Who gets left behind by left behind places?

Dylan S. Connor* Arizona State University[1]

Aleksander K Berg Arizona State University[1]

Tom Kemeny University of Toronto[2]

Peter J. Kedron Arizona State University[1]

Forthcoming at the Cambridge Journal of Regions, Economy and Society

We document that children growing up in places left behind by today's economy experience lower levels of social mobility as adults. Using a longitudinal database that tracks over 20,000 places in the United States from 1980 to 2018, we identify two kinds of left behind places: the 'long-term left behind' that have struggled over long periods of history; and 'recently left-behind' places where conditions have deteriorated. Compared to children of similar baseline household income levels, we find that exposure to left behind places is associated with a 4-percentile reduction in adult income rank. Children fare considerably better when exposed to places where conditions are improving. These outcomes vary across prominent social and spatial categories, and are compounded when nearby places are also experiencing hardship. Based on these findings, we argue that left behind places are having "scarring effects" on children that could manifest long into the future, exacerbating the intergenerational challenges faced by low-income households and communities. Improvements in local economic conditions and outmigration to more prosperous places are, therefore, unlikely to be full remedies for the problems created by left behind places.

*Corresponding author: d.c@asu.edu

[1] Spatial Analysis Research Center (SPARC) and the School of Geographical Sciences and Urban Planning, Lattie F. Coor Hall, 975 S Myrtle Ave, Tempe, AZ 85281

[2] Munk School of Global Affairs & Public Policy, 1 Devonshire Place, Toronto, Ontario, M5S 0A7 Canada

Introduction

Growing political discontentment across Europe and North America has triggered a new wave of studies that examine economic disparities across regions and communities (Ganong & Shoag, 2017; Gyourko et al., 2013; Kemeny & Storper, 2022). Places that are being left out or left behind by current regimes of economic growth look precarious with respect to personal incomes, livelihoods, social infrastructures and innovation (MacKinnon et al., 2022). Existing studies highlight these places as sites of growing populist political sentiment (Lee et al., 2018; Rodríguez-Pose, 2018), rising inequality and job insecurity (Tomlinson, 2016), and declining life expectancy (Case & Deaton, 2020). What remains uncertain, is how long the effects of living in a left behind place today will last into the future and over the coming generations.

Research on intergenerational mobility suggests that the life chances of children today will be determined, in part, by how the communities in which they live are adapting to the New Economy. Growing up in contexts with high levels of family and community stability, well-funded schools, and low levels of poverty are all predictive of upward income mobility (Chetty et al., 2014; Connor et al., 2022; Sampson, 2019), albeit moderated by other dimensions of social inequality such as race and ethnicity (Abramitzky et al., 2021; Chetty, Hendren, Lin, et al., 2016). While these place effects can be highly persistent over time and have "deep roots" in history, they are also subject to cycles of change in regional economic fundamentals (Connor & Storper, 2020). The punishing effects of economic restructuring on workers, families, and communities has long been noted in the literature (Putnam, 2016; Wilson, 1996). If exposure to the economic and social disadvantages that characterize left behind places does curtail the life chances of residents, then a failure to change the prospects of these places will compound negative future effects and amplify inequality through its scarring effects on children. This will be particularly true if these contexts shape attitudes, behaviors, and the development of skills early in life, with lasting repercussions.

By studying the adult economic outcomes of the people who grew up in these contexts, this article provides new insight on the inequality-generating effects of left behind places. Our primary hypothesis is that children growing up in places left behind by the current era of economic change will experience constrained upward mobility, even after accounting for baseline family conditions. Using new data that links four decades of economic change across communities in the United States to local upward income mobility, we provide a first set of insights on how growing up in a left behind place could curtail the long-term economic prospects of children. We investigate whether

such effects vary according to sex, race, ethnicity, and location, and attend to additional issues of spatial scale, trajectory, and dimensionality among left behind places.

The determination of what counts as a "left behind place" has implications for both scientific analysis and policy action (Houlden et al., 2022). Yet, despite growing interest in left-behindness as a concept, there remains ambiguity about its identifying features. Using a longitudinal database to track the characteristics of over 20,000 Incorporated and Census Designated Places in the United States from 1980 to 2018, we classify places based on changes over the study period along four dimensions: education levels, poverty and unemployment rates, and average incomes. Based on these observations, we classify places into one of four mutually exclusive trajectories: the long term left behind; the recently left behind; the no longer left behind; and the never left behind. We investigate the impacts of children's exposure to these contexts, while also considering the scalar structure of these places with respect to nearby communities and to the regional contexts in which they are embedded.

Our analysis thus contributes to two strands of literature: work on how geographic forces shape intergenerational mobility (Berger & Engzell, 2019; Chetty et al., 2022; Connor & Storper, 2020; O'Brien et al., 2022; Rothwell & Massey, 2015) and studies concerned with the problems with places that are left behind (Kemeny & Storper, 2020; Lee et al., 2018; MacKinnon et al., 2022; Martin et al., 2021). We contribute to work on left behind places by proposing a new way of theorizing and measuring left-behindness that is sensitive to scalar issues, urban and rural differences, intertemporal change, and differentiation among left behind contexts, specifically, between the long-term, the recently, and the no longer left behind. Descriptively, we show that these community trajectories are distinct from one another, in terms of a wide range of local demographic attributes, and their effects play out differently according to gender, race, ethnicity, and migrant status. Our findings support the call for the multifaceted conceptualization and measurement of left-behindness. Similarly, we demonstrate that it is not just a person's home community that affects his or her prospects, but also the economic trajectories of neighboring communities. To the growing literature on intergenerational mobility, our study documents how place-based patterns of economic change (and also the patterns of nearby places) are linked to differences in upward income mobility.

After adjusting for a wide range of community characteristics, as well as the regional labor market areas ("commuting zone") in which places are situated, we find that exposure to left-behindness is associated with lower rates of upward mobility. Growing up in a place that is characterized as either long term or recently left behind is associated with a 4-percentile reduction in the adult income rank

of children from low-income households. Approximately a quarter of this penalty can be attributed to the child's exposure to the place in question, while the remaining three quarters can be explained by the influence of neighboring places and broader regional labor market conditions. These estimates point to the inequality-exacerbating effects of left-behindness and the multi-scale nature of the problem.

