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Family, community, and the rural social mobility advantage

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ABSTRACT

Children born into poverty in rural America achieve higher average income levels as adults than their urban peers. As economic opportunity tends to be more abundant in cities, this "rural advantage" in income mobility seems paradoxical. This article resolves this puzzle by applying multilevel analysis to new spatial measures of rurality and place-level data on intergenerational income mobility. We show that the high level of rural income mobility is principally driven by boys of rural-origin, who are more likely than their urban peers to grow up in communities with a predominance of two-parent households. The rural advantage is most pronounced among Whites and Hispanics, as well as those who were raised in the middle of the country. However, these dynamics are more nuanced for girls. In fact, girls from lower-income rural households exhibit a disadvantage in their personal income attainment, partly due to the persistence of traditional gender norms. These findings underscore the importance of communities with strong household and community supports in facilitating later-life income mobility, particularly for boys. They also challenge the emerging consensus that attributes the rural income mobility advantage to migration from poorer rural areas to wealthier towns and cities.

1. Introduction

Since the 1980s, technological and political forces have restructured the economic geography of the United States (Autor, 2019; Kemeny & Storper, 2020). In particular, once prosperous local and regional industrial economies have lost ground to an elite tier of "superstar" metropolitan areas (Connor, Kemeny, & Storper, 2023; Gyourko, Mayer, & Sinai, 2013; VanHeuvelen, 2022), reducing intergenerational mobility rates across many industrial regions (Berger & Engzell, 2022; O'Brien et al., 2022).[1] Over the same period, however, the intergenerational mobility rates of children from rural regions now look surprisingly favorable when compared to urban regions (Connor & Storper, 2020; Weber et al., 2017, 2018). The strong economic performance of children from rural backgrounds appears paradoxical and requires further investigation. Addressing this puzzle could help inform policy efforts to boost equality of opportunity across all places.

This paper investigates these issues by measuring the size of the rural advantage in income mobility and by determining who has benefited from it. Despite longstanding interest in how rural places shape child wellbeing (Manning & Lichter, 1996) and a very recent double special issue on the topic (Clark et al., 2022), the basic quantitative facts linking place-level rurality and intergenerational mobility are not well established. This situation reflects the challenges in combining data on intergenerational mobility outcomes and the rurality of childhood communities. We advance the conversation through the construction of a novel place-level dataset that measures the socioeconomic characteristics, rurality, and income mobility of over 20,000 places of childhood in the United States. Places are used to characterize the early life context of socialization, a more precise geography than counties which are more typically studied in the literature. We measure the rural advantage in income mobility using data from Opportunity Insights (Chetty et al., 2018) and attempt to explain it based on established determinants of intergenerational mobility.

Why would intergenerational mobility rates today differ for rural and urban children? Given the growing precarity of many rural communities within an economy that favors cities, we might expect it to be children in urban places who are advantaged in income mobility (De la Roca & Puga, 2017; Green, 2020). If, however, the conditions in which children are raised matters more than where they enter the labor market (e.g., Chetty et al., 2014), rural childhoods could confer long-lasting

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[1] A related body of European-focused research is examining these issues in the context of "left behind places" (Houlden et al., 2022; Pike et al., 2023).

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benefits. Small towns are, after all, noted for having high levels of community trust, social capital, accelerated paths through key life states, and, at least historically, more two-parent households (Heaton et al., 1989; Hofferth & Iceland, 1998; Miller & Edin, 2022; Putnam, 2016; Wirth, 1938).[2] Prior findings, including those from the Fragile Families and Child Wellbeing Study and Opportunity Insights, highlight the critical role of family and community conditions in shaping children's early cognitive development and later life attainment (Chetty et al., 2022a; Dupraz & Ferrara, 2023; Jackson et al., 2017; James et al., 2021; McLanahan & Sandefur, 2009). These findings are related to a longer and contested literature (Moynihan, 1965; Wilson, 1987), describing what Kearney (2023) refers to as the "Two-Parent Privilege". Differences along these dimensions are, therefore, plausible hypotheses for why rural places may exhibit higher than average rates of intergenerational mobility.

There are also more specific features of small-town living that could matter. Rural outmigration is noted for being highly selective (Carr & Kefalas, 2009) and it may be the case that the income attainment of rural-origin children could be driven exclusively by those who move to cities or wealthier regions (Anstreicher, 2023). The cultural homogeneity and lack of anonymity of rural communities may also exert unique social and moral pressures that may affect how lower income rural families cope with poverty (Sherman, 2006). This is particularly notable given the strong racial and ethnic contours to rural poverty in the United States (Lichter & Brown, 2011; Manning & Lichter, 1996) and its link to intergenerational mobility (Lichter & Johnson, 2021). Our study is thus not just concerned with establishing the general association between rurality and intergenerational mobility, but also with investigating *where* and *for whom* this association holds.

2. Geography and rural intergenerational mobility

Recent work has advanced our understanding of how communities and regions influence the economic prospects of children born into low-income households (Chetty et al., 2014, 2022a; Sampson, 2019; Sharkey, 2016). This work breaks with a long intellectual tradition focused on the intergenerational mobility of individuals and societies (Becker & Tomes, 1979; Blau & Duncan, 1967), which historically relegated communities and regions to being marginal background considerations (Mare, 2019). A major turning point in the field was the Opportunity Insights team's use of restricted Internal Revenue Service data to reveal enormous variation in children's later-life outcomes based on where they grew up (Chetty, 2021; Chetty et al., 2016; Chetty & Hendren, 2018b, 2018a). Findings suggest that the low rates of intergenerational mobility in the United States is a "local problem", intimately connected to regional, neighborhood, and community contexts (Chetty et al., 2014, p. 1620; Connor & Storper, 2020).

The public dissemination of Opportunity Insights' data is having a lasting impact on the field. The initial data releases first enabled deeper examination of mobility patterns at the scale of counties and commuting zones, documenting strong county effects on intergenerational mobility outcomes (Abramitzky et al., 2021; Berger & Engzell, 2019; Connor & Storper, 2020; Leonard & Smith, 2021). As a result, we now have a much-improved understanding of economic mobility across labor market areas, particularly urban ones. More recently, the same economic mobility estimates have been published at the scale of census tracts or neighborhoods, and have been further segmented to show sharply divergent outcomes based on parental attributes including income, race, ethnicity, and gender (Chetty et al., 2018). The finer granularity of these estimates opens up new possibilities for studying the contributions of communities to intergenerational income mobility outcomes.

Although rural communities have received only a small share of the attention in the recent literature (e.g., Weber et al., 2017, 2018), general comparative studies have generated relevant insights. For example, Chetty and colleagues documented surprisingly high rates of upward mobility among children growing up in remote regions of the country, particularly in states across the Midwest and Great Plains (Chetty et al., 2014). This finding may be counterintuitive since rural areas tend to have less dynamic labor markets. It is less surprising, however, when one considers that *where* children grow up may matter more for long-term attainment than where they live now (Abramitzky et al., 2021). Rural children may thus benefit from early life exposure to smaller communities with greater social cohesion and family stability, and only later pursue opportunities in urban labor markets (Connor & Storper, 2020). Credence for this hypothesis comes from recent findings that socioeconomic connectedness (described below) within childhood locations is the strongest single predictor of upward income mobility at the county scale (Chetty et al., 2022a, 2022b).

Extending the analysis of Chetty and colleagues to historical eras, Connor and Storper (2020) found that the rural geography of intergenerational mobility has changed over time. Rural counties, as defined by population density, ranked among the worst performers for economic mobility in the early twentieth century post 1980s. Despite generating low levels of economic mobility in the past, many rural counties have historically fared quite well in promoting intergenerational educational mobility (Tan, 2022). The historical disparities in economic and educational outcomes among rural children may result from the positive conditions for early-life attainment in these settings, as well as the limitations they impose on labor market outcomes in adulthood. In line with this perspective, Connor and Storper (2020) hypothesize that the high rates of economic mobility among rural-origin children after 1980 results from their exposure to relatively favorable small-town environments during childhood, coupled with their subsequent migration to more opportunity-abundant urban labor markets in adulthood.

The historical correlation between urbanization and upward income mobility is consistent with an extensive line of research in social stratification. Specifically, intergenerational occupational mobility generally rises during periods of declining agricultural employment and expanding industrial activity (Dribe et al., 2015; Erikson & Goldthorpe, 1992; Lipset & Bendix, 1959; Torche & Ribeiro, 2010). Under these circumstances, proximity to urban industrial activity tends to be associated with higher rates of upward mobility, particularly among children from places that are not already incorporated into the urban system. These assertions and the hypothesized rise and decline in intergenerational mobility through periods of industrialization are also supported by historical time series data (Song et al., 2020).

Our expectations regarding rural intergenerational mobility in a post-industrial society are less clear. One hypothesis with recent support suggests that as the transition from agriculture to manufacturing fades, forces related to schooling and human capital acquisition grow in importance for rural communities (Connor & Storper, 2020). In other words, as opportunities for migration to urban industrial employment decrease, educational attainment will become a primary factor in the economic stratification of rural children. This is consistent with observations that high-achieving rural children are particularly likely to transport their human capital by leaving their rural childhood communities (Krause & Reeves, 2017; Parker et al., 2022).

The recent examinations of income mobility differences across the rural to urban continuum support the view that high rates of upward rural income mobility may be linked to both early life community conditions and later migration. Weber et al. (2017) examine intergenerational mobility across counties that differ according to their metropolitan classifications and find that small to medium ("micropolitan") urban centers constitute a unique context for generating upward mobility. Subsequent studies provide support for the hypothesis that early childhood influences on human capital, such as family structure

[2] Although rural and urban Americans have become less distinctive with respect to marriage and family (Snyder & McLaughlin, 2004), there is much variation among rural Americans, particularly by region (Leonhardt & Quealy, 2015; Livingston, 2018).

and local inequality, play a key role in shaping intergenerational mobility, particularly for communities far from metropolitan areas (Li et al., 2018; Weber et al., 2018). The children coming of age in these more remote contexts appear to reap some of the largest benefits from interstate migration (Anstreicher, 2023).

Forces related to race and ethnicity are also at play. Krause and Reeves (2017) note that there are almost no Black residents in the rural counties with the highest rates of upward mobility, yet they make up almost one in four residents in the counties with the lowest intergenerational mobility rates. The areas of rural America that exhibit the highest rates of upward mobility are also disproportionately White. For Hispanic households, Lichter and Johnson (2021) note that children face disadvantages in their access to opportunity both in and outside of major metropolitan regions. It is not clear whether these patterns reflect low rates of intergenerational mobility among racialized and disadvantaged populations in and outside of rural areas, or if, instead, they emerge from more universal constraints on opportunity in racially diverse and lagging regions such as the South. In other words, to what extent do these patterns reflect the population composition of rural communities as opposed to true rural contextual "effects" on intergenerational mobility outcomes?

