

Income Inequality and Intergenerational Income Mobility in the United States

ONLINE APPENDIX

TABLES, FIGURES AND
SUPPLEMENTAL DATA DESCRIPTION

Deirdre Bloome*

*Department of Sociology, Population Studies Center and Survey Research Center, University of Michigan, Institute for Social Research Room 2086, 426 Thompson St., Ann Arbor, MI 48106. Email: dbloome@umich.edu.

Table (A1) Family income inequality by state and year. Decennial Census and IRS data.

	Gini				Top 1% Share			
	1969	1979	1989	1999	1969	1979	1989	1999
Alabama	.393	.385	.418	.435	.077	.075	.120	.152
Alaska	.366	.369	.387	.377	.055	.057	.102	.115
Arizona	.363	.365	.413	.429	.083	.077	.119	.165
Arkansas	.404	.389	.405	.422	.088	.080	.113	.147
California	.357	.372	.422	.458	.081	.091	.158	.227
Colorado	.349	.354	.394	.411	.081	.077	.118	.181
Connecticut	.336	.348	.401	.446	.102	.096	.161	.256
Delaware	.346	.361	.363	.398	.122	.083	.116	.154
District of Columbia	.425	.434	.489	.562	.105	.106	.180	.154
Florida	.398	.385	.422	.445	.102	.103	.183	.215
Georgia	.381	.387	.417	.437	.089	.076	.126	.164
Hawaii	.353	.365	.381	.401	.082	.069	.132	.130
Idaho	.350	.354	.386	.398	.074	.069	.117	.157
Illinois	.342	.352	.407	.425	.086	.080	.152	.189
Indiana	.322	.337	.372	.386	.075	.069	.108	.144
Iowa	.347	.344	.368	.376	.074	.067	.104	.135
Kansas	.362	.353	.388	.396	.081	.076	.125	.150
Kentucky	.392	.385	.421	.434	.078	.076	.124	.142
Louisiana	.403	.400	.446	.453	.087	.084	.124	.148
Maine	.328	.342	.373	.396	.074	.070	.109	.147
Maryland	.349	.352	.384	.407	.078	.071	.125	.153
Massachusetts	.334	.350	.387	.425	.087	.075	.135	.217
Michigan	.329	.350	.395	.406	.079	.069	.115	.147
Minnesota	.346	.346	.379	.387	.085	.076	.125	.158
Mississippi	.427	.401	.435	.446	.086	.080	.109	.145
Missouri	.369	.362	.400	.413	.086	.075	.122	.158
Montana	.349	.351	.379	.399	.068	.071	.123	.140
Nebraska	.355	.351	.375	.384	.078	.075	.122	.164
Nevada	.332	.350	.386	.411	.116	.105	.191	.237
New Hampshire	.317	.330	.344	.377	.077	.074	.131	.170
New Jersey	.341	.354	.395	.430	.088	.080	.151	.197
New Mexico	.389	.383	.431	.438	.074	.075	.106	.138
New York	.369	.378	.434	.472	.109	.094	.185	.251
North Carolina	.372	.365	.394	.421	.084	.075	.122	.147
North Dakota	.369	.358	.379	.383	.066	.069	.097	.120
Ohio	.331	.340	.390	.404	.080	.072	.119	.141
Oklahoma	.387	.376	.412	.420	.085	.084	.115	.146
Oregon	.345	.353	.390	.408	.076	.071	.121	.150
Pennsylvania	.334	.345	.396	.413	.083	.072	.133	.162
Rhode Island	.341	.347	.377	.416	.087	.076	.131	.153
South Carolina	.375	.369	.396	.423	.080	.070	.109	.147
South Dakota	.386	.370	.381	.397	.076	.076	.115	.184
Tennessee	.390	.381	.414	.431	.088	.078	.129	.166
Texas	.380	.379	.434	.449	.094	.101	.148	.189
Utah	.330	.337	.369	.386	.069	.069	.110	.159
Vermont	.341	.349	.367	.388	.078	.066	.109	.140
Virginia	.379	.368	.398	.423	.073	.065	.116	.157
Washington	.335	.346	.378	.406	.069	.069	.123	.234
West Virginia	.371	.363	.406	.429	.072	.067	.101	.114
Wisconsin	.326	.335	.365	.372	.075	.069	.111	.146
Wyoming	.340	.330	.392	.386	.076	.082	.144	.249

Table (A2) Descriptive statistics for state and parental characteristics, states/years in which PSID respondents resided at age 13-17. **PSID**, Census, and Statistical Abstracts data.