Not all forms of left-behindness exhibit the same kinds of links to intergenerational mobility. In particular, long-term left behind regions exhibit the largest mobility penalties, followed by recently left behind, and then the no longer left behind. Although children from this latter trajectory of places – locations where conditions are improving – exhibit higher levels of upward mobility than individuals from struggling places, they do not fully close the gap with their peers from places with no recent experience of left-behindness.

We conclude the analysis by examining how these associations play out by gender, race, ethnicity, and migrant status. First and foremost, Black, Hispanic, and Native American households are overrepresented in left behind places, and are, by virtue of this fact, more exposed to the issues that are arising in these contexts. This finding, however, comes with an important caveat: Whites exhibit some the greatest variance in outcomes across different kinds of places. The largest within-group inequality in upward mobility is between Whites who grew up in left behind places and those who do not. In fact, among households from left behind places, low-income Whites experience lower levels of upward income mobility than do their Hispanic peers. This finding is in line with other recent studies focused on the spatial and political polarization of working-class Whites over recent elections (Fotheringham et al., 2021; Miller & Grubesic, 2021; Monnat & Brown, 2017). We conclude by showing that the curtailed upward mobility associated with left behind places is evident among males and females, and even among those who decided to leave their childhood region. This suggests that policies incentivizing migration will be insufficient in eliminating the scars of left behind places on personal outcomes.

Contributions to literature

We contribute to two related, but as yet largely unlinked, literatures: one focused on the causes and impacts of regional left-behindness; the other on intergenerational social mobility. To the literature on left behind places, we introduce a multidimensional perspective on the concept of left-behindness that attends to underexamined issues of temporal and spatial scale. We similarly

emphasize the potential importance of spatial scale within the intergenerational mobility literature by examining contextual effects at the local and regional levels.

In recent decades, subnational disparities in incomes, output, and productivity have grown in Europe, the United States, the UK and many other economies (Ehrlich & Overman, 2020; Kim, 2008; Rice & Venables, 2021). Research on these disparities has commonly focused attention on a particular subgroup of locations that is seen to be increasingly being 'left behind' by the highest performing local economies (Kemeny & Storper, 2020). Studies show that spatial income disparities between these and other locations are linked to place-based gaps in job insecurity and joblessness (Austin et al., 2018; Tomlinson, 2016); career advancement (Eckert et al., 2022); race-based exclusion (Sitaraman et al., 2020); health (Case & Deaton, 2020; Singh et al., 2017), and especially cultural and political polarization and the rise of populist politics (Abreu & Öner, 2020; Cramer, 2016; Dijkstra et al., 2020; Hendrickson et al., 2018; Lee et al., 2018; McCann, 2020; Rodríguez-Pose, 2018). Yet, despite this growing attention, we remain at an early stage in terms of how we understand left behind places and what is happening to the people within them (MacKinnon et al., 2022).

The identification of a left behind place is an area in need of much greater consensus. What features mark a place as left behind? Existing work suggests that we should focus on locations that have not adapted successfully to secular processes of economic change, in particular those that are deindustrializing as well as those that are rural (MacKinnon et al., 2022). Yet left-behindness is likely to be multidimensional, incorporating social, demographic and cultural considerations (Gordon, 2018). Despite this, many studies proxy left-behindness by focusing on measures like low levels of gross domestic product per capita (Iammarino et al., 2019). While such measures may be reasonably well correlated with other aspects of welfare, there remain significant national scale residuals (Jones & Klenow, 2016), which are also likely to be found at the subnational scale.

Existing research suggests that the temporality of left-behindness is as important as its social and economic dimensions. For instance, studies like Gordon (2018) and Lee et al. (2018) argue that medium- and long-term dynamics – especially downward change in economic circumstances – play an important role in shaping local voting patterns (i.e. Gordon, 2018; Lee et al., 2018). Implicitly, what matters is not just where a place is now, but where the place came from. Recent work like Houlden et al (2022), Connor et al. (2019), Connor & Storper (2020), and Kemeny & Storper (2022) build on this idea, using explicitly longitudinal tools to characterize groups of places and regions following comparable economic pathways through time. Such work reveals that spatial inequality is

highly differentiated and, depending on the trajectories of places, the prospects for economic convergence will be varied and uncertain with respect to individual and community outcomes.

A further, and surprisingly little explored dimension of this problem is that of spatial scale. At what scale should we be looking for features of left-behindness? Existing empirical work has mostly operationalized left-behindness at the scale of subnational regional economies. Dijkstra et al. (2020) and Essletzbichler et al. (2018), for example, consider gaps among European NUTS3 regions as well as metropolitan areas. Each of these approximate functionally integrated regional economies, with each constituted by a much larger collection of smaller places and communities. At a finer scale, Jennings & Stoker (2018) contrast the political choices of residents in British towns and cities. In the U.S., Austin et al (2018) consider differences in non-employment among public-use microdata areas – a statistical concept which divides states into contiguous zones of no less than 100,000 residents. The decision to focus on the regional scale is not purely a methodological consideration. Even if not fully articulated, a focus on regions asserts a specific conceptualization for how key outcomes are produced; it may influence findings; and will ultimately direct policy in some directions at the expense of others. As a starting point, our best guess is that left-behindness is not an essential property of one spatial scale or another, but should rather be considered based on what we know of the outcomes of interest.

In addition to our connection to the literature on left behind places, the present study contributes to a rapidly growing body of work on the geography of intergenerational mobility. Intergenerational mobility refers to the degree to which children move up the economic hierarchy relative to their parents. The ability for individuals to climb the economic ladder through hard work has been a long-lasting societal value of the United States, and one that has been used to justify a tolerance for high income inequality (Long & Ferrie, 2013). These values are however under threat, due to mounting evidence that US intergenerational mobility has fallen over time (Song et al., 2020), as opportunity increasingly selects for households and places with schooling advantages (Connor & Storper, 2020; Tan, 2022).