We advance these lines of investigation on three fronts. First, we test the robustness of the rural advantage in income mobility using finer scale data and cutting-edge measures of rurality and intergenerational income mobility. This is a significant advancement on earlier analyses at the county scale, which have relied on coarser aspatial measures of rurality and urbanization such as population density (e.g., Connor & Storper, 2020). Second, we exploit the granularity of these data to elucidate the mechanisms (and possible spuriousness) that underlie the earlier documented relationship between rurality and intergenerational mobility. Finally, we test for heterogeneity across counties and states, and at various population intersections (e.g., sex, migrant status, race, ethnicity). These analyses provide insight into the classic problems of context and composition (Duncan et al., 1998). In short, we use the best available data to ask *where* and *for whom* there exists a rural advantage in intergenerational income mobility.

3. Data & analytic strategy

Our analytic strategy follows very closely in spirit and design to the last decade of work on the geography of intergenerational mobility (Berger & Engzell, 2022; Chetty et al., 2014, 2018; Connor & Storper, 2020). We are specifically concerned with how exposure to places with different characteristics during childhood – the rurality of a place in this case – affects long-term income attainment. Our measure of rurality is based on a newly constructed Place-level Urban-Rural index or "PLURAL" for short (Uhl et al., 2023). The relationship between rurality and other contextual characteristics can be usefully described through the "dosage-response" metaphor, in which a child's exposure to a bundle of place-based characteristics leads to differences in attainment (Galster, 2011).

As we describe below, we rely on two separate sets of aggregated measures. The first set of measures are estimates of the average intergenerational income mobility levels of children from 1978 to 1983 cohorts, growing up across over 20,000 Incorporated Places and Census Designated Places during the 1980s and 1990s. These estimates are derived for children who grew up in lower income households and are based on their personal and household income attainment in their mid-30s. These estimates are weighted according to the time that these children spent across different locations. The aggregation of these estimates to places means that we cannot use these data to represent the full variance in children's outcomes within these contexts. They do, however, provide a comprehensive and fine scale perspective on average upward mobility levels as related to local contexts. These estimates serve as our primary dependent variables.

The second set of measures captures various aspects of the place and county contexts in which these individuals spent their childhoods. We draw these contextual measures from various sources, including the decennial census. Our focus on childhoods is theoretically grounded in evidence that the economic effects of exposure to context are much larger in childhood and adolescence than in adulthood (Chetty & Hendren, 2018a). The importance of these ages reflect critical periods for cognitive development, important lifetime transitions such as starting school, as well as the accumulation of chronic disadvantages across key development stages and transitions (Lee & Jackson, 2017).

There are also pragmatic analytic decisions for focusing on childhood context. We know that adults often end up living in places that differ from where they spent their childhoods. However, migration decisions are themselves outcomes, that are conditioned by similar processes to those that facilitate economic advancement, such as positive educational experiences and achievements earlier in life (Carr & Kefalas, 2009). The economic potential of migrants and non-migrants therefore tends to be correlated with the dynamism of the labor market areas in which these individuals ultimately decide to live (Connor, 2019; Lee et al., 2018; Lichter et al., 2022). In the absence of quasi-experimental interventions (Abramitzky et al., 2024; Katz et al., 2001), the selective and endogenous nature of migration – for both movers and stayers – makes it exceedingly challenging to interpret economic outcomes independently of migration decisions.

Given these considerations, we follow the literature in taking a relatively confined focus on the impact of *childhood* context on economic outcomes. We are concerned with the characteristics of the places in which individuals spent their childhoods in the 1980s and 1990s and, for the most part, consider the outcomes of migrants and non-migrants jointly. We do however explore the potential role of migration as a mediator that links rural childhood contexts to later life outcomes.

3.1. Unit of analysis: rural places

Our focus on incorporated and Census Designated Places, rather than counties, deviates from much recent work in this area. Counties have become the dominant spatial unit of analysis for rural demography, partly because of their consistency and coverage over time, their political importance, and their alignment with data sources such as the Current Population Survey. In deciding whether a county should be considered as rural or urban, the standard approach is to rely on a county classification like the Rural-Urban Continuum Codes ("RUC codes") from the Office of Management and Budget (OMB), which typically classify rurality based on population size and adjacency to urban areas. The coarseness of counties however is evident in that most rural dwellers in the United States, as officially defined, now actually live in metropolitan counties (Lichter & Brown, & Parisi, 2021).

The map of county-based RUC codes in Fig. 1 helps demonstrate three of the salient issues with county-based classifications of rurality. First, county-based measures tend to be coarse, lacking smooth gradients in the transition from rural to urban regions. Second, the strong regionalization of these classifications also means that the measurement of rurality runs the risk of being conflated with other features of regional context. Recent studies have, for example, documented strong relationships between contemporary intergenerational mobility patterns and regional histories of ethnic settlement and slavery (Berger, 2018; Berger & Engzell, 2019). Third, county-based analysis results in unknown levels of classification error, particularly for large counties in the Southwest where sizeable areas of undeveloped land is misclassified as metropolitan.[3] The ability to make comparisons based on rurality within

[3] Joshua Tree, California, is one well known case of misclassification according to the county-based RUC codes. Despite being resident to fewer than 4000 people (in 1980) and being a renowned national park and wilderness area, the settlement of Joshua Tree is situated in the most urban of RUC codes, making it a clear "false negative" with respect to rural classification.

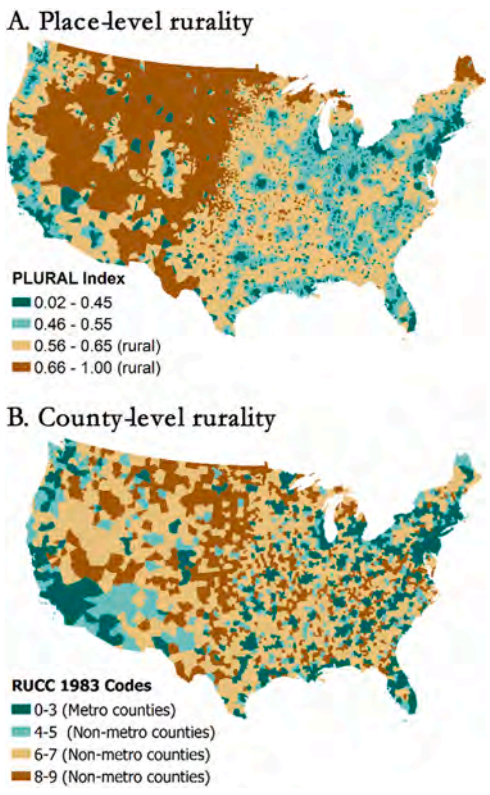

Fig. 1. Maps of the rural to urban continuum by county- and place-based classification. Notes: Two maps showing the rural and urban regions of the United States based on a place-based (top) and a county-based (bottom) classification. In the place-based classification , rural areas are defined as those that above 0.55 on the PLURAL index in 1980. The darker (green) shades represent urban areas and the lighter (brown) areas refer to more typically rural areas. The county-based classification uses the 1983 version of the "Rural-Urban Continuum Codes" from the OMB.

regions, states and counties is a strong contribution of our place-level approach.

Our strategy follows an earlier strand of rural research that took places to be the key unit of analysis (Fuguitt, 1965, 1971). The Census Bureau describes incorporated places as legally bounded entities, including cities, boroughs, towns, or villages. Census Designated Places (unincorporated places) are statistical entities that are not legally incorporated, but which are identifiable by name and contain people, housing, and commerce. There are roughly 3,000 counties in the United States, but there are more than 20,000 places.[4] These places better represent the boundaries of the small-towns and villages around which rural residents organize their lives (Johansen & Fuguitt, 1984).

We study rural places by augmenting an earlier constructed longitudinal dataset that covers all places in the lower 48 states, observed from 1980 to 2018 (Hunter et al., 2020). This dataset includes place-level attributes from a combination of the decennial census and the five-year estimates of the American Community Survey over five time periods: 1980, 1990, 2000, 2010 and 2014–2018. However, given our focus here on the 1978–1983 birth cohorts, we mainly focus on these places as they existed in the 1980s and 1990s.

[4] One limitation of our approach is that we omit "non-place" populations from our analysis. In this sense, we are more inclusive of rural populations living in more urbanized counties but less inclusive of people living outside of official settlements.

3.2. Variable of interest: place-level rurality

We measure the rurality of places using our recently developed Place-level Urban-Rural index ("PLURAL") (Uhl et al., 2023). The PLURAL index is a valuable addition to rural research as it incorporates typical place-based characteristics like population size and density with spatial characteristics such as proximity to larger towns and cities. In this sense, it provides a single continuous measure combining place size and remoteness within an explicitly spatial design. The PLURAL index uses the total population of a place and its distances to other places with total populations of 10,000–20,000, 20,000–50,000, 50,000–100,000, 100,000-250,000, and over 250,000. The PLURAL index is scaled continuously from 0 (least rural) to 1 (most rural). Because the PLURAL index is a composite measure with multiple inputs, its value has only intuitive meaning through comparison to other data sources (below). We map the values of the PLURAL index in Fig. 1, which shows a much smoother gradient in the transition from urban to rural.

Despite providing continuous measurements of rurality, we determine a working threshold for the PLURAL index above which to consider places as "likely rural". This threshold of 0.55 provides a strong balance between maximizing our inclusion of truly rural places and minimizing likely non-rural places. After applying this threshold to the universe of places in 1980, we classify 8,472 of the 20,639 places in the lower 48 states as rural. We use this threshold for presentation and exposition, but our formal analyses rely on the continuous gradient in rurality.

Table 1 provides descriptive statistics for the PLURAL index for places within counties along the urban to rural continuum. RUC codes 0–3 are designated as metropolitan, and codes 4–9 are non-metropolitan. Codes 4, 5 and 6 may be considered as somewhat transitional categories (Hunter et al., 2020).[5] Table 1 also demonstrates the value of the PLURAL index in distinguishing rural from non-rural places in the middling RUC categories. In RUC code 5, for example, 51% of places are classified as rural. This means that irrespective of whether these counties are designated as urban or rural, approximately half of places may be misclassified in this aggregation.