	Northeast	Midwest	West	South	US
<i>Parental Characteristics</i>					
Age (years)					
Mean	43.47	41.90	41.90	40.97	41.96
SD	5.75	6.01	5.94	6.27	6.08
Education (years)					
Mean	12.41	12.29	12.60	11.46	12.13
SD	2.11	2.10	2.28	2.83	2.40
Race (%)					
White	94.80	93.98	87.65	77.80	88.45
Black	4.30	4.76	2.71	19.90	8.73
Other	.90	1.26	9.64	2.30	2.81
Marital Status (%)					
Stably Married	71.72	66.39	59.94	65.62	66.27
Both Stably Single	.45	.14	.90	.66	.48
Both Unstably Married	16.74	16.11	21.99	17.27	17.51
Other	11.09	17.37	17.17	16.45	15.74
(e.g., one single, one unstably married)					
Child Male (%)	47.06	51.82	47.59	48.19	49.45
Child's year of birth (mean)	1962.25	1963.42	1963.55	1964.07	1963.55
<i>State Characteristics</i>					
Median Family Income					
Mean	52330.62	50239.56	50451.35	42202.84	48382.80
SD	4981.89	4117.29	2639.93	5997.13	6224.19
Percent Black	9.76	8.28	4.68	19.05	11.14
Percent Hispanic	4.92	1.59	11.89	3.99	4.62
Percent Foreign Born	9.14	3.30	10.02	3.55	5.67
Percent Poor	10.54	10.97	11.28	17.15	12.72
Unemployment	6.11	6.45	6.33	5.70	6.14
Region (%)					
Northeast	100	0	0	0	21.09
Midwest	0	100		0	34.06
West	0	0	100	0	15.84
South	0	0	0	100	29.01
Economic Segregation (State NSI)					
Mean	.46	.44	.43	.43	.44
SD	.07	.06	.07	.05	.06
Education spending per child age 5-17					
Mean	5387.11	5578.74	6495.15	5023.64	5522.46
SD	1882.43	1773.12	1704.45	1575.84	1794.85
Health spending per capita					
Mean	312.74	274.38	266.86	280.26	282.98
SD	154.50	88.09	86.56	117.68	114.53
Welfare spending per capita					
Mean	605.05	428.35	504.56	292.54	438.29
SD	211.26	176.59	191.86	92.23	202.61
<i>N</i> individuals	442	714	332	608	2096
<i>N</i> states	6	12	7	16	41

Table (A3) Descriptive statistics for state and parental characteristics, states in which NLSY79 respondents resided in 1979. **NLSY79**, Census, and Statistical Abstracts data.