Shifting from a long tradition of examining mobility outcomes at the scale of individuals or societies (Becker and Tomes, 1979; Blau and Duncan, 1967), the last decade of research has seen a veritable explosion of work on the role of intermediate geographic forces on intergenerational outcomes, beginning mainly with Chetty et al. (2014). This recent work has examined the determinants of intergenerational mobility at the scale of neighborhoods (Chetty, Hendren, & Katz, 2016; Sampson, 2019), communities and places (Connor et al., 2022; Putnam, 2016), counties

(Chetty et al., 2014; Ewing et al., 2016; Leonard & Smith, 2021), and regions (Connor & Storper, 2020; Delajara et al., 2022). These studies find that local contexts play a key role in shaping upward mobility because they shape norms, aspirations and the acquisition of human capital early in life, with sizeable effects on labor market outcomes later in life.

One area where relatively little is known is how local economic change may affect opportunities for upward intergenerational mobility. Connor & Storper (2020) demonstrate that long-term shifts in the regional geography of opportunity are linked with broader changes in the location of economic activity. Analyses of the contemporary period also document negative associations between exposure to automation and intergenerational mobility (Berger & Engzell, 2022), perhaps because of the deterioration of local tax bases through the loss of activity (O'Brien et al., 2022) and a worsening of rural poverty, inequality, and household conditions (Connor et al., 2022). The findings of these studies point to forms of localized economic trauma that trickle down into communities, subsequently limiting prospects for upward mobility. We know little, however, about where and at what scale these changes are playing out, whose intergenerational mobility is being curtailed, and how these patterns might fit with our current understanding of left behind places.

Is upward mobility, and how it is shaped by economic geography, fundamentally a question for communities and neighborhoods, for regions, or for both at once? The former are relevant contextual units for social interaction, political decision making, and human development. At the same time, regional economies condition possibilities for skill development and good jobs, which should be material for intergenerational mobility. Moreover, regions and the neighborhoods within them interact in terms of exchanges of goods and services and commuting flows. These interactions may themselves shape local landscapes of opportunities. While the formal examination of spatial spillover effects is common in regional science, in the literatures on intergenerational mobility and on left behind places, such spillovers have only been lightly explored.

Data and methods

To study the association between left-behindness and social mobility, we need to measure the recent economic trajectories of places and integrate this information with intergenerational income mobility data. As articulated in a recent study by Houlden and colleagues, we approach left-behindness through an analytic framework that emphasizes the trajectories of places, is sensitive to spatial scale, and also contends with the challenge of multidimensionality (Houlden et al., 2022). Taking these issues seriously, we assembled a place-level longitudinal dataset that characterizes the economic and

social conditions of places over time, that is also of a high enough spatial resolution to be used to investigate issues related to local spatial context.

Longitudinal database of places. Our longitudinal database of places is constructed using place-level census data drawn from the National Historical Geographic Information System (NHGIS) and the American Community Survey. The rural components of this dataset were prepared in earlier work (Connor et al., 2022; Hunter et al., 2020; Uhl et al., 2023), which has set the stage for our integrated analysis of urban and rural places. This dataset contains information across a range of place-level demographic and socioeconomic variables in 1980, 1990, 2000, 2010, and 2018 for over 20,000 places in the United States. The 2010 and 2018 data are drawn from the five-year estimates of the American Community Survey. When combined, this information allows us to characterize the trajectories of places over time.

Our focal units of analysis are Incorporated and Census Designated Places. Places were once a popular scale for analysis in rural demographic research, such as in Fuguitt's (1971) appropriately titled work the "The Places Left Behind". Places have recently re-emerged as an insightful scale of analysis. This is because, as compared with other common units of analysis like counties or census tracts, places better cohere with the scales of rural and urban contexts around which individuals immediately live their lives (Hunter et al., 2020). Moreover, in a recent study of rural places, Connor et al. (2022) document that a large share of the variation in intergenerational mobility is between places within the same county.

Classifying left behind places. We define left-behindness as a multidimensional process driven by the change of several social and economic factors: poverty rate, median household income, unemployment rate, and college attainment. We measure left-behindness based on the change in a rank-based index of these four factors for four main reasons. First, as is clear from our review of the literature, left-behindness refers to a set of local conditions that cannot be directly linked to any single economic indicator. Second, measuring left-behindness with a single variable invites measurement errors. For example, a plant closure could temporarily depress local employment levels, while the local poverty rate remains unchanged or the stock of human capital remains intact. By measuring left-behindness along multiple dimensions, we can better address such transitory economic shifts and avoid misclassification of local contexts. Third, we use the rank of place's along each factor in our measure because left-behindness is a measure of relative performance within the broader economic system. Fourth, we define left-behindness across time because we are interested in the trajectory of local performance.

We use a four-step process to assign place to trajectories. First, for each period *t* within our 1980-2018 study period, we identify the percentile rank of each place *i* within the national distribution of places for each of our four indicator variables. Second, we then calculate the Left Behind Index (*LBI*) from the average rank across our four indicator variables for each period as:

$$Left\ Behind\ Index_{it} = \frac{rPov_{it} + rInc_{it} + rUnemp_{it} + rEdu_{it}}{4} \qquad (1)$$

Third, we then rank order these average ranks. If, in a given year, a place falls below the 25th percentile of the Left Behind Index, we identify it as left behind at that point in time. Finally, because we are interested in the trajectory of a place, we assign places into one of four trajectory categories. We present the relative size and criteria associated with these trajectories in **Table 1.** A place is never left behind ("Never LB", 70 percent) if it did not fall below the 25th percentile of average ranks at the starting point (1980 or 1990) or at the end point of our analysis (2010 or 2018). A place is no longer left behind ("No longer LB") if it was below the 25th percentile of average ranks at the starting point, but above the 25th percentile at the end point (8 percent). A place is recently left behind ("Recently LB") if it was above the 25th percentile at the start point but was below the 25th percentile of average ranks at the end point (9 percent). Finally, a place is long term left behind ("Long-term LB") if it is below the 25th percentile at both the start and end point (13 percent). We use the Never LB trajectory as a benchmark for assessing outcomes across our three left behind trajectories.