3.3. Dependent variable

As noted, our intergenerational mobility estimates are drawn from Opportunity Insights (Chetty et al., 2018). These estimates are derived from analysis of over 20.5 million children from the 1978–1983 birth cohorts, who are assigned to census tracts based on the proportion of their childhood that they spent in those locations. Opportunity Insights publish these exposure-weighted observations as a set of composite measures that detail the estimated adult income attainment associated with growing up in each census tract, for children from households at various points in the income distribution (e.g., 25th percentile, 50th percentile).

Our preferred dependent variable is a place-level estimate of the average adult household income rank in the national distribution circa 2015, for children whose parents were at the 25th percentile of the national income distribution.[6] We choose household income attainment over personal income attainment as our preferred dependent variable as it provides a stronger indicator of economic standing. However, personal income attainment does become an important consideration in our

[5] Table 1 also provides a working interpretation of our 0.55 threshold. This threshold value is the same as the median value of the PLURAL index for places within counties that have an urban population of 20,000 or more and are not adjacent to a metropolitan area (RUC code 5), and for places in counties that have an urban population of 2500 to 20,000 and which are adjacent to metropolitan areas (RUC code 6).

[6] As not all census tracts have households at the 25th percentile, the original tract-level estimates are derived from a regression line fitted to the available data.

Table 1
Descriptive statistics for the PLURAL Index by county-based RUC codes.

County-based Rural Urban Continuum Codes, 1983		Place-based PLURAL Index			
		Median	Min	Max	Rural
0	Central counties of metro of 1 million pop or more	0.24	0.04	0.55	1%
1	Fringe counties of metro of 1 million pop or more	0.39	0.07	0.56	2%
2	Counties in metro areas of 250,000–1 million pop	0.46	0.14	0.60	7%
3	Counties in metro areas of fewer than 250,000 pop	0.51	0.22	0.67	23%
4	Urban pop of 20k or more, metro adjacent	0.50	0.25	0.61	13%
5	Urban pop of 20k or more, metro not adjacent	0.55	0.30	0.72	51%
6	Urban pop of 2.5–20k, metro adjacent	0.55	0.30	0.67	48%
7	Urban pop of 2.5–20k, metro not adjacent	0.59	0.33	0.77	85%
8	Fully rural/less than 2.5k urban pop, metro adjacent	0.57	0.46	0.74	71%
9	Fully rural/less than 2.5k urban pop, metro not adjacent	0.63	0.53	0.80	95%

Notes: A table showing descriptive statistics for the PLURAL Index of places by the 1983 RUC codes of the counties in which they are nested. The share of places classified as "rural" is determined by whether a place is above 0.55 on the PLURAL Index. Rural Urban Continuum Codes from 0 to 3 are classified as metropolitan and codes 4 through 9 are non-metropolitan.

Table 2
Descriptive statistics of urban and rural places.

	Year of observation	Urban	Rural
		Plural < 0.55	*Plural > 0.55*
N		12,154 (58.95%)	8423 (41.05%)
Rural Index ("PLURAL")[P]	1980	0.418	0.611
Income mobility & marriage outcomes			
Adult household income rank, parents at 25th pctile[P]	2014–15	0.437	0.465
Adult personal income rank, parents at 25th pctile[P]	2014–15	0.443	0.455
Married by age 32%[P]	2014–15	0.503	0.555
Married by age 32% (25th percentile)[P]	2014–15	0.404	0.487
Household composition			
Two-parent HH %[P]	1994–2000	0.768	0.805
Two-parent HH % (25th percentile)[P]	1994–2000	0.516	0.667
Social capital			
Penn State index[C]	1990	0.024	0.372
Economic connectedness (childhood)[C]	2022	0.936	0.791
Volunteering rate[C]	2022	0.074	0.080
Civic organizations[C]	2022	0.016	0.021
Economic			
Poverty rate[P]	1980	10.54	16.54
Median income[P]	1980	56,827	39,175
Unemployment rate	1980	0.068	0.075
Race & Ethnicity			
Share White[P]	1980	0.926	0.925
Share Black[P]	1980	0.063	0.059
Share other non-White[P]	1980	0.011	0.016
Share Hispanic[P]	1980	0.033	0.029

P = place, C = County
Notes: A table showing the means for key variables of interest for rural and urban places. The population of places is split based on those that are above (Rural) or below (Urban) the 0.55 threshold on the rurality index.

subanalyses by sex and race. The 25th percentile of annual income refers to a value of $27,000 and is calculated based on the national household income distribution (Chetty et al., 2018). This baseline income measure is determined based on the mean household income levels of parents over the five years of 1994, 1995, 1998, 1999 and 2000, when most of the individuals under analysis were in their teens.[7] As the children used to generate these variables grew up in low-income households, their adult attainment can be interpreted as a measure of upward income mobility. These estimates are reported separately for males, females, migrants, non-migrants, and for children from White, Black, and Hispanic households, albeit with higher levels of uncertainty than in the combined estimates.

These estimates are made publicly available at the scale of census tracts. As we are studying places, we needed to undertake areal interpolation and dasymetric refinement (Goodchild et al., 1993; Ruther et al., 2015). Using 30-meter resolution maps of the distribution of residential land across the United States from the 1992 National Land-cover Database as an ancillary weighting variable, we reapportioned the estimates of income mobility at the intersection of census tracts and published place boundaries from the National Historical Geographic Information Systems repository (Manson et al., 2017). We generated these tract-to-place weights by multiplying the total children in a census tract, as recorded by Opportunity Insights, by the proportion of that tract's land area that intersects with its surrounding places. In effect, we spatially allocated the children of interest from tracts to places based on overlapping residential land area. From this approach, we could generate reliable population-weighted estimates of income mobility for every place.

3.4. Other explanatory variables

Table 2 lists our other explanatory variables of interest, with further details on the scale and time period of measurement. In terms of spatial

[7] In the original production of these estimates by Chetty et al. (2014), no tax records were available for 1996 or 1997.

units, these variables are measured at the place and county scale, solely based on the childhood locations of the 1978–1983 cohorts. With respect to temporal ordering, we are interested in characteristics of the places in the 1980s and early 1990s, when the individuals from these birth cohorts were still in childhood. By focusing on this period, we minimize the possibility that children's own upward mobility will bias our independent variable of interest, which is a place's level of rurality as inferred from the 1980 PLURAL index.

In terms of family structure, we measure the share of children from the 1978–1983 birth cohorts who grew up in two-parent households. This information is reported in the Opportunity Insights data based on numerous years of observations across the period from 1994 to 2000. We measure these shares based on all observed children in these cohorts, and also just for children in households below the 25th percentile.[8]

Other place-level sociodemographic characteristics are drawn from the 1980 census. These variables include median household income, the poverty and unemployment rate, and the share of the population that is White, Black, other non-White, or Hispanic. We calculate an index of racial diversity based on three racial population shares (White, Black, other non-White), where higher values indicate a more equal size balance across racial groups (Simpson, 1949). These variables capture many of the economic and sociodemographic indicators of relevance to intergenerational mobility.

In order to measure the stock of social capital, we turn to two other data sources. Our first measure is the widely used Penn State Index for the year of 1990 (Rupasingha et al., 2006). The Penn State index is a county-level composite derived from input variables that capture aspects of civic organization, community engagement, political polarization, and business patterns. We rely on the 1990 measure because there is no available 1980 equivalent. For interpretation, counties scoring higher on the Penn State index tend to have higher levels of community cohesion and engagement.

Our second set of social capital variables rely on the recent cutting-edge work of Chetty et al. (2022a), (2022b). These variables are generated from Facebook-derived data on 21 billion friendship ties among individuals who were 25–44 years old in 2022 and Chetty et al. show that they are strongly related to income mobility levels in the 1978–1983 birth cohorts. In this variable set, Chetty et al. prefer the "economic connectedness" variable, which captures the average connectedness of a county's population to persons of above the median in terms of socioeconomic status. This variable thus quantifies the level of friendship connection across class lines.[9] Due to potential concerns around reverse causality between 2022 Facebook ties and intergenerational mobility levels, we rely on a supplementary measure of economic connectedness, which Chetty et al. refer to as "childhood economic connectedness." This derivative measure is based on Facebook friendship ties that were formed during high school and captures the level of homophily within high school friendship networks based on parental socioeconomic status. These measures of homophily are assigned to the counties in which the school is located and not to the counties where the individuals ultimately ended up living in their mid-30s. In addition, we also include the county's volunteering rate and level of civic organization, as inferred from the share of users who are members of online volunteering groups and the proportion of a county's Facebook pages that are related to civic organizations, respectively. Chetty et al. provide an extensive and compelling set of robustness exercises to assuage concerns around reverse causality and selection bias.

We conclude this section by reiterating that we do not possess the original IRS records that were used to generate the exposure weighted tract-level estimates of income mobility. We cannot therefore directly reweigh our independent variables according to the amount of time that children were exposed to different contextual place-level characteristics. Instead, these place and county characteristics should be interpreted as descriptions of the childhood contexts that facilitate upward mobility, rather than as direct measures based on exposure across the life course.

4. Descriptive statistics

Before turning to our formal analyses, we describe the characteristics of urban and rural places, as well as how these community characteristics correlate with income mobility. Table 2 presents statistics on our main variables of interest for places that are above and below the rural threshold of 0.55. The descriptive statistics present a picture that is consistent with our discussion of the literature above. The adult income attainment of children from households at the 25th percentile is higher for rural places than for urban places. Although this is true for both the household and personal income rank measures, the rural advantage is particularly pronounced for household income rank. High household income levels are due, in part, to the relatively high propensity for children from lower income rural backgrounds to be married in adulthood (48.7% for rural; 40.4% for urban).

The descriptive statistics are revealing of how social capital and family structure differ across urban and rural places. Rural places tend to be within counties with higher average values on the Penn State index, implying a stronger local stock of community social capital. Contrastingly, rural places fare less favorably in terms of childhood economic connectedness and are more similar to urban areas in terms of their engagement in volunteering and civic organizations.