	Northeast	Midwest	West	South	US
<i>Parental Characteristics</i>					
Age (years)					
Mean	45.25	44.84	44.26	44.36	44.63
SD	6.83	6.84	7.13	7.40	7.12
Education (years)					
Mean	11.12	11.57	9.99	10.33	10.73
SD	3.11	2.60	3.97	3.10	3.22
Race (%)					
White	49.58	55.48	32.74	30.65	40.92
Black	24.37	22.37	10.15	47.65	30.02
Hispanic	18.78	4.61	46.34	13.91	18.27
Other	7.28	17.54	10.77	7.79	10.78
Marital Status (%)					
Parent Married, Child Age 14	70.68	81.36	77.93	72.43	75.44
Child Male (%)	51.90	51.68	50.21	47.75	49.91
Child's year of birth (mean)	1962.47	1962.53	1962.65	1962.56	1962.38
<i>State Characteristics</i>					
Median Family Income					
Mean	52178.49	52303.31	49833.70	43338.13	48454.30
SD	3844.38	3253.53	2959.12	3753.23	5375.51
Percent Black	10.91	9.38	5.68	20.19	13.05
Percent Hispanic	5.80	1.84	16.61	6.11	6.85
Percent Foreign Born	10.18	3.77	11.76	4.27	6.57
Percent Poor	10.85	10.27	11.63	15.48	12.59
Unemployment	6.45	7.25	6.43	5.83	6.42
Region (%)					
Northeast	100	0	0	0	18.06
Midwest	0	100		0	26.06
West	0	0	100	0	18.21
South	0	0	0	100	37.66
Economic Segregation (State NSI)					
Mean	.51	.47	.47	.44	.47
SD	.04	.05	.05	.05	.05
Education spending per child age 5-17					
Mean	5999.69	5944.02	6970.11	5173.41	5850.71
SD	997.33	700.13	334.96	547.76	920.82
Health spending per capita					
Mean	322.96	322.98	321.83	351.40	333.47
SD	111.38	47.30	40.60	82.59	76.71
Welfare spending per capita					
Mean	655.96	495.23	556.50	303.46	463.19
SD	146.05	133.94	193.44	151.88	205.41
<i>N</i> individuals	948	1368	956	1977	5249
<i>N</i> states	6	11	8	16	41

Table (A4) Family income elasticity trends: comparing coefficients and standard errors with previous research. SRC subsample, sons only. PSID data.

Cohort	Lee and Solon		Current Analysis	
	β	se	β	se
1954	0.50	0.15	0.492	0.047
1955	0.48	0.13	0.469	0.047
1956	0.42	0.14	0.480	0.047
1957	0.52	0.12	0.463	0.048
1958	0.46	0.11	0.479	0.047
1959	0.39	0.11	0.454	0.047
1960	0.41	0.12	0.422	0.047
1961	0.47	0.10	0.469	0.047
1962	0.41	0.12	0.457	0.047
1963	0.38	0.09	0.422	0.047
1964	0.42	0.09	0.448	0.047
1965	0.36	0.08	0.431	0.048
1966	0.43	0.08	0.469	0.049
1967	0.45	0.08	0.496	0.046
1968	0.49	0.08	0.467	0.049
1969	0.43	0.07	0.513	0.047
1970	0.40	0.07	0.466	0.048
1971	0.43	0.07	0.454	0.047
1972			0.476	0.047
1973	0.47	0.06	0.431	0.046
1974			0.475	0.047
1975	0.47	0.06		

Note: “Current analysis” estimates from random coefficient models (partially pooled estimates). “Lee and Solon” estimates from Table 1 of their paper (2009), OLS models. In Table 1 they report by year rather than cohort; cohorts reported here are year minus 25. Several differences in the analyses generate some divergence in the results, including the ages studied and the empirical models. See papers for greater detail.

Table (A5) Family income elasticity-Gini models. Gini coefficient measured in early childhood, and standardized to mean 0, standard deviation 1. **PSID** and Census data.

	OLS		Random Effects		Fixed Effects
	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Income Not Adjusted for Family Size</i>					
Parental Income	.481 (.022)	.456 (.034)	.434 (.023)	.432 (.030)	.412 (.034)
Parental Income*Gini		.057 (.029)	.051 (.022)	.055 (.026)	.044 (.030)
Gini		-.662 (.328)	-.603 (.240)	-.651 (.282)	-.531 (.344)
Intercept	5.671 (.246)	5.957 (.381)	6.192 (.260)	6.219 (.322)	6.370 (.367)
State-year Intercept			✓	✓	✓
State-year Slope				✓	
AIC	4201.478	4188.380	4198.721	4202.876	4185.268
<i>Income Adjusted for Family Size</i>					
Parental Income	.539 (.021)	.521 (.032)	.497 (.023)	.496 (.029)	.475 (.033)
Parental Income*Gini		.040 (.030)	.035 (.021)	.039 (.025)	.032 (.033)
Gini		-.432 (.318)	-.392 (.209)	-.431 (.256)	-.346 (.347)
Intercept	4.913 (.219)	5.107 (.338)	5.354 (.235)	5.366 (.303)	5.541 (.329)
State-year Intercept			✓	✓	✓
State-year Slope				✓	
AIC	4077.574	4073.751	4076.984	4080.124	4063.679
<i>N</i> individuals	2393	2393	2393	2393	2393
<i>N</i> state-years	686	686	686	686	686
<i>N</i> states	42	42	42	42	42

Note: Standard errors in parentheses (robust, clustered by state and year). Gini coefficient captures inequality in the year a PSID respondent was about 4 years old in the state in which he resided around age 14. Random effects models fit with restricted maximum likelihood (REML).

