Decomposing the Increase in Suburban Poverty and Diversity

Fabian Terbeck, University of Connecticut, Contact: fabian.terbeck@uconn.edu, www.linkedin.com/in/fabianterbeck

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ABSTRACT

Poverty has increased in suburbs in recent years - as has the proportion of minorities. A popular hypothesis among scholars has been that both trends are interrelated and **partly the consequence of poor minorities moving from inner-cities to suburbs** (Kneebone and Berube 2013).

I investigate the assumed relationship by comparing the net population change in census tracts in Chicago's metropolitan area between 2000 and 2010 for 8 cohorts. I further decompose the population change to differentiate between population growth driven by regional trends and census-tract specific characteristics.

Major results are that the **increase in poverty is chiefly driven by the numeric decline of non-poor white population** in suburbs, and that the net population grows of non-poor minorities exceeds the growth of poor minorities, although trends differ among suburbs.

RESEARCH QUESTIONS

1. Is the increase in **suburban poverty driven by the suburbanization of poor minorities**?
2. Where does the suburbanization of poverty and minorities **overlap** in suburbs and where not?
3. To what extent do **regional trends** (economy, international migration, aging demographics) of diversity and poverty affect the suburbanization of poor and minorities?

To answer those questions, we need to compare counts of poor and minorities in census tracts between years, but **census tract boundaries frequently change**. We therefore interpolate 2000 census tract counts into 2010 boundaries

AREAL INTERPOLATION

For the split blocks we calculated the 2000 population $\hat{z}_i$ as follows: $\hat{z}_i = \frac{A_i}{A_b} * z_b$

For each intersect of the split blocks, the 2000 population $\hat{y}_{bc}$ is estimated as $\hat{y}_{bc} = \frac{\hat{z}_i}{z_c} * y_c$

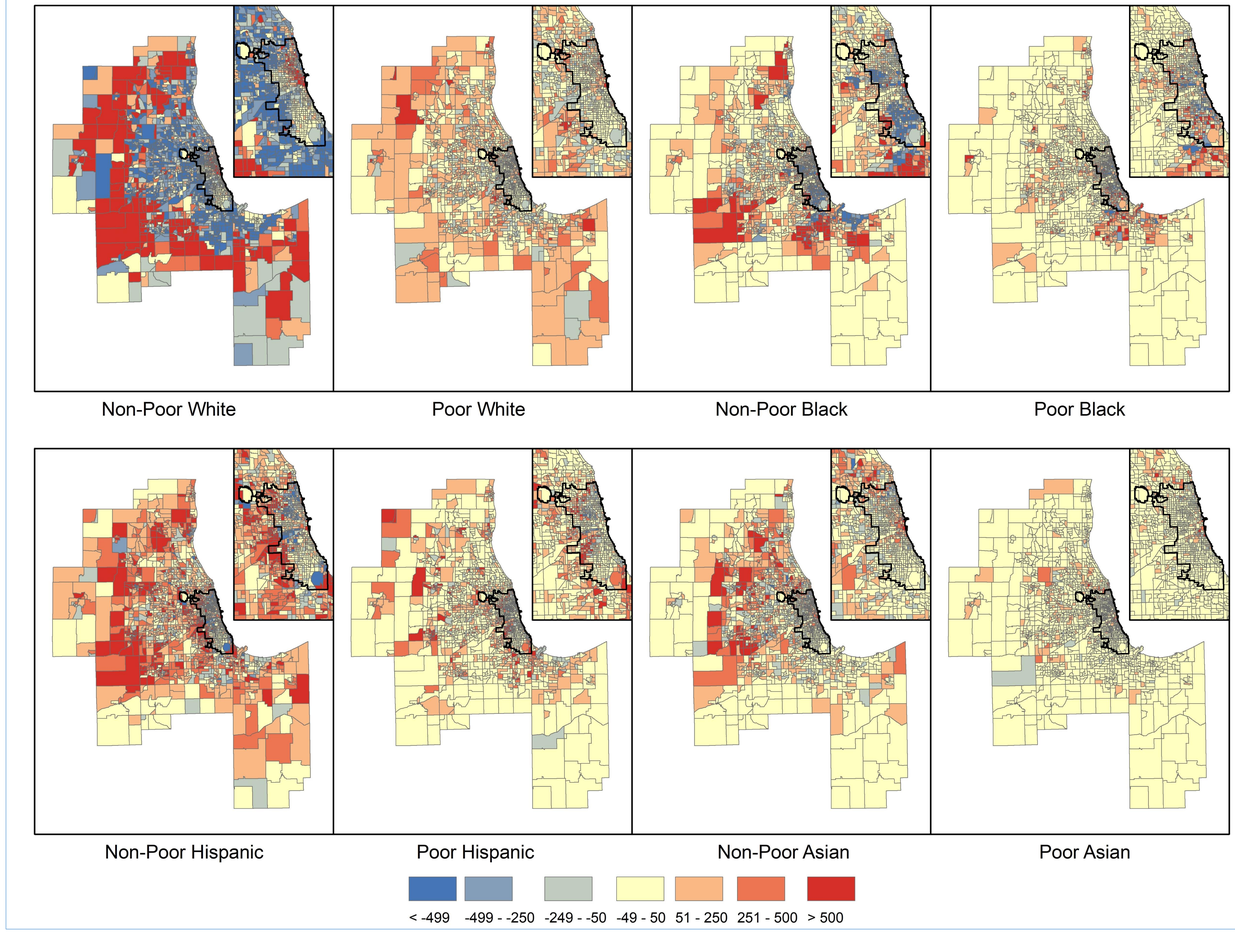
For unsplit blocks $\hat{y}_{bc}$ is estimated as $\hat{y}_{bc} = \frac{z_b}{z_c} * y_c$