In terms of household structure, the differences between rural and urban places are pronounced. For children at the 25th percentile, there

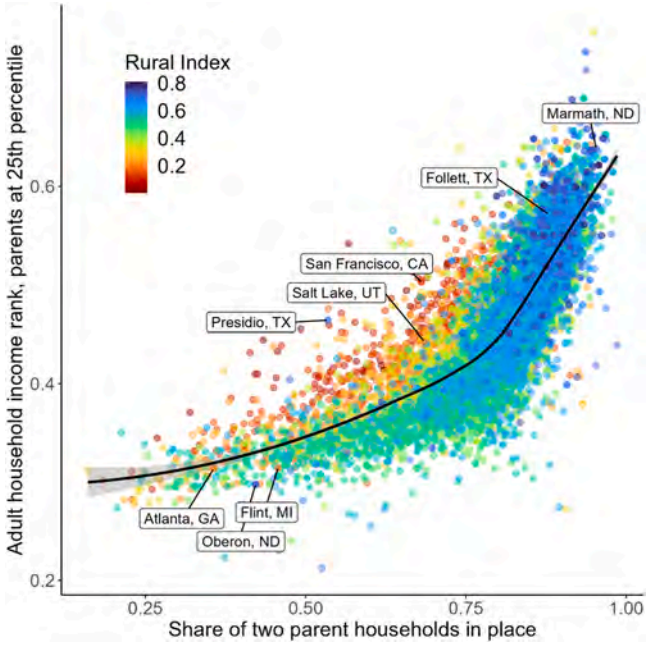

Fig. 2. The share of two-parent households and income mobility by place. Notes: A scatterplot showing the share of two-parent households and the adult household income rank of children born to parents at the 25th percentile across over 20,000 places. We choose four exemplar rural places from North Dakota and Texas (Oberon, Marmath, Presidio, Follett) and three urban places (Atlanta, San Francisco, Salt Lake) to illustrate the range in values.

[8] We interpolate these measures to places from the tract scale exactly as described above.

[9] Economic connectedness ranges from 0 to 2 and captures the over- or under-representation of above median socioeconomic status friends, in an individual's Facebook network. A value of 0.8 means that higher socioeconomic status friends are 20% underrepresented and a value of 1.3 would mean that they are 30% overrepresented. Chetty et al. (2022a), (2022b) calculate this measure as: (number of friends with above median SES/Total number of friends)/0.5

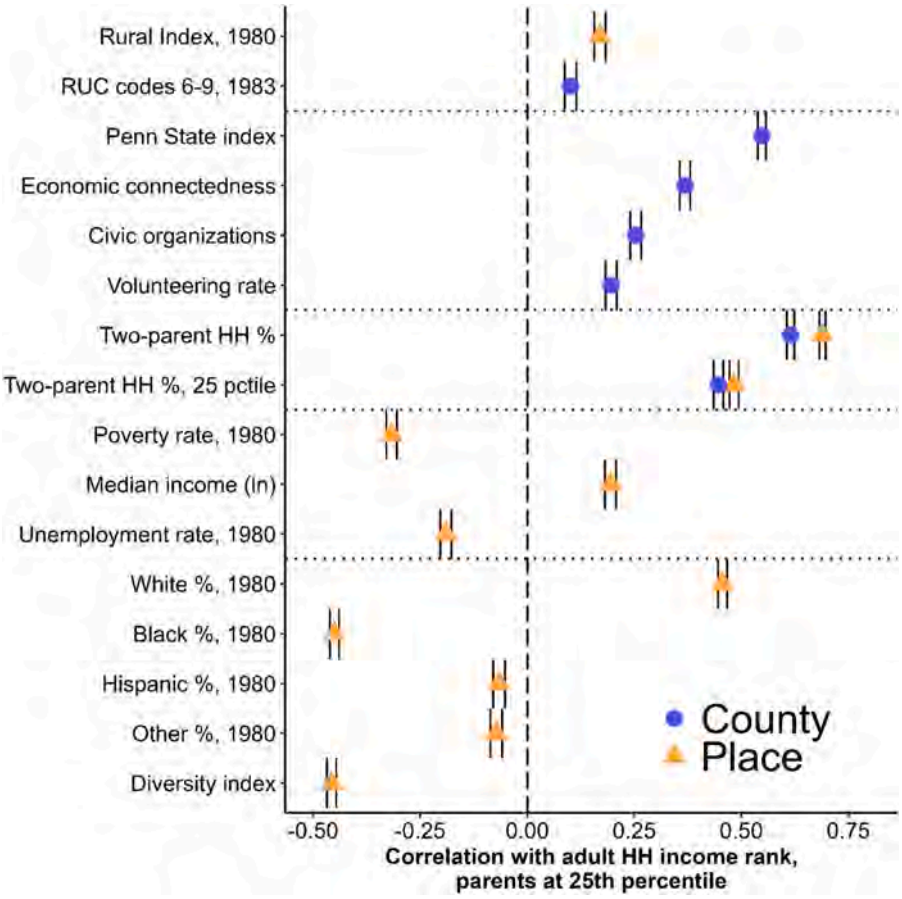

Fig. 3. Correlation of place-level income mobility and other variables of interest. Notes: A plot showing the correlation between income mobility and variables of interest measured at the county (blue) and place (1980) scale.

is almost a 15-percentage point gap between rural and urban places, and around a four-percentage point difference for all children. Descriptively then, rural places are characterized by substantially higher rates of two-parent households but more modest differences in social capital.

We describe the strength of this relationship, visually, in Fig. 2. There is a strong correlation between the upward income mobility level and the share of two-parent households across communities (correlation = 0.69), with rural places being particularly highly represented in the upper-right of the graph. To show that this general relationship is not being driven by coarse differences across the major US regions, we also highlight a set of major cities and smaller rural communities within the same state to demonstrate local variation in these outcomes. Fig. 2 therefore not only demonstrates the link between household structure and income mobility, but also local and regional differences in rurality.

From Table 2, we also note large differences in the social and economic composition of rural and urban communities. Poverty and unemployment rates are higher in rural than in urban areas, and median income levels are approximately 40% higher for urban places. These large economic differences do not strongly track with ethnic or racial composition. The White population share is almost identical between urban and rural places, but rural places have lower Hispanic and Black population shares.

Fig. 3 shows the correlation between our preferred income mobility measure and each of these characteristics, including a reference for whether the characteristics are measured at the scale of the county (blue) or the place (yellow). In terms of rurality, we observe moderate positive correlations between measures of rurality and income mobility. The most positively correlated characteristics with income mobility are the Penn State Index of social capital and the local share of two-parent households. That is, income mobility tends to be higher in places with more two-parent households and higher levels of social capital. By contrast, measures of poverty, unemployment, racial diversity and Black population shares are all associated with lower levels of income attainment for children from lower income backgrounds. These estimates are fully consistent with prior work (Chetty et al., 2022a). In the analyses that follow, our goal is to assess the specific contribution of these characteristics as mediators of the relationship between rurality and intergenerational income mobility.

5. Rurality and income mobility

5.1. Multilevel framework

Our modelling strategy relies on assessing the relationship between income mobility and rurality at the scale of places within a multilevel framework. As prior work underscores the importance of the county context, our estimation strategy also incorporates the nesting of places within counties. We do this by estimating a series of multilevel models (Bates et al., 2016; Gelman & Hill, 2006), which have proven to be an effective tool for examining contextual patterns of inequality and demography (Connor, 2017; Quick & Revington, 2021).

Our main specification takes the following form:

$$Mobility_{ij} = \beta_0 + \beta_1 RURALITY_{ij} + \beta_k PLACEVAR_{ij} + \beta_k COUNTYVAR_j + \mu_{0j} + \epsilon_{ij} \quad (1)$$

where the dependent variables $Mobility_{ij}$ is the mean adult household income rank of children growing up in place i in county j with parents at the 25th percentile of the national income distribution. The main right-

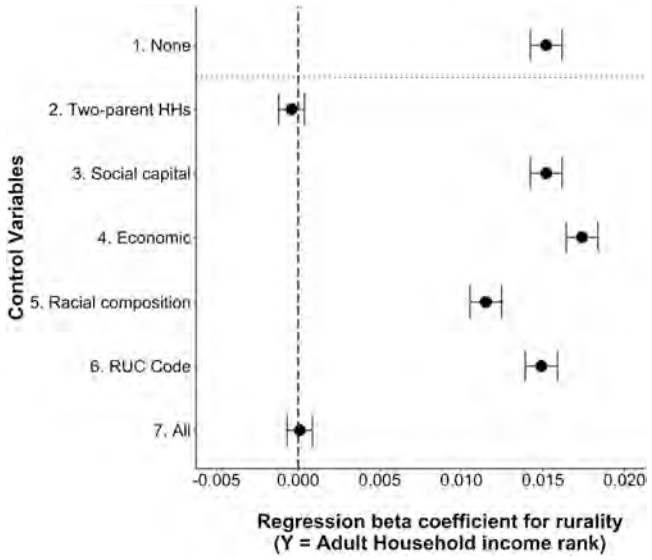

Fig. 4. Estimates from regressions of adult household income rank on rurality, with and without controls. Notes: A figure presenting estimates from seven multilevel models in which the average place-level adult household income ranks of children born to households at the 25th percentile are regressed on various characteristics of childhood places and counties. The key estimate of interest is the effect of rurality, represented by the PLURAL Index of the childhood location. These estimates are based on data from children born in the 1978–1983 birth cohorts, with their parents observed in the early 1990s. The children's economic outcomes were tracked during the 2014–2015 period. The confidence intervals displayed are at the 95% level.

hand side variable at level 1 (*RURALITY*) is the rurality of a place *i* in county *j* based on each place's 1980 value on the PLURAL index. In addition to rurality, we include a set of *k* independent variables of interest, measured either for a place *i* in county *j* (*PLACEVAR*) or just for counties *j* (*COUNTYVAR*). ϵ_{ij} refers to the error term for places, and the county-level intercept is denoted through the disturbance term for county *j* (μ_{0j}) with respect to the grand mean (β_0).

5.2. Main specification

We begin by measuring the place-level rural advantage in income mobility and then attempt to explain it. Fig. 4 presents estimates from seven separate multilevel regression models, where the plotted value represents the standardized regression coefficient for the association between the rural index and income mobility, measured by adult household income rank. The first estimate ("1. None") measures the association between place-level rurality and income mobility after adjusting only for the nesting of places within countries. We then assess the robustness of this coefficient to each of our sets of explanatory variables, and then with all independent variables entering the model together ("7. All"). Our intuition is that any significant attenuation in the regression coefficient for the rural index, after adjusting for confounding variables, will unveil potential underlying sources of the rural advantage in intergenerational mobility.

The first model provides the baseline estimate for the association between rurality and income mobility. A one standard deviation increase in a place's rural index is associated with a 0.015 mean increase in the adult household income rank of children from low-income households. To put this estimate in context, this coefficient is commensurate with nearly a quarter of a standard deviation increase (23%) in adult household income rank. This coefficient thus provides confirmation of the income mobility advantage held by children from rural places.