Table (A6) Family income elasticity-Gini models. Gini measured in state and year of birth, and standardized to mean 0, standard deviation 1. **NLSY79** and Census data.

	OLS							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<i>Income Not Adjusted for Family Size</i>								
Parental Income	.473 (.018)	.456 (.020)	.482 (.016)	.483 (.016)	.474 (.025)	.484 (.025)	.458 (.022)	.456 (.016)
Parental Income*Gini		-.009 (.018)	-.039 (.015)	-.040 (.015)	-.034 (.023)	-.035 (.023)	-.011 (.019)	-.006 (.010)
Gini		.053 (.188)	.379 (.156)	.390 (.156)	.322 (.244)	.329 (.245)	-.072 (.219)	-.081 (.151)
Intercept	5.746 (.198)	5.917 (.221)	5.586 (.170)	5.568 (.171)	5.664 (.269)	5.643 (.276)	.055 (.006)	6.124 (.138)
State Intercept			✓	✓	✓	✓	✓	✓
Year Intercept				✓				✓
State Slope					✓			
Year Slope						✓		
AIC	13082.038	13064.958	12374.229	12374.229	12361.135	12361.135	12991.441	12991.441
<i>Income Adjusted for Family Size</i>								
Parental Income	.469 (.017)	.454 (.014)	.483 (.015)	.486 (.015)	.482 (.020)	.486 (.021)	.455 (.016)	.457 (.010)
Parental Income*Gini		-.008 (.012)	-.039 (.014)	-.040 (.014)	-.037 (.018)	-.038 (.018)	-.012 (.014)	-.005 (.004)
Gini		.038 (.119)	.357 (.134)	.373 (.134)	.338 (.180)	.353 (.179)	-.120 (.148)	-.113 (.073)
Intercept	5.652 (.170)	5.798 (.145)	5.467 (.147)	5.435 (.149)	5.477 (.200)	5.439 (.215)	.041 (.005)	5.985 (.130)
State Intercept			✓	✓	✓	✓	✓	✓
Year Intercept					✓			✓
State Slope						✓		
Year Slope							✓	
AIC	12347.558	12333.463	11746.236	11746.236	11743.711	11743.711	12239.462	12239.462
<i>N</i> individuals	5354	5354	5354	5354	5354	5354	5354	5354
<i>N</i> state-years	264	264	264	264	264	264	264	264
<i>N</i> states	49	49	49	49	49	49	49	49

Note: Standard errors in parentheses (robust, clustered by state in models 2, 3, 5, and 7; clustered by state and year in models 4, 6, and 8). Gini measured in respondent's state and year of birth. Respondents born 1960-65, allowing random and fixed effects by both state and year (unlike the main NLSY79 analysis, which permits random and fixed effects by state only because the Gini is measured in the same year for all respondents, 1979). Random effects models fit with restricted maximum likelihood (REML).