Figure 1 uses an alluvial plot to visualize the movement of places in terms of the quartiles of their average economic ranks at the start (1980-1990) and end (2010-2018) of our study period. The size of the flows refers to the number of places within a given transition. The long-term left behind places are exclusively confined to the lowest quartile across our four economic indicators (light red). Most of the recently left behind (dark red) places fall only a short distance, from initially being in the second lowest quartile on the four economic variables to dropping into the lowest quartile. A minority of recently left behind places fall from the higher baseline quartiles. Similarly, most of the no longer left behind places move up to the second quartile, but some rise up even higher.

Measuring intergenerational social mobility. We measure the intergenerational mobility levels of children that grew up in these places with recently published data from Opportunity Insights (Chetty et al., 2018). Opportunity Insights have published the richest set of US-based intergenerational mobility and migration estimates to date. These estimates detail the adult income

and migration outcomes of 20.5 million (or over 96%) children from the 1978 to 1983 birth cohorts, who were born in the United States or arrived as authorized immigrants during childhood. The original data assigns children to neighbourhoods based on the proportion of their childhood that they spent in a given neighbourhood (census tract). Although these estimates are purely observational, Chetty and colleagues (2018) have validated the data against findings from experimental studies like those using the Moving to Opportunity program (Chetty, Hendren, & Katz, 2016).

Our preferred dependent variable captures the adult income levels of children who grew up in low-income households. The construction of this measure relies on income measurements at two points in time. The parent's income is measured when the individuals of concern were in childhood. As we are interested in upward income mobility, we focus on children whose parents had incomes at the 25th percentile of the national income distribution.[1] The 25th percentile of the national income distribution is equivalent to around $27,000 in annual income. Our dependent variable is therefore derived from the adult personal income rank of these children in the national income distribution in the 2014-2015 period.

As the intergenerational mobility estimates published by Opportunity Insights are published at the tract scale, we needed to rely on estimates that have been areal-interpolated to the place scale (Goodchild et al., 1993). Connor et al. (2022) generated these place-based estimates by applying the methods of "dasymetric refinement" to census tract data (Leyk et al., 2013). Connor and collaborators used ancillary satellite-based raster imagery from the 1992 National Land Cover Database to perform this re-estimation procedure. The result of this work is that all tract-level intergenerational mobility estimates are available at the scale of places and available for use here.

Measuring "neighbourhood effects" for left behind places. A key strength to studying left-behindness at a subregional scale, as we do, is that it enables us to examine neighborhood or regional effects from the "bottom up". This flexibility helps us incorporate the exposure of individuals to nearby local and regional conditions (e.g. Kwan, 2018), and to avoid or investigate potential aggregation issues such as the Modifiable Areal Unit Problem (MAUP), or by its newer name the "Openshaw effect" (Goodchild, 2022; Openshaw, 1984). Specifically, we can examine whether the effects associated with exposure to left behind places are amplified when other nearby places are also experiencing hardship.

[1] Parents were linked to their children based on the first parent to claim the child as a dependent on the 1040 tax form.

We follow the approach employed by Chetty et al. (2018), in their examination of the poverty rate of neighboring census tracts and census blocks on upward mobility in the 50 largest commuting zones. They find that at the neighborhood scale, the association between poverty is "hyper local" with an estimated 20 percent of the variation being attributable to the census block and 80 percent being attributable to the ten nearest nearby census blocks. At the scale of census tracts, however, they find that percentages flip, with the majority of the variation being within the tract and a small share variation being attributable to neighboring census tracts. As we are working at a coarser geographic unit, it is not clear whether the findings of Chetty et al. on neighborhood poverty, will also be reflected at the place scale that we study here, which capture entire rural municipalities, towns and cities.

We investigate this issue by measuring the wider "neighborhoods" for each of our ~20,000 places. For each place, we measure the left-behindness within focal neighborhoods of its ten nearest neighboring places. We do this by first counting the number of neighboring places that fall into each of our four left behind trajectories (see **Table 1** above). We use these counts to calculate the proportion of a place's neighbors that are represented by those categories. This calculation is performed in Equation 2 as follows:

$$Neighbors_i = \frac{\sum_{j=1}^{n} x_j}{n} \qquad (2)$$

where the variable captures the proportional representation of left behind trajectories that are among the ten nearest neighbors *n* of each place *i*. We index summation as *j*, which initializes at the first nearest neighbor (1) and terminates after summing to the tenth nearest neighbor. We divide the count by ten (*n*). We replicate this calculation three times in order to generate three separate measures, capturing the representation of the three left behind trajectories within each focal neighborhood.

Descriptive statistics

Figure 2 maps our four place-level trajectories. The long term and recently left behind places (red) are scattered throughout country, but particularly so throughout South. The long term left behind also tend to be situated in rural regions of the country, either in the South or the Southwest. Places moving out of left-behindness – the no longer left behind – are disproportionately concentrated in the middle of the country in states like Minnesota, Wisconsin and areas of Texas. Earlier research has pointed to rising levels of upward mobility in these regions (Connor & Storper, 2020).

Table 2 presents broader descriptive statistics for our four place-level trajectories. Although we present statistics on all independent and dependent variables, we focus attention on the sociodemographic variables and neighbor shares of our four place-level trajectories. The recently and long-term left behind places have lower shares of white households than do the more prosperous trajectories (no longer left behind and never left behind). Left behind places have higher shares of Black, Native American, Hispanic, and single-parent households, confirming that populations that have traditionally been identified as more socially vulnerable also tend to be more exposed to left-behindness.

Beyond the maps above, we describe the geography of these trajectories in two other ways. First, we observe large differences with respect to the rurality of these trajectories.[2] Long-term left-behind places are disproportionately rural. Specifically, while around 40 percent of all US places are rural, this share rises to 62 percent for long-term left-behind places. Similarly, around 63 percent of the no longer left behind places were rural at baseline, suggesting that the improving conditions of these places may in part be linked to patterns of local urban development or annexation. In contrast to these two cases, only 42 percent of recently left behind places are rural, perhaps pointing to more urban decline in this trajectory than for the long-term or no longer left behind.