We then introduce the share of two-parent households as control variables within the multilevel regression model ("2. Two-parent HHs"). The addition of these indicators of childhood household structure entirely attenuates the rurality coefficient, rendering it statistically indistinguishable from zero. The attenuation of the rurality coefficient in this model implies that the two-parent household share of places can account for the entire average difference in income attainment between rural- and urban-origin children from lower income backgrounds, the phenomenon that we have referred to as the rural income mobility advantage.

The remaining control variables are then added to the regression models, first individually, and then jointly with all control variables together. We observe no sizeable attenuation in the regression coefficient for the rurality index after adjusting for county-level social capital, the rural urban continuum codes, and place-level economic and racial composition. These variables therefore account for relatively little of the association between place-level rurality and intergenerational mobility. It is only when we include all control variables simultaneously, including the share of two-parent households, that we observe another significant attenuation in the rurality regression coefficient. This implies that the share of two-parent households plays an outsized role in mediating the relationship between rurality and income mobility.

Before proceeding, we do want to highlight that these variables are not unimportant explanatory variables with respect to intergenerational mobility. In fact, the social capital variables have a level of explanatory power (marginal r-squared value) that is comparable to the two-parent household share. This suggests that while the social capital variables can explain a significant portion of the overall variation in intergenerational

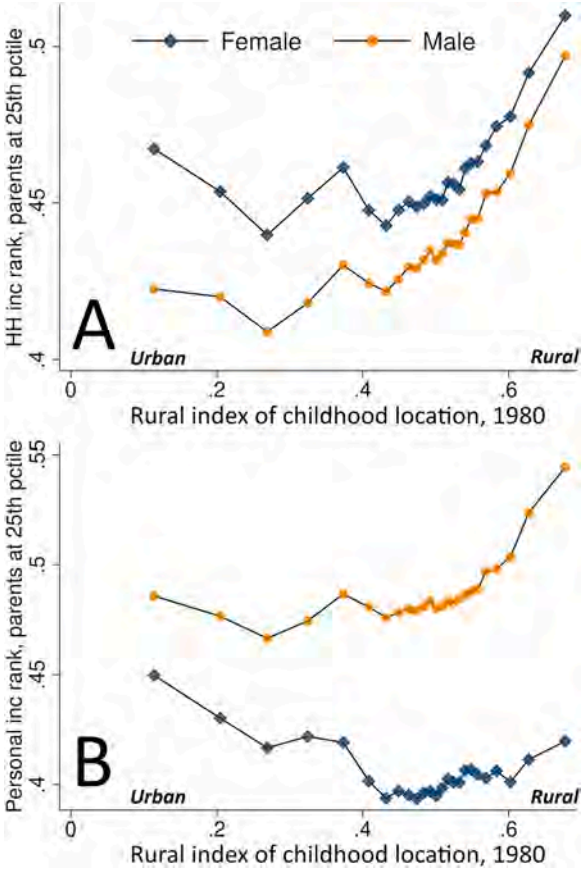

Fig. 5. Binned estimates of adult household income and personal income rank by sex and place-level rurality. Notes: Two binned scatter plots showing the association between household and personal income rank in 2014–2015 for males and females that grew up in households at the 25th percentile. Estimates are conditional on the four census regions. The binned scatter plots created using the algorithms of Stepner (2013).

mobility across places, they do not account for the differences in outcomes between rural and urban childhood locations.

In summary, these analyses confirm a robust connection between rurality and income mobility, while also highlighting the significance of local household structure in explaining these relationships. In Table Appendix 1 and Appendix 2, we undertake further tests to determine if the impact of household structure on income is influenced by a place's level of rurality. To do so, we divide places into five equally sized quantile cells based on their PLURAL index scores and then introduce interactions between these cells and the place's two-parent household share within our regression framework. Compared to places elsewhere along the rural-urban continuum, we observe that the most rural communities display the most pronounced effects of two-parent household shares on income mobility. This phenomenon may be attributed to the magnified impact of early-life household conditions in settings where human capital plays a crucial role in overcoming limited local economic opportunities (e.g., due to rural brain drain).

5.3. Sex-based differences

Do boys and girls from rural places equally benefit from enhanced intergenerational mobility? This remains uncertain, given the body of evidence highlighting the role of urban areas in promoting women's empowerment in the labor market and in childbearing decisions (Connor, 2021; Evans, 2018; Scarborough & Sin, 2020). Furthermore, recent research demonstrates that frontier regions in the United States have nurtured distinct and enduring norms associated with reduced female employment and increased time allocated to household work (Bazzi et al., 2023). Therefore, it is plausible that the relationship between rurality and intergenerational mobility may also vary by sex.

We begin by presenting binned scatter plots illustrating income differences for males (yellow) and females (blue) from lower income households, categorized by the rurality of their childhood locations (Fig. 5). Since our focus here is on sex-based differences, we provide intergenerational mobility estimates based on household income (A) and personal income (B) attainment. **Panel A** of Fig. 5 shows higher household income attainment for females compared to males across all levels of rurality. However, this pattern can partly be attributed to the earlier ages at marriage of females and the inclusion of their spouses' income in the calculation of total household income. While household income attainment is a more relevant measure for overall economic wellbeing, we also include the personal income attainment measure to distinguish women's specific income achievements in the labor market from those of their cohabiting spouses.

The estimates in **Panel A** align closely with our finding of a general advantage among children from lower income rural households. Both males and females similarly exhibit higher levels of household income attainment relative to their urban counterparts. The disparities based on origin location are most pronounced for males of urban origin, who face significant disadvantages compared to both males from rural places and females from urban places. In contrast, males and females from rural places exhibit a high degree of similarity in their outcomes. It is therefore noteworthy that males from low-income urban backgrounds exhibit the poorest levels of household income attainment relative to their counterparts from all other settings.

Patterns of sex-based differences in personal income attainment (Panel B) sharply contrast from those for household income attainment. Firstly, males consistently achieve higher average levels of personal income attainment than females across all childhood contexts along the rural to urban continuum. This general reversal in attainment for males and females across the two income variables can be directly attributed to marital behavior and its effects on different income measures. Women are significantly more likely to be married by the time they are observed in our data and this contributes to their higher household income levels. Conversely, personal income levels are higher on average for men than for women. Secondly, while the largest sex-based disparities in *household*

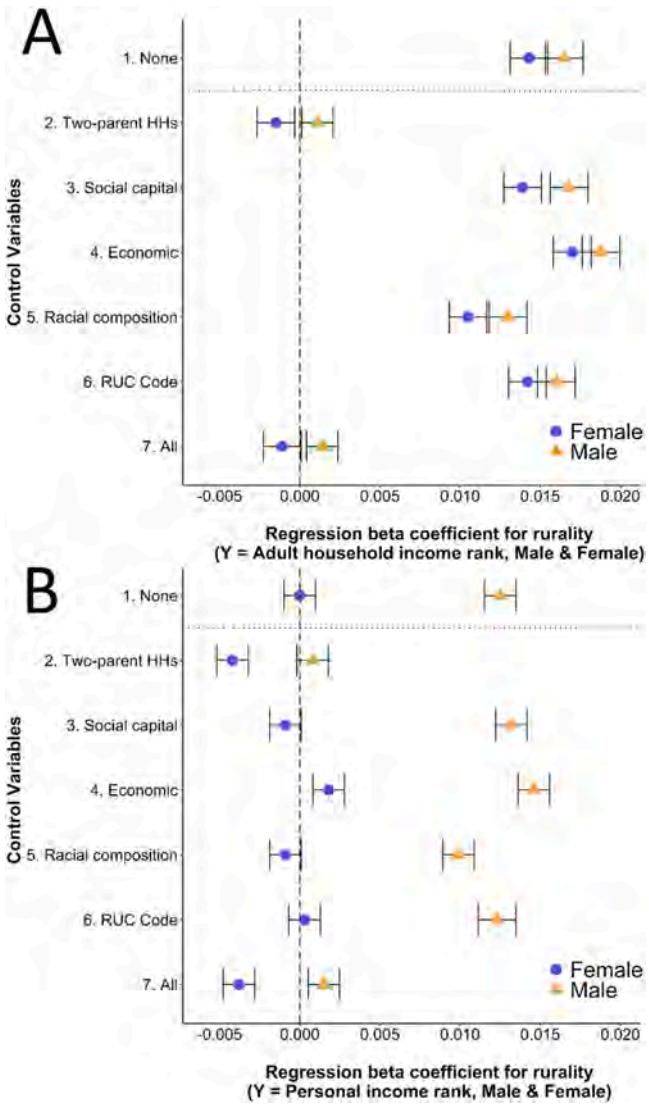

Fig. 6. Estimates from regressions of adult household income and personal income rank on rurality by sex, with and without controls. Notes: Two figures presenting estimates from 14 multilevel models in which the average place-level adult household income and personal ranks of children born to households at the 25th percentile are regressed on various characteristics of childhood places and counties. Estimates are presented separately for males and females. The key estimate of interest is the effect of rurality, represented by the PLURAL Index of the childhood location. These estimates are based on data from children born in the 1978–1983 birth cohorts, with their parents observed in the early 1990s. The children's economic outcomes were tracked during the 2014–2015 period. The confidence intervals displayed are at the 95% level.

income attainment were observed in urban areas, the most significant *personal* income disparities are found in rural areas, where the average personal income levels of females are markedly lower than those of males. Moreover, females from poorer households tend to achieve lower levels of income attainment when they grow up in rural areas as compared to urban areas, indicating an overall rural *disadvantage* in personal income attainment. From this perspective, it is evident that the rural advantage in intergenerational mobility is primarily driven by the labor market outcomes of men.

In Fig. 6, we consider the determinants of attainment for males and females of rural origin. **Panel A** begins by examining the rural advantage by sex with respect to household income attainment. Males and females from lower income backgrounds exhibit a similarly positive relationship between the rurality of their childhood locations and their household

income attainment as adults ("1. None"). After adjusting for the share of two-parent households in the childhood places, this advantage tends toward zero for males and turns slightly negative for females. As above, the remaining variables account for only minor shares of the association between rurality and income attainment for males or females. For household income attainment, at least, the relationship between rurality and intergenerational mobility are largely consistent by sex.