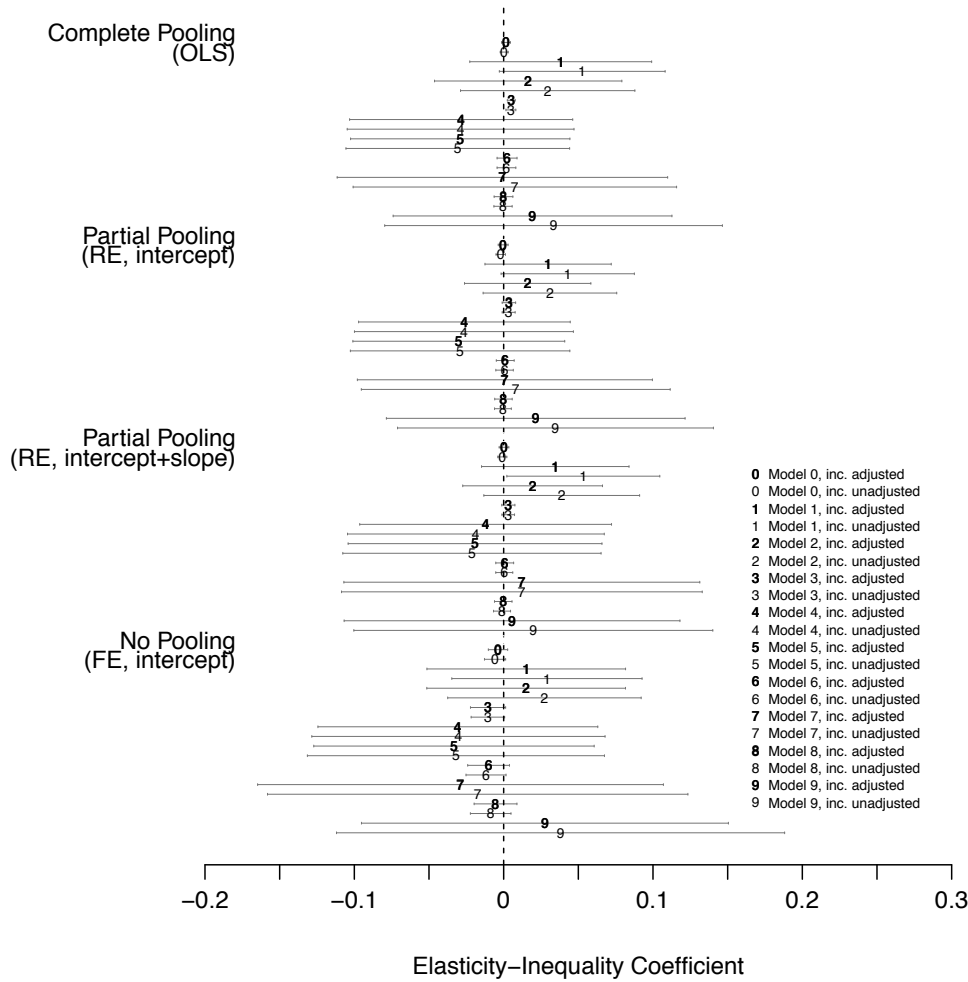


Figure (A1) Model robustness checks for mobility-inequality relationship. **PSID**, Census, and Statistical Abstracts data. Estimates (with 95% confidence intervals) of elasticity-inequality coefficient. Inequality measures standardized (mean 0, sd 1). Models use different income measures (income un/adjusted for family size) to explore (a) different covariate vectors and (b) different error structures (OLS “complete pooling,” random effects “partial pooling,” and fixed effects “no pooling” of between state/year information). Covariate vectors are as follow:

	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Parental Income Main Effect	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gini*Parental Income	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gini Main Effect		✓	✓	-	✓	✓	-	✓	-	✓
State-Level Covariates’ Main Effects			✓	-	✓	✓	-	✓	-	✓
State-Level Covariates*Parental Income				✓	✓	✓	✓	✓	✓	✓
State-Level Mediators’ Main Effects						✓	-	✓	-	✓
State-Level Mediators*Parental Income							✓	✓	✓	✓
Individual-Level Covariates’ Main Effects									✓	✓

Note: Within each pair of models (3, 4), (6, 7), and (8, 9) the same predictors are used, except for the state-level main effects, which are included in only the second model of each pair. State-level covariates: % black, % hispanic, % foreign born, median income, % poor, lagged unemployment, region. State-level mediators: education spending per child age 5-17, health spending per capita, welfare spending per capita, residential segregation. Individual-level covariates: parental age, parental education, parental marital status, race, and child’s sex.

