

Methodological Appendix

We obtained county-level mortality data from the Centers for Disease Control Wide-Ranging Online Data for Epidemiologic Research (WONDER) Compressed Mortality files. Mortality rates per 100,000 include all deaths for non-Hispanic whites aged 45-54 over the 3-year period between 1999 and 2001 and over the 3-year period between 2011 and 2013 [1].

Data on economic mobility were taken from the Equality of Opportunity Project [2-3]. Economic mobility was defined as the county-level correlation of the percentile ranks in the national income distribution for children (based on average incomes between 2010-2012 for the 1980-1982 birth cohort) and their parents (whose income was measured over 1996-2000). Higher values reflect less economic mobility; the higher the value, the greater the degree to which an individual's economic position in adult life is determined by economic the circumstances of their birth. These data include both whites and nonwhites but are only available at a single point in time. These estimates are based on linked IRS administrative tax records for virtually every individual born between 1980 and 1982 and their parents; these are the first—and only—local area estimates of intergenerational economic mobility derived from population-level administrative data.

We obtained county-level estimates specific to non-Hispanic whites for population proportion below the poverty line (scaled 0-1), proportion of college graduates (scaled 0-1), proportion married (scaled 0-1), proportion unemployed in the civilian labor force (scaled 0-1), and per capita personal income (log). We also obtained county-level estimates of the total population (log), population density (log) and the Gini index of inequality (scaled 0-1). Covariates for the

mortality period 1999-2001 (hereafter “2000”) were taken from the 2000 Decennial Census [4]; covariates for the mortality period 2011-2013 (hereafter “2012”) were taken from the American Community Survey 5-Year estimates, pooling survey years 2010-2014 (midpoint 2012) [5].

We estimated least squares models specifying logged mortality rate as the dependent variable. These models included the above covariates, a binary indicator for year (=1 for observations for 2012 and 0 for 2000), and county fixed effects. The year indicator and county fixed effects account for all national trends and time-invariant county attributes, respectively, that may jointly influence the economic measures and outcomes. To model whether mortality increased more in areas characterized by low economic mobility net of other covariates, we included our measure of economic mobility in the model interacted with the year indicator.

We estimated the following model:

$$\ln(Y_{ct}) = \beta_1(Mobility_c * Year_t) + \beta X_{ct} + Year_t + \alpha_c + \varepsilon_{ct}$$

where $\ln(Y_{ct})$ is the logarithm-transformed mortality rate for non-Hispanic whites aged 45-54 in year t and county c; $Mobility_c$ is our economic mobility measure; $Year_t$ is a dummy indicator for year (2000=0; 2012=1); X_{ct} is a vector of covariates in time t for each county c; α_c is the county fixed effect; and ε_{ct} is the error term. The coefficient on the interaction term, β_1 , is the key parameter of interest. This coefficient (multiplied by 100) can be interpreted as the marginal percent change in mortality owing to a one-unit increase in absolute upward mobility. Again, the main effect for $Mobility$ is subsumed by the county fixed effect.

We weighted models by the average number of non-Hispanic whites aged 45-54 at risk for death in each of the two time periods. All standard errors were corrected for clustering at the county level, so as to account for serial correlation in mortality rates within counties. All analyses were conducted using Stata version 14.0.

Economic Mobility and Mortality by Sex

Models estimating the association between economic mobility and change in mortality separately for non-Hispanic men and non-Hispanic women aged 45-54 are presented in eTable 1 and eTable 2, respectively. The interaction between economic mobility and the year indicator is positive and of roughly similar magnitude in both models, suggesting that mortality increased more in areas characterized by low-economic mobility over this time period for both men and women. The analytic sample is smaller for these sex-specific models due to missing mortality data from counties where the population of men or women aged 45-54 is too small to generate reliable estimates.

eTable 1. Non-Hispanic White Middle-Age Mortality and Economic Mobility: Men

Economic Mobility X Year	0.501 [0.169 , 0.833]
Gini Index	0.009 [-0.018 , 0.037]
Income Per Capita (log)	0.007 [-0.062 , 0.077]
College Graduates	-0.306 [-0.381 , -0.231]
Population Density (log)	-1.187 [-4.273 , 1.898]
Proportion Married	-0.009 [-0.047 , 0.029]
Unemployment Rate	-0.023 [-0.059 , 0.012]
Poverty Rate	0.006 [-0.033 , 0.045]
Population (log)	0.916 [-1.774 , 3.606]
Year	0.077 [-0.089 , 0.244]
Constant	6.363 [5.895 , 6.831]
Observations	4,713
R-squared	0.912

Notes: 95% confidence intervals computed with standard errors corrected for clustering at the county level in brackets.

eTable 2. Non-Hispanic White Middle-Age Mortality and Economic Mobility: Women

Economic Mobility X Year	0.691 [0.310 , 1.072]
Gini Index	-0.051 [-0.092 , -0.011]
Income Per Capita (log)	-0.018 [-0.097 , 0.061]
College Graduates	-0.348 [-0.437 , -0.259]
Population Density (log)	-0.828 [-3.649 , 1.992]
Proportion Married	-0.043 [-0.088 , 0.001]
Unemployment Rate	-0.017 [-0.056 , 0.022]
Poverty Rate	0.045 [-0.007 , 0.097]
Population (log)	0.786 [-1.680 , 3.253]
Year	0.114 [-0.058 , 0.287]
Constant	5.665 [5.176 , 6.154]
Observations	3,966
R-squared	0.894

Notes: 95% confidence intervals computed with standard errors corrected for clustering at the county level in brackets.

References

1. Centers for Disease Control and Prevention, National Center for Health Statistics. Compressed Mortality File 1999-2014 on CDC WONDER Online Database, released December 2015. Data are from the Compressed Mortality File 1999-2014 Series 20 No. 2T, 2015, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/cmfi/d10.html>
2. Chetty R, Hendren N, Kline P , Saez E. Where is the land of Opportunity? The Geography of Intergenerational Mobility in the United States. *The Quarterly Journal of Economics*. 2014;129:1553–1623.
3. Data available for download: <http://www.equality-of-opportunity.org/index.php/data>
4. Social Explorer Tables: Census 2000, Social Explorer; U.S. Census Bureau. <http://www.socialexplorer.com/> Accessed May 10, 2016.
5. Social Explorer Tables: American Community Survey 2014 (5-Year Estimates); U.S. Census Bureau. <http://www.socialexplorer.com/> Accessed May 10, 2016.