In addition, HLM enables the estimation of 1970 to 2000 change in segregation, as well as the predictors of that change. In the process, I test hypotheses about the causes of static and dynamic variation in racial and ethnic residential inequality.

Introduction

Scholars interested in measuring and explaining the persistence of racial and ethnic residential inequality frequently focus on temporal change in levels of segregation (e.g., Van Valey, Roof, and Wilcox 1977; Massey and Denton 1987; Farley and Frey 1994; Lewis Mumford Center 2001). Scholarship in this tradition has provided important information about the extent to which segregation has persisted or eroded over time, and occasionally about the effects of city-level variables on changes in segregation (e.g., Farley and Frey 1994). However, a common limitation of these studies is that they simply compare results for a large number of individual cities, or averages from a group of cities, across two or three censuses. Prior research has not attempted to estimate effects of theoretically important variables on change in segregation over a relatively long period of time.

In this paper I use hierarchical linear modeling (HLM) techniques to estimate segregation growth trajectories for a sample of U.S. cities from 1970 to 2000. In these models, repeated observations of urban areas (UAs)—comprising metropolitan areas (MAs), central cities, and suburban rings—are nested within those UAs. The results will provide up-to-date measures of four indicators of segregation in 2000 and the UA-level predictors of those indicators. In addition, HLM enables the estimation of 1970 to 2000 change in segregation, as well as the predictors of that change. In the process, I test hypotheses about the causes of static and dynamic variation in the levels of segregation experienced by American Whites, Blacks, Asians, and Latinos.

Data, Measures, and Methods

Data

The data for this study come from the 1970 through 2000 U.S. Censuses, concatenated in the Neighborhood Change Database (NCDB). The NCDB was developed by the Urban Institute in

collaboration with GeoLytics, Inc. (GeoLytics, Inc. 2003). A unique feature of the NCDB is that all census tracts from 1970 to 1990 are matched to consistent Census 2000 boundaries. The benefit to researchers of this geographical matching is that comparisons of segregation indexes over time are not hampered by systematically changing boundaries of the units that contribute to the calculations of those indexes or their predictors.

Measures

Dependent variables. I construct four measures of segregation. First, I use the familiar indexes of dissimilarity (D) and exposure ($P^*_{.xy}$) to analyze changes in the evenness of distribution of racial and ethnic minorities and their exposure to Whites in American cities. Second, Timberlake (2002) recently applied Lieberman's index of net difference (ND) (Lieberman 1975) to calculate levels of and changes in residential stratification—the extent to which members of one group experience more *advantaged* neighborhood contexts than members of another group—between Whites and Blacks, Latinos, and Asians. Finally, because the previous three measures are by construction two-group comparisons, I also construct a multi-group index, Theil's H (Theil 1972). This index has recently been endorsed by Reardon and Firebaugh (2002) as an effective measure of multi-group segregation.

Independent variables. Following work by Farley and Frey (1994) and Crowder (1997), I measure several variables at the UA level. In models that predict the 2000 level of segregation and those that predict change from 1970 to 2000, I include the census region of the UA. In models predicting 2000 levels of segregation, I include population size, percent Black, Asian, and Latino, UA functional specialization, age of UA, and correlations between tract percentage minority, and new housing construction and housing vacancy rates. Finally, in models predicting 1970 to 2000 change, I include measures of average decadal change in the variables listed above.

It is important to control for housing market characteristics because processes of racial turnover depend deeply on the availability of housing both in neighborhoods undergoing transition and in neighborhoods into which departing residents can move. Put simply, cities with extremely tight housing markets may exhibit low levels of neighborhood mobility of any sort. For example, South and Crowder (1997, 1998) find that housing availability is strongly related to mobility between various types of neighborhoods. However, they also find that vacancy rates are negatively associated with Black mobility out of Black neighborhoods. They speculate that when much of the housing availability exists in Black neighborhoods or poor neighborhoods, then slack housing markets alone cannot provide an avenue for Black upward neighborhood mobility. Therefore, I follow the example of Crowder (1997) by calculating the UA-level correlations between tract percentage minority and both new housing construction and vacancy rates.

Methods

In this paper I estimate two-level hierarchical linear models, in which repeated observations of UAs are nested within those UAs. In this analysis the level-1 model is specified as:

$$Y_{ij} = \mathbf{b}_{0j} + \mathbf{b}_{1j}(\text{CENSUS} - 2000)_{ij} + e_{ij}, \quad (1)$$

where

- Y_{ij} = segregation at time t in UA j ;
- \mathbf{b}_{0j} = segregation in 2000 in UA j ;
- \mathbf{b}_{1j} = the average decadal change in segregation from 1970 to 2000 in UA j ;
- and
- e_{ij} = a level-1 disturbance term.

At level-2, the \mathbf{b}_{0j} and \mathbf{b}_{1j} become outcomes to be modeled as a function of city-level variables. Examples of level-2 models to be fit are:

$$\mathbf{b}_{0j} = \mathbf{g}_0 + \mathbf{g}_1(\%BLACK)_j + \mathbf{g}_2(\%ASIAN)_j + \mathbf{g}_3(\%LATINO)_j + \Sigma \mathbf{g}_r(CONTROLS)_j + u_{0j} \quad (2a)$$

$$\mathbf{b}_{1j} = \mathbf{g}_0 + \mathbf{g}_1(\Delta\%BLACK)_j + \mathbf{g}_2(\Delta\%ASIAN)_j + \mathbf{g}_3(\Delta\%LATINO)_j + \mathbf{S} \mathbf{g}_r(\Delta CONTROLS)_j + u_{1j} \quad (2b)$$

where, if the level-2 covariates are grand-mean centered (i.e., each UA-level variable Z_k is centered around the overall sample average [$Z_{kj} - Z_k$]), then

- \mathbf{g}_0 = the covariate-adjusted average level of segregation in 2000 for the sample of UAs;
- $\mathbf{g}_1, \mathbf{g}_2, \mathbf{g}_3$ = effects of percentage Black, Asian, and Latino, respectively, on the level of segregation in 2000;
- \mathbf{g}_r = effects of control covariates on the average level of segregation in 2000;
- \mathbf{g}_0 = the covariate-adjusted average decadal change in segregation from 1970 to 2000 for the sample of UAs;
- $\mathbf{g}_1, \mathbf{g}_2, \mathbf{g}_3$ = effects of changes in percentage Black, Asian, and Latino, respectively, on change in segregation from 1970 to 2000;
- \mathbf{g}_r = effects of changes in control covariates on change in segregation from 1970 to 2000; and
- u_{0j}, u_{1j} = level-2 disturbance terms.

Contributions of the Research

This research, to the best of my knowledge, represents the most comprehensive investigation of recent trends in segregation currently available. Put simply, in this paper, I assess (1) effects of UA-level variables on (2) 2000 levels of and (3) 1970 to 2000 change in (4) four indicators of residential inequality, across (5) types of urban areas, and (6) four major racial and ethnic categories.

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