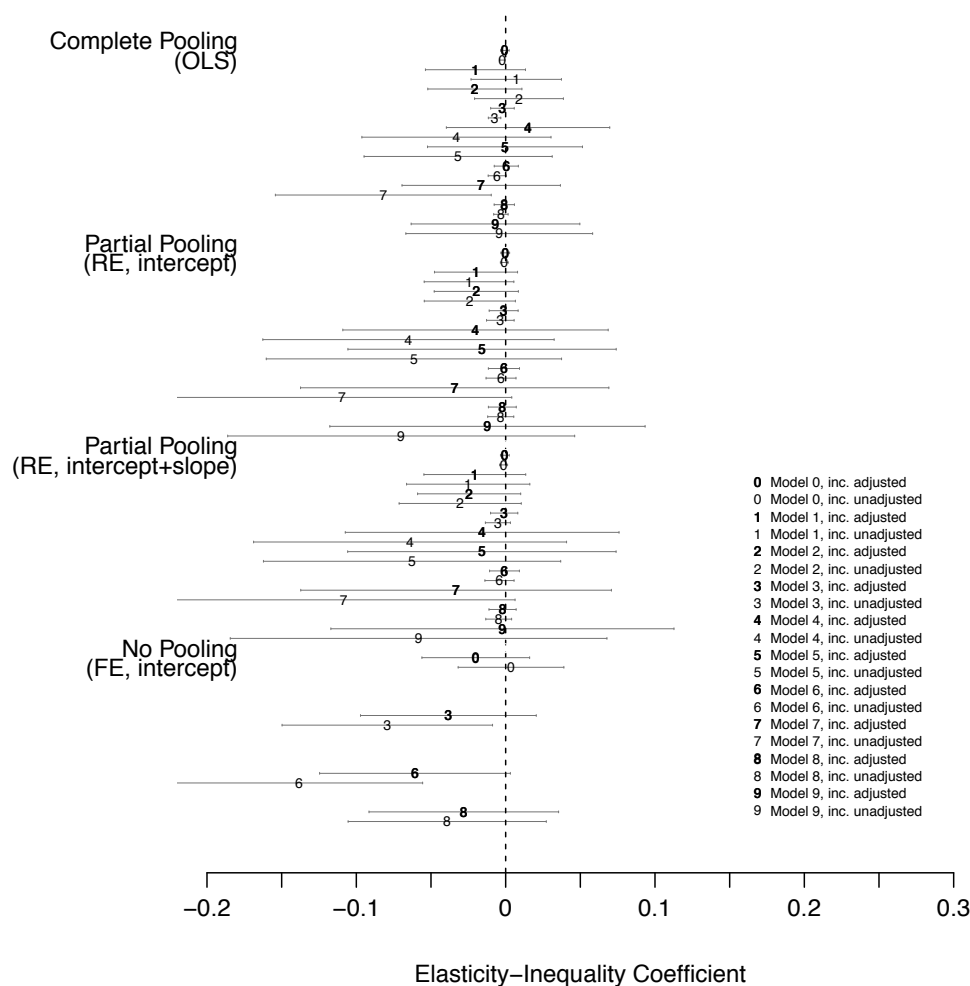


Figure (A2) Model robustness checks for mobility-inequality relationship. NLSY79, Census, and Statistical Abstracts data. Estimates (with 95% confidence intervals) of elasticity-inequality coefficient. Inequality measures standardized (mean 0, sd 1). Models use different income measures (income un/adjusted for family size) to explore (a) different covariate vectors and (b) different error structures (OLS “complete pooling,” random effects “partial pooling,” and fixed effects “no pooling” of between state information). Covariate vectors are as follow:

	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Parental Income Main Effect	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gini*Parental Income	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gini Main Effect		✓	✓	-	✓	✓	-	✓	-	✓
State-Level Covariates' Main Effects			✓	-	✓	✓	-	✓	-	✓
State-Level Covariates*Parental Income				✓	✓	✓	✓	✓	✓	✓
State-Level Mediators' Main Effects						✓	-	✓	-	✓
State-Level Mediators*Parental Income							✓	✓	✓	✓
Individual-Level Covariates' Main Effects									✓	✓

Note: Within each pair of models (3, 4), (6, 7), and (8, 9) the same predictors are used, except for the state-level main effects, which are included in only the second model of each pair. Some covariate vector/error structure combinations not shown, because in the NLSY79, fixed effects specifications with state-level main effects cannot be estimated. State-level covariates: % black, % hispanic, % foreign born, median income, % poor, lagged unemployment, region. State-level mediators: education spending per child age 5-17, health spending per capita, welfare spending per capita, residential segregation. Individual-level covariates: parental age, parental education, parental marital status, race, and child’s sex.