Secondly, we can describe the geography of these place-level trajectories based on trajectories of their neighbors. **Table 2** shows the percentage of a place's ten nearest neighbors that are represented by each of our four trajectories. It is particularly instructive to look to the share of neighbors that are in the same trajectory as one another. Never left behind places comprise about 70 percent of all places but are 80 percent of the neighbors of other never left behind places. This implies that the never behind places are more likely to be near to one another than would be expected due to random chance. Spatial clustering is even stronger among the remaining three categories. Recently left behind and the no longer left behind are twice as likely to be neighbors than would be expected due to chance (8% and 9% overall, but 16% and 19% of neighbors), and the long-term left behind are almost three times more likely to be neighbors (13% overall, 35% of neighbors). At the same time, it is worth noting that while we document strong spatial clustering among our trajectories, left behind places still only make up a minority of the neighbors of other left

[2] This database has been augmented by Uhl et al. (2023), who developed a continuous urban-rural index that enables identification of urban and rural places. Following Connor et al. (2022), we define urban paces as those falling below 0.55 on Uhl's index, with rural places scoring above this threshold.

behind places. This provides strong justification for investigating both the regional and subregional dimensions of left-behindness.

Before turning to our main analysis, we contextualize the many experiences of left-behindness through a set of examples. We map five distinctive places in **Figure 3**: Porterville in the Central Valley of California (A); the urban tribal community of Guadalupe, Arizona (B); the former industrial city of Gary, Indiana (C); Uniontown, Alabama (D); and the urbanizing town of Holly Springs, North Carolina (E). We present basic summary statistics for these places in **Table 3**.

Gary, Indiana, is a quintessential example of a now long-term left behind place. Situated just east of Lake Michigan, Gary was one of the historic cores of North American steel production and experienced rapid development across the early twentieth century. With the restructuring of US heavy industry and global steel production over the post-war decades, Gary's economy entered a long period of contraction. The population fell from a 1960 peak of 180,000 residents to fewer than 70,000 today. The children of Gary have not only faced challenging labor market conditions, but also long-term funding cutbacks to essential services and schools (see O'Brien et al., 2022).

Uniontown and Guadalupe are also long-term left behind places, but with very different histories to Gary. Uniontown is situated in the region known as the "Black Belt" (Wimberley & Morris, 2002) and the town's economy historically depended on the cotton industry and cotton plantations. Today, more than 95 percent of the residents of Uniontown identify as Black and the town has recently been at the center of a long fight regarding environmental racism, issues claimed to have particularly adverse effects on local children.[3] Turning to the Southwest, Guadalupe is a small town at the heart of the Phoenix metropolitan area. The town is a center of the Yaqui people, and most residents are of Native American or Mexican descent. Although the city is situated in a fast-growing metropolitan area, the children of Guadalupe are growing up in a place where the poverty rate is over three times the national average, and high school completion rates are very low.[4] Despite already ranking toward the bottom of the Left Behind Index in 1980, Guadalupe and Uniontown have both fallen further down the scale.

[3] In 2007, Alabama's largest municipal-waste site opened in Uniontown, leading the Black Belt Citizens Fighting for Health and Justice organization to unsuccessfully petition the Environmental Protection Agency to intervene. The 1000-acre landfill site, which serves 33 states, has been highly disruptive to Uniontown's residents and children through the site's release of corrosive particles and toxic coal ash. It is reported that many residents are reluctant to let their children play outside due to fears for their health (Hitson, 2022).

[4] The history of Guadalupe has received focused scholarship (for example, see Trujillo, 1998). A newspaper report from 2015 highlight the lack of community businesses and a high school graduation rate of only 50 percent as particularly pronounced challenges being faced be the community (Scott, 2015).

Porterville is situated in the eastern most region of the Central Valley, where approximately 70 percent of the city's 63,000 residents identify as Hispanic. As a recently left behind place, the city has experienced a dramatic fall from 32.50 to 15.00 on the Left Behind Index. Porterville is situated in Tulare County, a region often labeled as the epicenter of the Great California Drought from 2012 to 2017 (Pompeii, 2020).[5] The poverty rate of Porterville has doubled since 1980 and its foreign-born population share has almost tripled. In many respects, Porterville highlights the precarious conditions that often accompany industrialized agricultural (Lobao & Stofferahn, 2008).

Finally, Holly Springs differs from the cases above in that it has ascended out of left behindness. The town's fate is linked to its location at the heart of North Carolina's Research Triangle, less than 20 miles from downtown Raleigh. In recent decades, the population has grown more than 50-fold from 700 to over 40,000, and the poverty rate is now only a fraction of the national average. These changes have been spurred by the town's increasing incorporation into Raleigh, and the arrival of several large biopharmaceutical firms like Amgen and Novartis. The experience of Holly Springs resembles many others in this category: small places that have been annexed by nearby agglomeration economies.

Each of these contexts have their own unique historical experiences that have resulted in these places being left behind. Yet for all five places, we observe income mobility levels that are below the US average (**Table 3**). In most cases, these areas also tend to be situated near other struggling contexts, which points to the probable importance of the spatial concentration of left behind places. The sections that follow formally test these links between left behind places and the average income mobility levels of local children.

Regression analysis

Estimation strategy. We assess how childhood exposure to left-behindness might impact social mobility with a model of the following form:

$$y_i = \alpha_1 + \beta_1(LeftBehind_i) + \beta_2(CZ_j) + \Sigma_{k=1..k}\beta_k X_{ik} + \varepsilon_i \qquad (3)$$

where the outcome *y* captures the social mobility level of children from low-income households in place *i*. The main variable of interest *LeftBehind* is a categorical variable that indicates the membership of a place in one of the four left behind trajectories. We include *k* independent variables to adjust for

[5] The city and its neighbor, East Porterville, have received considerable attention due to the water insecurity crisis faced by the Hispanic community (Egge & Ajibade, 2021; Méndez-Barrientos et al., 2022).

characteristics of place *i* that may be correlated with left behindness, such as population size, racial and ethnic composition, and the local share of single parent households.

