Sociology 756
Problem Set 6

Multiregional Projection

This exercise requires that you adapt the model of Mare's 1997 "Differential Fertility…" article to the specific constraints and possibilities of the data supplied below.

You have the data given below in Tables 1-4 for black and white women for a given year. (Percentage totals in these tables may not sum to 100 because of rounding.)

For this exercise, assume that (1) the population is closed to immigration and emigration, (2) the population has only one sex (females) and two race categories, (3) all fertility is confined between exact ages 15 and 45 and age-specific fertility rates are constant within this interval, and (4) fertility, mortality, and mobility rates are fixed over time.

Several of the questions below ask you to describe the equilibrium education distributions. This assumes that there is an equilibrium distribution of persons in the P(t+1) vector across education groups associated with the Leslie matrix and the starting P(0) vector. That is, repeated application of the Leslie matrix to the P(0) vector will eventually produce a P(n) vector in which the distribution of persons across education groups is not changing with each subsequent multiplication.

This problem set will be submitted in two parts:

October 26: Generate an M matrix with data for Black women and an M matrix with data for White women. You may have to make some decisions in constructing these. Make note of these for the answer to question number 1, to be submitted the following week. **Upload your R script** that constructs the two matrices to your GitHub page. The only "submission" this week to share the link to your uploaded file to me and **two** people in the class.

November 9: Submit answers to the questions below in standard problem set fashion.

1. What decisions did you have to make to work with the data that you received for this assignment? Do these decisions require assumptions?

2. What equilibrium distributions of educational attainment for Black and White people are implied by the data in Tables 1-4?

3. To what degree are differences in the (equilibrium) education distributions for Black and White people attributable to differences in fertility patterns between Black and White women?

4. To what degree are differences in the (equilibrium) education distributions for Black and White people attributable to differences in maternal mortality patterns between Black and White women?

5. To what degree are differences in the (equilibrium) education distributions for Black and White people attributable to differences in child (under 15) mortality patterns by race?

6. To what degree are differences in the education distributions for Black and White people after three generations attributable to differences in intergenerational mobility patterns between Black and White people?

7. What would be the equilibrium education distributions for Black and White people if there were NO intergenerational educational mobility?

8. What would the equilibrium distributions be if mother's and daughter's educational attainments were statistically independent?

9. Extra credit: Choose one of the questions above and plot the population educational distribution over time to determine (a) whether equilibria exist and (b) how long it takes to achieve.