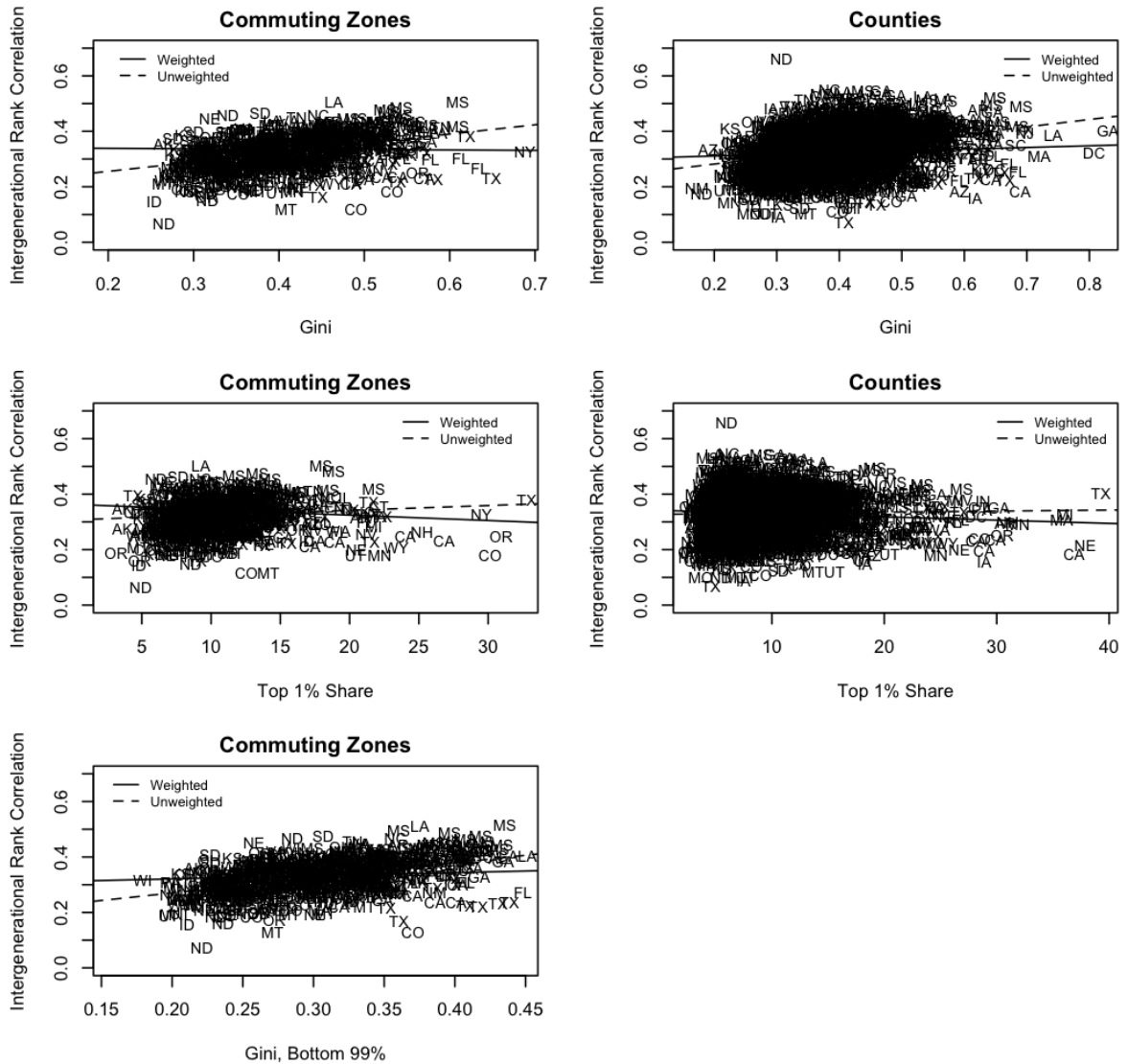


Figure (A3) Family income mobility and inequality by U.S. Census commuting zone and county, stratified OLS estimates. Slope coefficients from regressions of child income rank on parent income rank plotted against local-area inequality. Fitted lines from regressions of area-specific slopes on area-specific inequality, either unweighted or weighted by the number of children in each local area used to estimate the intergenerational slopes. Birth cohorts 1980-1982, IRS data.

Appendix A: Supplemental Data

I draw on several data sources to examine potential mediators and confounders of the mobility-inequality association. The PSID and NLSY79 provide variables including parents' age, race, education, and marital status.¹ The Census Bureau's annual *Statistical Abstract of the United States* provide information on states' social spending. I divide spending by the number of residents (or number of children age 5-17, using the Census Bureau's Intercensal Estimates of the Resident Population of States by Age) to obtain annual per-capita welfare spending, per-capita health and hospital spending, and per-child education spending. Watson (2009) provides Census-based economic segregation measures. The "neighborhood sorting index" (NSI—the square root of the share of MSA income variance between tracts) ranges theoretically between zero and one, when segregation is complete and all variance lies between tracts. To generate state-level measures, I average each state's MSAs' NSIs, weighting by population² and linearly interpolating intercensal years by state.³ Census microdata provide information on the percent of the state population that is African American, percent Hispanic, percent foreign born, percent poor, median family income, and the unemployment rate.⁴ I linearly interpolate intercensal years by state. Tables A2-A3 provide descriptive statistics.⁵

I also analyze administrative IRS records, which permit mobility estimates in smaller geographic areas than national surveys. I rely on Chetty and collaborators' (Chetty, Hendren, Kline, Saez, and Turner 2014) mobility and inequality measures because the IRS microdata are not available; their measures are close enough to mine to provide good analogs to the primary analysis. Chetty et al. calculate