We assess the regional context in which a place is embedded in two ways. First, we include a fixed effect in Equation 3 that captures the *j* labor market region or commuting zone (*CZ)* to which a place belongs. Our second approach is to incorporate the proportional measures of left behindness from each place's focal neighborhood, as described above in Equation 2. Models exploring this second approach take the following form:

$$y_i = \alpha_1 + \beta_1(LeftBehind_i) + \beta_2(Neighbors_i) + \Sigma_{k=1..k}\beta_k X_{ik} + \varepsilon_i \qquad (4)$$

where the equation is indexed identically to Equation 3 above, but where we incorporate the three *Neighbors* variables to measure the influence of the local share of left behindness within the focal neighborhood of each place *i*. Due to collinearity, we do not include a spatial lag for the never left behind places.

One further attractive feature of the Opportunity Insights data are the decomposition of upward mobility estimates across various subpopulations. Published estimates are segmented by race, ethnicity, sex, and migrant status. We use these data to test for differences in the effect of left-behindness by whether the respondent was Black, White, Hispanic, Native American, Asian, male, female or if they left their childhood commuting zone (move or stay). We do this by estimating a series of models like that shown in Equation 3, but where the dependent variables are derived exclusively from the subpopulations above.

Our intuition is that the exposure of a child from a low-income household to different kinds of place-level trajectories – a left behind place as opposed to a more prosperous, never left behind place – will impact their average chances of upward income mobility. One concern is that the skill-, personality-, or ability-based sorting of individuals across places could bias our estimates (Combes et al., 2008). For example, more motivated individuals may be more attracted to dynamic labor markets which could, in turn, upwardly bias the associations between these locations and upward mobility. This is less of a concern in our case, as the childhood locations are pre-determined by the decisions of the parents.

Upward mobility outcomes. We begin in **Table 4** by estimating the association between growing up in a left behind place and the upward mobility of all children from households below the 25th percentile. Column 1 examines the differences in the average adult income rank of children

based on their place-level trajectory. Children in low-income households growing up in a long-term and recently left behind places exhibit a 4.5 and 4.0 percentile rank reduction (roughly 10 percent), respectively, in upward mobility relative to the base level (0.46). There is only a 1.0 percentile rank deficit for children from no longer left behind places, pointing to greater upward mobility in places that move out of left-behindness.

As exposure to a left behind place may be correlated with regional economic conditions, Column 2 controls for the commuting zones in which places are embedded. After making this adjustment, the place-level coefficients attenuate by approximately two thirds. This implies that a substantial portion of the negative association between left behindness and upward mobility can be attributed to the broader conditions of the regions in which these places are embedded. Conversely, even when we compare places within the same region, we find persisting differences in the upward mobility of children by whether or not their childhood place has experienced left behindness.

We then adjust for a range of other baseline place-level characteristics including ethnic and racial composition and rurality (Column 3). Despite further attenuating the association between left behindness and upward mobility, the coefficients remain sizeable and statistically significant. Importantly, these additional variables are co-determined with our trajectories of left-behindness. We include them here mainly to ascertain whether the economic variables used to construct the trajectories have independent weight or if, instead, the trajectories capture other markers of left behindness such as rurality or racial segregation. Our estimates are robust to these additional control variables.

These findings reinforce several insights on the phenomena of left-behindness and the existing literature surrounding it. Residence in a left behind place is associated with lower levels of upward mobility, which implies that these places are exacerbating the existing challenges faced by children from lower income households. Additionally, the inclusion of an economically relevant regional level measure clearly improves the model, reinforcing conceptualizations of left-behindness as more than a localized phenomenon. The persistence of intra-regional differences also indicates that region is insufficient for explaining localized variation.

Neighboring influences. We now turn to examining how a place's nearest neighbors within a commuting zone may impact its upward mobility levels. We begin in **Figure 4** by testing whether adjacency to other left behind places is predictive of upward mobility, conditional on the left behindness of one's own place of residence. To ease interpretation, we collapse the recently and

long-term left behind places into a single "left behind" indicator variable. In Panel A, we plot the regression coefficients for this indicator for the place of residence (neighbor number = 0) and the ten nearest neighboring places (neighbor number = 1 to 10). Panel A presents estimates that are only conditional on the left behindness of the place of residence (neighbor 0), and Panel B includes all other relevant control variables.

The first pattern revealed in **Figure 4** is that the left behindness of the place of residence has a significantly larger influence on upward mobility than does the status of its neighbors. This is evident in the large negative association for neighbor 0 and the sharp attenuation in the coefficients of neighbors. Furthermore, we do not observe a gradual attenuation in the influence of neighbors with distance, suggesting a relatively large and more regionalized footprint for a place's focal neighborhood. Were we to sum the associations of neighbors, we would find that a place of residence can account for 15 percent (Panel A) to 26 percent (Panel B) of the influence of left behindness on upward mobility. The status of neighboring places in terms of left behindness are correlated with one another, and these neighboring effects are therefore not simply additive. Therefore, in the regression analyses that follow, we use the proportional neighborhood measures described above in Equation 4. These estimates are nonetheless suggestive of sizeable "neighborhood effects" that are similar in magnitude to those found previously at the finer census block scale (see Chetty et al., 2018).

In **Table 5** we approach this process more formally by presenting three models that include the proportional representation of left behind places among each place's ten nearest neighbors. These estimates are generated under the assumption that each neighboring place makes an equal contribution to the neighborhood effect, irrespective of the neighbor's total population size.[6] The addition of these spatial lag terms in Column 1 yields two findings of note. First, the neighbor estimates are statistically significant and have associations that move in the anticipated directions: high proportions of long-term and recently left behind places among neighbors is associated with reduced upward mobility. Conversely, the presence of no longer left behind places among neighbors is positively linked to a place's upward mobility levels.

[6] We provide an alternative set of population-weighted estimates for the neighboring effects in **Appendix Table A1**. These estimates reveal that our results are not particularly sensitive to the decision to weight the contributions of neighbors. We opt against using weights in our main specifications because it is not entirely clear in this context whether the population sizes of nearby places are good measures of their influences on children. Ideally, future work would be able to observe and measure the relevant spatial interactions between places that affect social mobility outcomes.