Panel B presents a much more discrepant story for the sex-based differences in personal income attainment. The male relationships closely track what we have already seen for household income attainment: a strong positive association between childhood rurality and attainment, that is entirely attenuated by adjusting for the share of two-parent households in the origin community. Female personal income attainment, however, presents very differently. In the baseline model for females, there is no significant relationship between childhood rurality and personal income attainment. After adjusting for the two-parent household share of childhood locations, the rurality relationship turns negative. This finding persists after adjusting for all other control variables in the final model. The estimates in Panel B therefore suggest that females may, in fact, be disadvantaged by their rural childhoods, as inferred from their adult *personal* income attainment.

What forces could account for the contrasting outcomes of males and females with respect to childhood rurality? To gain further insight on these issues, we present details in the appendix on a range of other personal outcomes that may be linked to income levels (incarceration, teen pregnancy, age at marriage) for males and females from lower income backgrounds (Table Appendix 3 and Appendix 4). These additional measures provide some insight as to mediating factors that link exposure to rural contexts to sex-based disparities in income attainment later in life.

Firstly, we observe robust associations between age at marriage and household income attainment for males and females. Later marriage is strongly associated with higher household income levels, while earlier ages at marriage exhibit a negative correlation with this metric. The higher marriage rates among rural children, particularly girls, account for much of the link between growing up in a place with more two-parent households and later household income levels. Our models indicate that intergenerational marriage patterns account for approximately 46% of the relationship between two parent household shares and household income attainment for females, and 34% of this relationship for males. As economic and marriage outcomes are jointly determined, these estimates should be taken only as an indication of the potential importance of the intergenerational transmission of marital behavior for intergenerational income mobility.

While marital behaviors help to explain the high household income attainment of females, they do not account for the divergent *personal* income differences by sex across rural and urban places. Turning to further statistics on males in Table Appendix 3, we observe that rurality and two-parent households shares are predictive of marriage in adulthood, higher personal incomes, and lower rates of incarceration. One plausible explanation for these patterns is that boys from lower income backgrounds tend to fare particularly poorly when growing up in mother-only households that are economically insecure (Autor & Wasserman, 2013), which occurs more often in urban communities. In contrast, rural females tend to marry and have children at younger ages and exhibit lower levels of personal income, patterns which are consistent with the greater presence of traditional gender roles and domesticity in rural communities.

These statistics therefore suggest two distinctive interpretations as to the sex-differentiating features of the rural advantage in intergenerational mobility. On the one hand, males do not fare as well in contexts where there is greater household instability, as is the case in many lower income urban communities. On the flip side, communities that tend to exhibit greater household stability often tend to be characterized by more traditional gender roles, thereby constraining the economic prospects of girls. Given the growing urbanicity of the US population, these dynamics may provide additional insight on why, over recent decades, boys appear to be faring increasingly poorly relative to girls across a range of indicators (see Reeves, 2022).

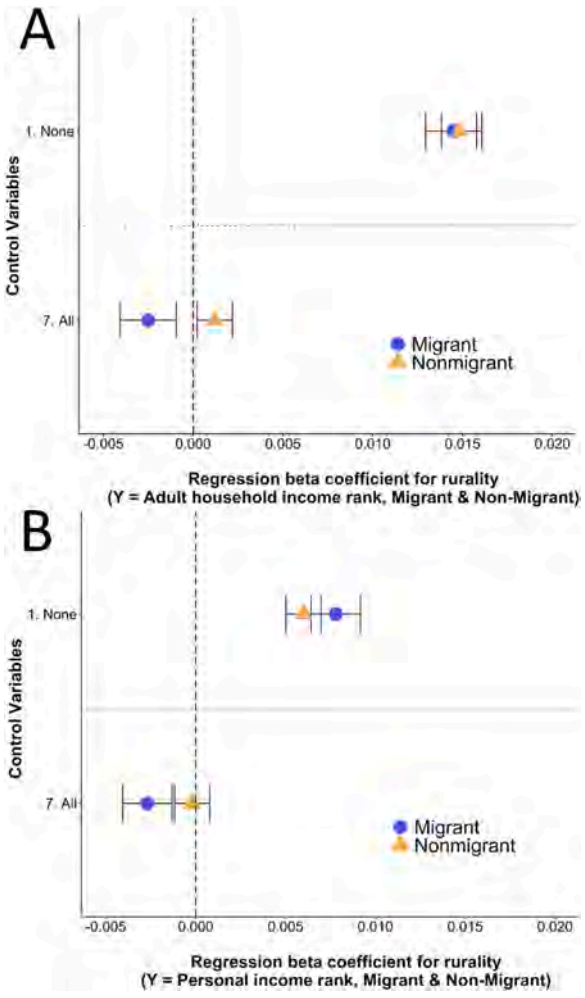

Fig. 7. Estimates from regressions of adult household income and personal income rank on rurality by migrant status, with and without controls. Notes: Two figures presenting estimates from four multilevel models in which the average place-level adult household income and personal ranks of children born to households at the 25th percentile are regressed on various characteristics of childhood places and counties. Estimates are presented separately for migrants and non-migrants, as inferred from whether they live in their childhood commuting zones. The key estimate of interest is the effect of rurality, represented by the PLURAL Index of childhood locations. These estimates are based on data from children born in the 1978–1983 birth cohorts, with their parents observed in the early 1990s. The children's economic outcomes were tracked during the 2014–2015 period. The confidence intervals displayed are at the 95% level.

5.4. *Outmigration and rural "brain drain"*

Given well documented patterns of rural "brain drain" (Carr & Kefalas, 2009), one potential concern is that the differences between children from rural and urban places could be the result of high rates of selective outmigration from rural communities to wealthier towns and cities. In this view, rural children from lower income backgrounds may feel a greater 'push' to move in search of economic opportunity, whereas their urban counterparts become 'stuck in place' (Sharkey, 2013). This hypothesis can be assessed by testing whether the positive link between childhood rurality and income mobility holds only for individuals who ultimately ended up living outside of their home communities.

We explore this possibility in Fig. 7 by conducting separate analyses for individuals who remained in their home regions and those who moved away. To simplify these figures, we only include estimates from the baseline model and the final model. Among both migrants and non-migrants, we observe a very similar relationship between childhood rurality and income attainment for those who stayed in their home locations and those who moved away. Regarding average income attainment differences, migrants are more upwardly mobile than non-migrants on average, but the estimated impact of growing up in a rural location is similar between the two groups. Furthermore, we find that controls for the characteristics of childhood locations (i.e., two-parent household shares) similarly attenuate the rurality coefficient. The consistency of these relationships among migrants and non-migrants indicate that the source of the rural advantage is rooted more in the childhood and adolescent contexts faced by individuals rather than the labor markets in which they ultimately work.

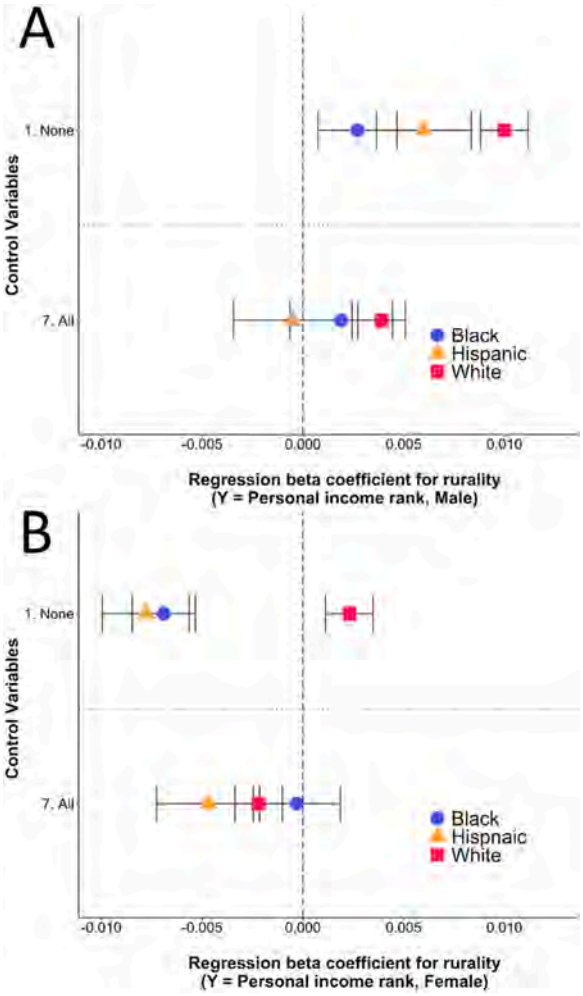

Fig. 8. Estimates from regressions of adult household income and personal income rank on rurality by race and sex, with and without controls. Notes: Two figures presenting estimates from four multilevel models in which the average place-level adult household income and personal ranks of children born to households at the 25th percentile are regressed on various characteristics of childhood places and counties. Estimates are presented separately by sex for children from Black, White, and Hispanic households. The key estimate of interest is the effect of rurality, represented by the PLURAL Index of childhood locations. These estimates are based on data from children born in the 1978–1983 birth cohorts, with their parents observed in the early 1990 s. The children's economic outcomes were tracked during the 2014–2015 period. The confidence intervals displayed are at the 95% level.

5.5. Race and ethnicity

This section of the analysis concludes with an examination of whether these sex-based differences vary by race and ethnicity. We do this to address possible concerns that our findings are being driven by variability in the outcomes of boys and girls of different racial backgrounds. For example, it may be the case that rural contexts with high shares of two-parent households are disproritonately White as compared to either rural communities with more single-parent households or to lower income urban communities. If this is the case, the positive income effects that we have documented could, in fact, mainly be a reflection of underlying racial disparities in intergenerational mobility. A related motivation for examining these relationships is to assess whether they generally persist irrespective of race. If they do, they could provide valuable insights for discussions of the role of racial biases and human capital development as determinants of both intergenerational mobility and racial inequality (e.g., Loury, 2019).

Panel A of Fig. 8 plots the adult personal income attainment for White, Black, and Hispanic males from lower income households. We again restrict ourselves to personal income attainment to avoid conflating our findings with differences in marital behavior. For readability, we restrict our estimates to the baseline model with no controls and the final model with all controls. There is notable variation in the baseline association among males, with Whites exhibiting the largest economic benefits to a rural childhood, and smaller income gains noted for Hispanics and Blacks. After adjusting for the control variables, we observe a similarly sharp attenuation for all three groups. The final model reveals a small residual positive association for rurality among White males, and no association for Black and Hispanic males.

Panel B assesses the same relationships for females. In this case, White females exhibit a small personal income advantage to growing up in a more rural place, while Black and Hispanic females exhibit large disadvantages. The rural advantage held by White females is less than a quarter of the size of that exhibited by males. After adjusting for the control variables, the White female advantage turns negative, and the disadvantage exhibited by Black and Hispanic females attenuates toward zero. These two sets of estimates are consistent with the more general patterns observed above: rural childhoods tend to be associated higher levels of personal income attainment for boys, irrespective of race, but also lower levels of attainment for girls.