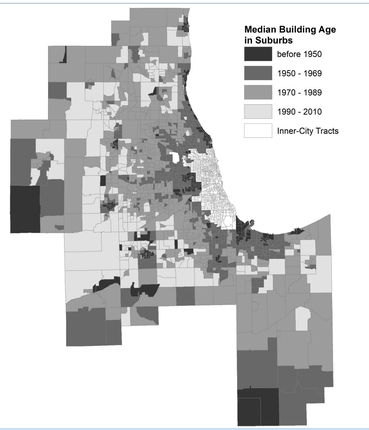
To get the 2000 population of each cohort in 2010 boundaries, we sum all $\hat{y}_{bc}$ in each 2000 census tract t.

$$\hat{y}_t = \sum_b \hat{y}_{bc}$$

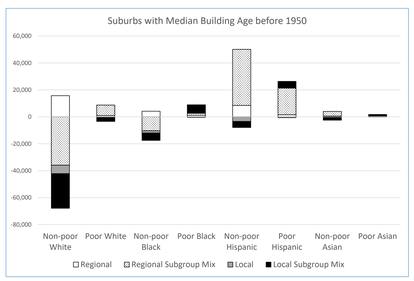
The method preserves the **pycnophylactic property** (Tobler 1979)

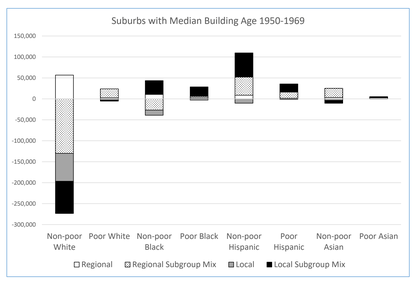
z_b= 2000 block population
y_c = population of each cohort
A_i = area size of each intersect of the split block
A_b = area size of the entire block.