The second point of note relates to trajectories for the main place coefficients of interest. By comparison to the estimates shown earlier (see Column 1, **Table 4**), the trajectory of neighbors attenuates the main place-trajectory coefficients by between a half and a third. For example, the initial estimates from **Table 3** imply that the upward mobility levels were 4.5 percentile ranks lower in long-term left behind places relative to never left behind places, but this deficit is reduced to 1.7 percentile ranks after accounting for neighboring left behindness. The fact that these patterns are evident across all three left behind trajectories implies that upward mobility outcomes are strongly linked to what is happening in the surrounding areas.

Next, we show that these neighboring place associations are not simply a reformulation of the regional commuting zone influences that we documented above. After introducing the commuting zone fixed effect (Table 4, Column 2) and the place-level controls (Column 3), we find that the coefficients for neighbors attenuate but remain statistically significant. The one notable difference is that the influence of nearby no longer left behind places turns negative after we adjust for the commuting zone, suggesting that proximity to any form of left-behindness, irrespective of whether conditions are improving or not, is associated with reduced levels of upward mobility. We also show in **Appendix Table A2** that these associations are highly consistent across urban and rural places.[7]

We conclude our examination of neighbors by visualizing the association between the trajectories of neighboring places and upward mobility. **Figure 5** presents average upward mobility levels for our four place trajectories according to the share of their neighbors that are long-term left behind (A), recently left behind (B), and no longer left behind (C).

In contexts where none of a place's ten nearest neighboring places are recently or long-term left behind, we observe large differences in upward mobility based on a place's own trajectory. As the share of neighbors that are recently or long-term left behind increases toward 50 percent, we observe that upward mobility in all places gets pulled down. As these places are pulled down, we observe convergence in the outcomes of places on different trajectories too. This association is strong enough that when 50 percent or more of neighbors are left behind, a place's own trajectory is only of marginal importance. Put differently, the circumstances of neighboring places appear to overwhelm a place's own effect on upward mobility, once enough neighboring places are experiencing hardship.

[7] As differences in upward mobility across rural and urban places have been studied elsewhere (e.g., Connor et al., 2022; Weber et al., 2017), we do not devote much attention to these outcomes here.

Race, ethnicity, gender, and migrant status. We now turn to investigating how the impact of left behindness on social mobility might interact with race, ethnicity, sex, or migrant status. In the descriptive statistics, we documented that children in low-income housesholds are distributed differently across places by race and ethnicity, with non-White households being more exposed to left behind places. In the analysis here, we examine whether there are group-specific differences in outcomes within places.

Figure 6 begins by showing average differences in upward mobility based on whether the child's household is classified as White, Black, Hispanic, or Native American. In broad terms, we observe mostly similar patterns across all four place-level trajectories: Black and Native American upward mobility levels are generally lower than those of Hispanics and Whites. The persistently low levels of upward mobility for Black and Native American children within these trajectories are highly revealing. The persistence of racialized differences in upward mobility within these trajectories demonstrate that the constraining effects of left-behindness on upward mobility are not driven by the racial composition of these places (e.g., Black households, who experience lower levels of upward mobility on average, being more likely to live in left behind places).

There are also notable differences in the relative outcomes of groups across trajectories. In general, all four groups exhibit lower levels of upward mobility in left behind places. However, children from White low-income households exhibit large variation in outcomes across the four trajectories. Despite attaining the highest levels of upward mobility when exposed to never left behind places, Whites fare far worse in recently and long-term left behind places. In fact, the outcomes of Whites fall behind those of their Hispanic counterparts in long-term left behind places and are similar to them in recently left behind ones.[8]

Figure 7 considers the role of sex (Panel A) and migrants' status (Panel B) in moderating the link between left behind places and upward mobility. Across all four trajectories, we find that male upward mobility levels are substantially higher than those of females, and children from low-income households who leave their childhood locations are more upwardly mobile than those who stay, perhaps due to the selective nature of migration (Lee et al., 2018). In all four cases, however,

[8] In **Figure A1**, we also include estimates for children from Asian households. We chose not include them in the main figure because their exceptionally high rates of upward mobility – which vary little across the left behind categories – distort the image, making it difficult to interpret the outcome magnitudes for children from non-Asian households.

children who grew up in left behind places do not fare as well, on average, as children who grow up elsewhere.

The differences by migrant status, particularly the disparate outcomes of the movers, are illuminating as to the sources of variation in upward mobility outcomes. If the effect of left behindness was chiefly rooted in the availability of local labor market opportunities, we would expect that the effect of left behindness would sharply attenuate among those who leave for opportunities elsewhere. To the contrary, we observe a very similar pattern of inequality in upward mobility among the migrants, based on where these individuals grew up. This indicates that the forces curtailing upward mobility are likely internalized early in life (e.g., by limiting schooling and access to human capital) and are transported by the migrants to their new places of residence. Increased outmigration is therefore unlikely to be a full remedy for the problems posed by left-behindness.

Robustness

We make several decisions with our data in order to produce our main results. This section tests the robustness of our findings to these choices. First, we used the bottom quartile as a threshold value for defining left behind places. In order to show that this decision did not produce an arbitrarily favorable result, we reproduce our main specification in the Appendix in **Table A3**, where we define alternate threshold values. These alternate results are consistent with our earlier findings. In **Figure A2**, we also visually describe the association between our preferred threshold and upward mobility outcomes. In **Table A4**, we re-specify that model so that instead of making categorical distinctions to describe movement in and out of left-behindness, we include the base categorization alongside the rank change on the Left Behind Index over the study period. This clarifies that the differences we observe in our main specification are not solely driven by the starting position of places on the Left Behind Index. We also note that while the initial categorization and the rank change on the Left Behind Index are of consequence, the initial categorization holds a particularly large association with upward mobility.

Due to imposing a strict threshold for left behindness, it is also possible that our results could be distorted by small marginal shifts across the threshold. For example, a place with a Left Behind Index of 26 in the base period and 24 in the end period will be considered as a Recently Left Behind

place. We test the impact of this decision in **Table A5** by limiting the Recently Left Behind and No Longer Left Behind places to only those that fall or rise by at least 25 ranks. We find that this additional restriction modestly strengthens our main results, suggesting that the relationships that we highlight here may be even stronger than is suggested in our main specifications. To provide further reassurance on this point, **Table A6** shows the average movement of places on the Left Behind Index by their category. Places that are no longer left behind move up the Left Behind Index by approximate 20 percentile ranks, and places that are recently left behind fall by approximately 18 percentile ranks. The large size of these moves reinforces the significance of these changes for the situations of places. Finally, **Table A7** shows that these place-level results hold even when we downscale the analysis and the dependent variable from places to census tracts.