These within-group estimates by race and sex reveal several crucial insights. While the relationship between a rural upbringing and personal income attainment exhbitis variability, our findings are generally consistent by sex and race. For children from White, Black, and Hispanic households, growing up in a rural environment is predictive of greater income attainment among males. However, for females, these associations tend to be more modest, and for Black and Hispanic females, even negative. Furthermore, the rural advantage in intergeneraitonal mobility is most pronounced in the comparison of low-income rural and urban Whites, providing little support for intuition that the rural advantage is just an artefact of racial compositional differences across lower income communities.

6. Spatial heterogeneity

This section explores the presense of spatial variation in the association between rurality and intergenerational mobility. The hypothesis for spatially-varying associations between intergenerational mobility and rurality is plausible given recent county-level evidence that regional norms and historical experiences have long-term effects on intergenerational mobility (Berger & Engzell, 2019; Connor & Storper, 2020; Leonard & Smith, 2021), and also the growing literature on the impact of state policy contexts on childhood development and social stratification processes (Bischoff & Owens, 2019; Jackson & Schneider, 2022). We test for these relationships across two separate specifications that allows places to have different intercepts and slopes for rurality with

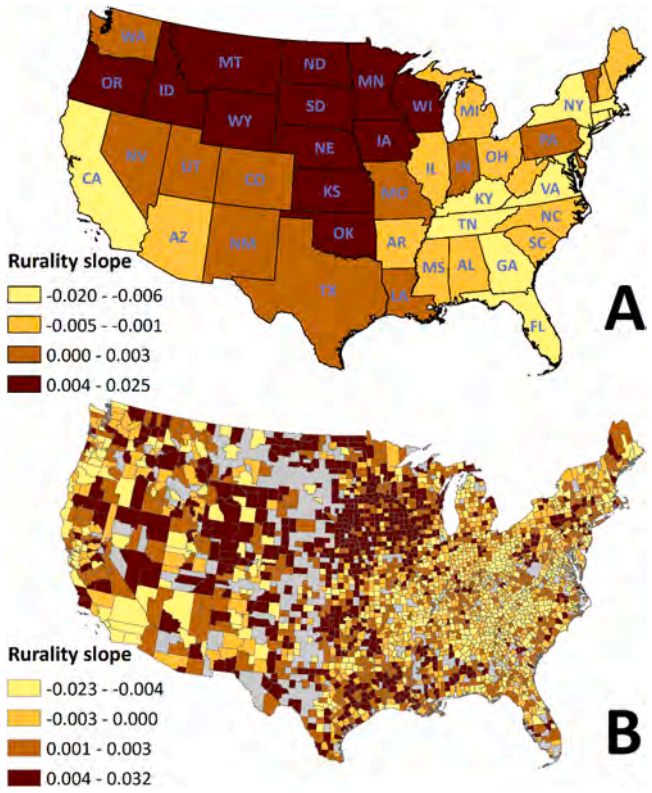

Fig. 9. Variation in rurality and income mobility across states and counties. Notes: A Figure showing two maps of the random slopes extract from two separate multilevel models. Panel A shows the estimates from a multilevel model where level 1 represents places and level 2 represents states. Panel B shows the estimates from a multilevel model where level 1 represents places and level 2 represents counties. Gray areas are omitted due to sparse data. Legend breaks are assigned based on quantile bins.

respect to income mobility, across states in the first specification, and across counties in the second. This random intercepts and random slopes model is specified as:

$$Mobility_{ij} = \beta_0 + \beta_1 RURAL_{ij} + \mu_{1j} RURAL_{ij} + \beta_k X_{ij} + \beta_k X_j + \mu_{0j} + \epsilon_{ij} \quad (2)$$

where the model includes a term for the average association of the rural index with the adult household income rank of children born to lower income parents ($\beta_1 RURAL_{ij}$) and also a county- or state-specific slope, which is referenced through the disturbance term ($\mu_{1j} RURAL_{ij}$). This disturbance term extends our model by estimating separate associations between place-level rurality and income mobility for every county and state. These models adjust for all independent variables of interest. The random effects for counties and states thus capture residual variation for these spatial units, which is not otherwise accounted for by our set of control variables.

This statistical framework allows us to examine *where* exactly in United States childhood rurality enhances prospects for intergenerational mobility, above and beyond the control variables described above. We present these contextual estimates across two maps in Fig. 9, where **Panel A** shows the state-specific estimates and **Panel B** shows the county-specific estimates. County and state contexts that are associated with higher levels of intergenerational mobility are denoted in brown. As the patterns are largely consistent across the two spatial scales, we interpret the two maps together.

Fig. 9 reveals a strong regional geography underlying the national-level association between rurality and intergenerational mobility. Rural contexts in the Great Plains and Pacific Northwest are strongly positively associated with intergenerational mobility. This means that the children growing up in rural places within these states and counties have tended to fare well relative to the national average, even after accounting for observable place-level characteristics. The positive outcome for these regions strongly contrasts with several Southern states (e.g., Georgia, Tennessee), New York, and California, where rurality is associated with lower levels of adult income attainment. These negative estimates imply a prevailing disadvantage in intergenerational mobility across the rural communities of these regions.

What might be the source of these regional patterns? As noted, Connor and Storper (2020) proposed two influences that can account for differences in long-term intergenerational mobility trajectories across regions: uneven regional impacts associated with structural economic change (e.g., exposure to automation) and deeper sociocultural roots, linked to long-term population processes that produce differences in local norms and community resources. Support for these hypotheses is provided by the close coherence between the patterns shown in Fig. 9 and recent studies that map the exposure of urban and rural regions to automation (e.g., Berger & Engzell, 2022). Moreover, we find a correlation of +0.33 between the county-level two-parent household share and the random effects shown in **Panel B**. In combination, these observations provide support for the two proposed paths through which regional trajectories act on intergenerational mobility: local contextual effects that are rooted in the underlying exposure of regions to industrial automation and deeper sociocultural processes that may influence developmental conditions in families and communities. This exploratory spatial analysis therefore suggests that the rural advantage in income mobility may be productively situated within the historical trajectories of regions and places.

7. Discussion & Conclusion

This study has investigated why Americans from poorer backgrounds tend to reach higher income levels as adults when they grow up in rural places than in more economically dynamic urban areas. This paradox has previously been observed through comparisons of counties that differ in their size and remoteness, but it had yet to be verified at the scale of rural places nor explained with sufficient detail. Using a newly constructed database on the average income mobility levels of children from the 1978–1983 birth cohorts from over 20,000 places, we investigate the nature of this relationship and its underlying drivers and deviations. From our baseline estimates, we estimate that a one standard deviation increase in the rurality of a childhood community is associated with a quarter of a standard deviation increase in adult household income attainment. Our first contribution is thus to confirm the presence of the rural advantage in intergenerational mobility at the place scale.

We then turn our attention to the sources of this rural advantage, revealing notable insights and caveats. First, the local share of a community's children who were raised in two-parent households can account for almost all of the variation between urban and rural places in terms of household income mobility. Rural children from poorer backgrounds are more likely than their urban counterparts to grow up with both parents present in the household. Where this is the case, these childhood circumstances are predictive of higher average levels of adult household income attainment. Given the importance of household income levels as an indicator of economic wellbeing, our work supports the view that differences in household structure are playing an important role in shaping the landscape of poverty, inequality, and intergenerational mobility.

Our second related insight regards the role of sex-based differences in the rural income mobility advantage. Although we find little variation in terms of *household* income attainment for males and females, we find a highly divergent pattern with respect to *personal* income attainment. High levels of income attainment among children from poorer rural backgrounds is driven exclusively by the outcomes of males growing up in rural communities with high shares of two-parent households. Males from rural places are also more likely to be married and less likely to be

incarcerated as adults. This finding is consistent with earlier studies which show that males tend to fare particularly poorly across a range of social indicators when growing up in single-parent headed households that are economically insecure (Autor & Wasserman, 2013; Bertrand & Pan, 2013). By extension, these patterns may be part of the explanation for why many boys appear to be struggling in our increasingly urban society (see also Reeves, 2022).

Rural girls on the other hand exhibit a very different pattern with respect to their urban counterparts. While we do document that females also benefit from growing up in a rural place in terms of their *household* income levels, we observe no such relationship in terms of *personal* incomes. In fact, we observe a pattern that is more consistent with a rural disadvantage. Girls growing up in rural places exhibit lower levels of personal income, higher rates of teen pregnancy, and earlier ages at marriage. These findings are consistent with the greater prevalence of traditional gender norms across rural communities, particularly those with more conservative, male-breadwinning traditions and religious beliefs (Bazzi et al., 2023; Scarborough & Sin, 2020). Of course, the tendencies described here are not meant to apply to every rural community, nor do they offer a comprehensive portrayal of life in any particular rural place.

Third, we show that these rural income mobility patterns hold irrespective of race. The rural advantage is largest among Whites and Hispanics and smaller for children who grew up in Black households, indicating that these patterns are *not* driven exclusively by differences in the racial composition of communities. The rural advantage also tends to be largest in Whiter regions of the country, particularly across the Great Plains, upper Midwest and the Pacific Northwest. Nonetheless, sex-based differences in personal income attainment hold irrespective of race or region of residence (see also Figure Appendix Fig. 1).

To summarize, our results broadly support the finding that the "fraction of children living in single-parent households is the single strongest correlate of upward income mobility" (Chetty et al., 2014, p. 1616). As revealed by the Fragile Families and Child Wellbeing Study, family instability can have powerful effects on the physical, emotional, and cognitive development of children from urban households (James et al., 2021). We extend on these findings by documenting that the same processes may be a central explanation of the relatively high rate of intergenerational mobility among rural-dwelling children, particularly boys. As a consequence, our results suggest that access to economic opportunity, which is overwhelming concentrated in cities, should not be given excessive weight in explaining patterns of intergenerational inequality. Our analysis rebuts common wisdom that high levels of rural attainment are mainly an artefact of the greater tendency for rural youth to move to high-opportunity urban areas. Rural outmigration is certainly an important decision with respect to income attainment, but it is only part of the story. Family and community interactions during childhood should thus take precedence over simply how far one lives from a town or city.