mobility by ranking each parent's and child's income in the national (generation-specific) distribution, obtaining percentiles ranging from 0-100. They then regress child's income rank on parent's rank separately by local area (county or commuting zone); the slope measures mobility through an intergenerational rank correlation. (Consequently, their mobility estimates tend

¹I employ information on both parents when available.

²For MSAs straddling state borders, I apportion NSIs by the states' population shares.

³Because of possible lags in responses to inequality, I measured these hypothesized mediators contemporaneously with inequality but also 1-5 years after. Measurement year did not influence the results. Reported results measure inequality and mediators contemporaneously.

⁴All are measured contemporaneously with inequality, except unemployment, which is lagged four years to capture conditions for children entering the labor market.

⁵Tables A2-A3 contain fewer observations than Tables 1-2 because they only include respondents with fully-observed covariates. Explorations using multiply-imputed datasets generated similar results.

to be lower than mine, since in eras of rising inequality, correlations are always lower than elasticities; see Empirical Methods section of the main manuscript.) They measure inequality with the fraction of aggregate parent income in the local area (county or commuting zone) accruing to parents in the top 1% of the national income distribution, as well as the local-area Gini and the Gini of parents in the lower 99% of the distribution. Income comes from IRS tax records, 1996-2012, and equals the sum of Form 1040 AGI, social security income, and tax-exempt interest minus taxable social security income. These income measures should capture the income of affluent (poor) families better (worse) than the PSID and NLSY79 survey measures, due to differential non-response and tax-return filing across the income distribution. Chetty et al. focus on birth cohorts 1980-1982, more recently born than my PSID and NLSY79 respondents. Childhood income is captured around ages 15-20 (1996-2000) and adult income around 29-32 (2011-2012). Commuting zone is assigned by the earliest observed ZIP-5 code reported on the primary parent's Form 1040 (typically in 1996).