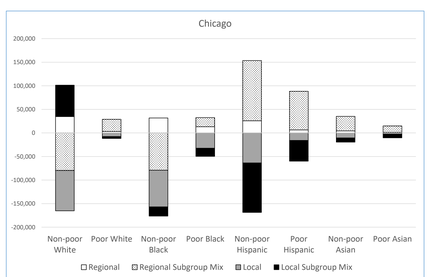


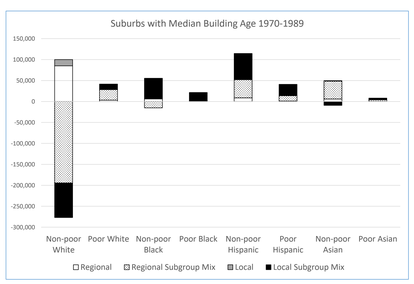


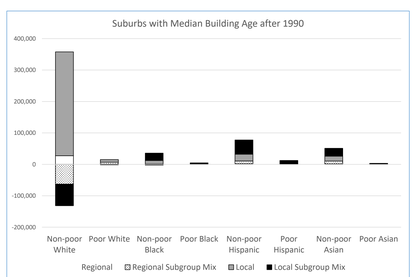
Explanation: The maps above show the numeric population change for each cohort in Chicago's metropolitan area between 2000 and 2010. Red indicates a net population growth, while blue shows a net population loss. The diagrams below show the decomposition of the numeric population growth for each suburb type - defined based on the median year buildings were built.











DECOMPOSITION

We further want to measure how much regional population growth as the result of economic trends, international/inter-regional migration, and birth and deaths has contributed to local population growth, and how much population growth can actually be attributed to census tract-specific characteristics.

We use a Shift Share Analysis for the decomposition (Danko and Hanink, 2017, Franklin 2014):

$$\Delta P_g^c = R_g^c + RS_g^c + L_g^c + LS_g^c$$

Here, **population change** ΔP_g^c is the result of economic trends, migration, and birth and deaths.

The **regional effect** R_g^c is the portion of population change in a census tract that would have been expected had the tract the same population growth rate for each cohort as the metropolitan area.

The **regional subgroup mix** RS_g^c captures the population change in census tracts that can be attributed to the cohort's growth rate on the metropolitan level.

The **local effect** L_g^c is a measure for the population change that resulted from census tract-specific characteristics that attracted more overall population growth or decline in a specific census tract. It is a measure of the overall competitiveness and attractiveness of a census tract, and is calculated as

The **local subgroup mix** LS_g^c measures the population change that resulted from tract-specific characteristics that lead to a stronger population growth/decline for a cohort. It is a measure of the census tract's competitiveness and attractiveness for a cohort.

MAJOR RESULTS

The **increase in suburban poverty is chiefly driven by the numeric decline of non-poor white population**.

The net population growth of poor minorities in suburbs is smaller than the growth of non-poor minorities → **increase in minorities lowers poverty rates**

The distribution of population growth differs by suburb type: older suburbs are less attractive for non-poor Whites and Asians, but attract poor blacks, non-poor/poor Hispanics and non-poor/poor Asians.

The newest suburbs saw population growth of all cohorts, but the local subgroup mix was negative for non-poor Whites → newest suburbs less attractive than Chicago for non-poor whites

In conclusion, suburbs experience a parallel increase in poverty and diversity, but diversity does not drive the increase in poverty.

Next step: How much have aging demographics and economic trends contributed to the decline of non-poor Whites and Blacks in Chicago?

Danko, Joseph J., and Dean M. Hanink. 2017. "Beyond the Obvious: A Comparison of Some Demographic Changes across Selected Shrinking and Growing Cities in the United States from 1990 to 2010." *Population, Space and Place*, December, e2136. https://doi.org/10.1002/psp.2136.

Franklin, Rachel S. 2014. "An Examination of the Geography of Population Composition and Change in the United States, 2000-2010: Insights from Geographical Indices and a Shift-Share Analysis: The Geography of Population Composition and Change in the United States." *Population, Space and Place* 20 (1): 18–36. https://doi.org/10.1002/psp.1744.

Kneebone, Elizabeth, and Alan Berube. 2013. *Confronting Suburban Poverty in America*. Washington, D.C: Brookings Institution Press.

Tobler, Waldo R. 1979. "Smooth Pycnophylactic Interpolation for Geographical Regions." *Journal of the American Statistical Association* 74 (367): 519–30. https://doi.org/10.2307/2286968.