Finally, our analysis advances theory on the contributions of context to inequality at various spatial scales. Urban industrialization has long been known to accelerate rates of intergenerational mobility. We have shown that rural America, or at least substantial areas of it, have fared well on this metric in the post-industrial era. This could be because smaller places are more conducive to social integration and supportive family conditions, which are particularly valuable for educational attainment and adult economic performance. At the same time, however, we have shown that this claim does not accurately characterize the experiences and outcomes of girls exposed to rural places. Our work thus calls for continued investigation into the divergent effects of local contexts on life chances across different populations.

Declaration of Competing Interest

None to declare.

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Appendix 1

Appendix Table 1
Regression models of income mobility on rurality, interactions between rurality and household composition.

	Adult household income rank, parents at 25th percentile		
	(1)	(2)	(3)
Constant	0.4153***	0.1774***	0.1793***
	(0.0015)	(0.0023)	(0.0031)
Rural index quantiles[P]			
Ref = Quantile 1 (most urban)			
Quantile 2	0.0152***	-0.0064***	-0.0127*
	(0.0011)	(0.0009)	(0.0057)
Quantile 3	0.0176***	-0.0063***	0.0110*
	(0.0013)	(0.0010)	(0.0056)
Quantile 4	0.0252***	-0.0005	0.0117*
	(0.0014)	(0.0011)	(0.0053)
Quantile 5 (most rural)	0.0453***	0.0109***	-0.0538***
	(0.0016)	(0.0013)	(0.0068)
Two-parent HH %[P]		0.3377***	0.3345***
		(0.0029)	(0.0041)
Interaction terms			
Quantile 2 x Two-parent HH %			0.0080
			(0.0073)

(*continued on next page*)

Appendix Table 1 (*continued*)

	Adult household income rank, parents at 25th percentile		
Quantile 3 x Two-parent HH %			-0.0220**
			(0.0072)
Quantile 4 x Two-parent HH %			-0.0153*
			(0.0068)
Quantile 5 x Two-parent HH %			0.0800***
			(0.0084)
Observations	20193	20193	20193
Marginal R^2	0.046	0.395	0.409

* p < 0.05 ** p < 0.01 *** p < 0.001

Notes: A table showing the results of 3 multilevel models where the adult household income ranks of children born to households at the 25th percentile are regressed on the characteristics of children's places and counties. The estimates are based on children from the 1978–1983 birth cohorts, whose parents were observed in the early 1990s. The children's economic outcomes were observed over the 2014–2015 period. The models in this table replicate Model 1 of Table 3, but where we substitute the continuous measure of rurality into five separate bins according to the PLURAL index. These equally sized bins are delineated as follows: Quantile 1 (PLURAL = 0.00–0.38); Quantile 2 (PLURAL = 0.39 – 0.47); Quantile 3 (PLURAL = 0.48 – 0.52); Quantile 4 (PLURAL = 0.52 – 0.56); Quantile 5 (PLURAL = 0.57 – 0.81).

Appendix Table 2
Regression models of income mobility on rurality, interactions between rurality and household composition.

	Adult personal income rank, parents at 25th percentile		
	(1)	(2)	(3)
Constant	0.4299 * **	0.2920 * **	0.2873 * **
	(0.0012)	(0.0021)	(0.0029)
Rural index quantiles[P]			
Ref = Quantile 1 (most urban)			
Quantile 2	0.0047 * **	-0.0078 * **	-0.0146 * *
	(0.0009)	(0.0008)	(0.0053)
Quantile 3	0.0042 * **	-0.0096 * **	0.0214 * **
	(0.0010)	(0.0009)	(0.0052)
Quantile 4	0.0090 * **	-0.0058 * **	0.0218 * **
	(0.0011)	(0.0010)	(0.0049)
Quantile 5 (most rural)	0.0227 * **	0.0023	-0.0337 * **
	(0.0013)	(0.0012)	(0.0062)
Two-parent HH %[P]		0.1958 * **	0.2018 * **
		(0.0027)	(0.0038)
Interaction terms			
Quantile 2 x Two-parent HH %			0.0078
			(0.0067)
Quantile 3 x Two-parent HH %			-0.0403 * **
			(0.0066)
Quantile 4 x Two-parent HH %			-0.0358 * **
			(0.0063)
Quantile 5 x Two-parent HH %			0.0435 * **
			(0.0077)
Observations	20,193	20,193	20,193
Marginal R^2	0.022	0.205	0.209

* p < 0.05 * * p < 0.01 * ** p < 0.001

Notes: A table showing the results of 3 multilevel models where the adult personal income ranks of children born to households at the 25th percentile are regressed on the characteristics of children's places and counties. The estimates are based on children from the 1978–1983 birth cohorts, whose parents were observed in the early 1990s. The children's economic outcomes were observed over the 2014–2015 period. The models in this table replicate Model 1 of Table 3, but where we substitute the continuous measure of rurality into five separate bins according to the PLURAL index. These equally sized bins are delineated as follows: Quantile 1 (PLURAL = 0.00–0.38); Quantile 2 (PLURAL = 0.39 – 0.47); Quantile 3 (PLURAL = 0.48 – 0.52); Quantile 4 (PLURAL = 0.52 – 0.56); Quantile 5 (PLURAL = 0.57 – 0.81).

Appendix Table 3
Estimates from models of additional intergenerational outcomes for males regressed on measures of rurality, marriage, and household structure.

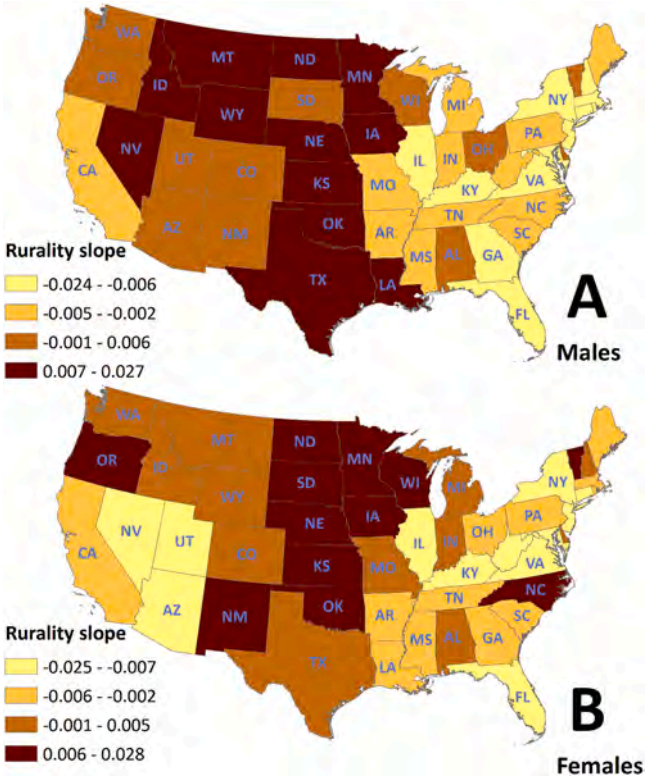
	Household income rank, 2014–2015			personal income rank, 2014–2015	Incarcerated, 2010	Married by age 26	Married by age 32
(Intercept)	0.4268 ***	0.4334 ***	0.4330 ***	0.4838 ***	0.0340 ***	0.2991 ***	0.4019 ***
	(0.0011)	(0.0009)	(0.0009)	(0.0009)	(0.0004)	(0.0013)	(0.0012)
Rural Index	0.0165 ***	0.0024 ***	0.0010 *	0.0016 **	-0.0018 ***	0.0204 ***	0.0226 ***
	(0.0006)	(0.0005)	(0.0005)	(0.0005)	(0.0003)	(0.0008)	(0.0009)
Two-parent HHs		0.0375 ***	0.0246 ***	0.0287 ***	-0.0127 ***	0.0304 ***	0.0523 ***
		(0.0004)	(0.0004)	(0.0004)	(0.0003)	(0.0006)	(0.0007)
Married by age 26			-0.0060 ***				
			(0.0005)				
Married by age 32			0.0361 ***				
			(0.0004)				
Observations	20176	20176	20176	20176	20160	20176	20176
Marg R-Sq.	0.051	0.317	0.519	0.213	0.163	0.183	0.328

Notes: A table showing the results of 7 multilevel models where the adult household and personal income ranks and the incarceration and marriage rates of children born to households at the 25th percentile are regressed on the characteristics of children's places and counties. The estimates are based on children from the 1978–1983 birth cohorts, whose parents were observed in the early 1990 s. The children's economic outcomes were observed over the 2014–2015 period.

Appendix Table 4
Estimates from models of additional intergenerational outcomes for females regressed on measures of rurality, marriage, and household structure.

	Household income rank, 2014–2015			personal income rank, 2014–2015	Teen birth	Married by age 26	Married by age 32
(Intercept)	0.4458 ***	0.4529 ***	0.4530 ***	0.3986 ***	0.2608 ***	0.3871 ***	0.4607 ***
	(0.0012)	(0.0009)	(0.0007)	(0.0008)	(0.0012)	(0.0014)	(0.0012)
Rural Index	0.0143 ***	-0.0009	-0.0043 ***	-0.0059 ***	0.0055 ***	0.0237 ***	0.0180 ***
	(0.0006)	(0.0005)	(0.0004)	(0.0005)	(0.0008)	(0.0009)	(0.0009)
Two-parent HHs		0.0403 ***	0.0217 ***	0.0154 ***	-0.0639 ***	0.0496 ***	0.0725 ***
		(0.0004)	(0.0004)	(0.0004)	(0.0006)	(0.0007)	(0.0007)
Married by age 26			-0.0088 ***				
			(0.0005)				
Married by age 32			0.0416 ***				
			(0.0005)				
Observations	20178	20178	20178	20178	20178	20178	20178
Marg R-Sq.	0.037	0.331	0.335	0.071	0.376	0.291	0.440

Notes: A table showing the results of 7 multilevel models where the adult household and personal income ranks and the incarceration and marriage rates of children born to households at the 25th percentile are regressed on the characteristics of children's places and counties. The estimates are based on children from the 1978–1983 birth cohorts, whose parents were observed in the early 1990 s. The children's economic outcomes were observed over the 2014–2015 period.



Appendix Figure 1. Variation in rurality and income mobility across states. Notes: A Figure showing two maps of the random slopes extracted from two separate multilevel models. Panel A shows the estimates from a multilevel model where level 1 represents places and level 2 represents states and the outcome is the adult household income rank of Males. Panel B shows the estimates from a multilevel model where level 1 represents places and level 2 represents states and the outcome is the adult household income rank of Females. Gray areas are omitted due to sparse data. Legend breaks are assigned based on quantile bins.

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