Conclusions and policy considerations

Left behind places have emerged as a leading challenge for regional policy and theory. While we continue to learn more about the links between the condition of left-behindness and a range of social, political, economic and medical outcomes, major gaps in our understanding remain, including the potential long-term impacts of these places. Even if one could design policies that lifted up today's left behind, the impacts of these contexts could live on through the people who were temporarily exposed to these places. This paper investigates this issue through from one perspective: the upward income mobility of children born to low-income parents.

Drawing on a longitudinal database of over 20,000 places in the United States, we have proposed a multidimensional framework for studying trajectories of left-behindness that is sensitive to both time and space. From this framework we identified three specific categories of places: the long-term left behind, the recently left behind and the no longer left behind. We contrast these three groups against the remaining places, which we term the never left behind. From here, we documented significant local variation and effects across these categories, suggesting that regions are not an appropriate alternative to these finer scale classifications.

The focus of this paper is on addressing the question: who gets left behind by left behind places? To address this question, we have examined children across the United States who grew up in low-income households over the 1980s and 1990s. Our analysis of these children in terms of their exposure to left behind places has yielded four distinct answers. First, children growing up in challenging circumstances face particularly large barriers to economic attainment when they spend

their childhoods in left behind places. This means that exposure to left-behindness compounds the already sizeable challenges faced by children from lower income backgrounds.

Second, these negative effects are amplified when the place in question is situated in a region with many other left behind places. These neighboring effects are powerful enough that they can even overwhelm the strength of the place in question as a determinant of upward mobility. By rough decomposition, we estimate that around a quarter of the penalty associated with growing up in a left behind place can be attributed to the place itself. The remaining three quarters can be explained by the trajectory of groups of neighboring places or by the regional economy. This leads us to conclude that policies aimed at addressing the problems of left-behindness need to not only contend with issues at the regional scale, but also with sensitivity to the interactions among people and places within regions.

Third, when it comes to interpersonal outcomes, we have shown that left behind places not only reinforce existing patterns of inequality (e.g., especially low levels of upward mobility among children from low-income Black and Native American households), they are also linked to large differences within ethnic and racial groups. The differences between children from White and Hispanic households are perhaps most notable in this respect. In places that fare reasonably well over our study period – the no longer left behind and the never left behind – Whites attain higher levels of upward mobility than Hispanics. This pattern reverses for left behind places, however, where Hispanic upward mobility is higher than that of Whites. In general terms, these patterns point to the intersectionality of personal outcomes with left-behindness. More specifically, our findings of polarization in the outcomes of Whites speak to a larger literature that has highlighted the deterioration of personal outcomes for working-class Whites in rural and deindustrializing communities; an issue that has been linked to populist voting patterns and what has been referred to as a "rural revolt" and the "the revenge of places that don't matter" (Monnat & Brown, 2017; Rodríguez-Pose, 2018).

Finally, the effects of left behind places appear to persist even when individuals leave their childhood locations for other regions, indicating that left behind places may be scarring individuals in ways that continue to be expressed even after they change their surroundings. This point is particularly relevant to calls for "people-based policies" that may incentivize migration, as substitutes for "place-based policies" that aim to improve local conditions (see Kline & Moretti, 2014; Parker et al., 2022). Our results suggest that the penalties associated with left-behindness are portable through migration, indicating that migration may dislocate some of the problems of left behind places, but

there may be lingering effects among the migrants at the new destinations. Whether or not these effects extend beyond income-based penalties is a topic for further investigation.

What are the mechanisms through which left behind places exacerbate the intergenerational transmission of disadvantage? While we want to be clear that we do not attempt to test the mechanism through which left behindness matters here, we can carefully speculate on the possible channels as they pertain to policy. The two dominant lines of thinking are policies that aim to expand human capital and opportunities at a young age, and those that promote local and regional economic growth. The existing body of literature suggests that in today's economy, proximity to economic growth and opportunity is not enough, and that early childhood environments may matter even more (Chetty, Hendren, & Katz, 2016; Heckman, 2008; Jackson, 2015). The assumption here is that positive early childhood circumstances facilitate movement to opportunity. The challenge for policy is that these two forces – economic growth and human capital expansion – are interdependent. Connor & Storper (2020) showed that prosperous places undergoing contraction also experience a deterioration in upward income mobility and earlier-life educational attainment. We have built on this evidence here to show similar relationships playing out across left behind places. In as far as we can speculate, policies aimed at equitable economic growth must also consider the inequities of economic contraction and long-term left behindness. That is, tackling the local mixture and productivity of jobs and firms will not be enough, and policy must also attend to the circumstances of the young people growing up in these places. Tackling local jobs and education are challenging enough and are likely to be even more so in the United States, where key infrastructure like schools heavily depend on local tax bases.

In summary, our findings document serious long-term consequences associated with left behind places. Left behindness is a chronic and potentially progressive problem that may be transmitted across generations. The outmigration of children from left behind contexts also does not appear to be a remedy for these issues. Without targeted attention that improves the fortunes of low-income families, and the children coming of age within these places, the scars of left-behindness may be visible for decades to come.

Acknowledgements

We acknowledge the comments and support of our editors and anonymous reviewers at the Cambridge Journal of Regions, Economy and Society, participants at the CJRES online conference

on "Left behind places and what can be done about them", and the Spatial Analysis Research Center (SPARC) at Arizona State University. Partial funding has been provided through the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health under award numbers R21 HD098717-02. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. Partial funding for this work was also provided through the Humans, Disasters and the Built Environment program of the National Science Foundation, award number 1924670. We also thank Lori Hunter, Johannes Uhl, Catherine Talbot, Andrés Rodríguez-Pose, Laura Tach, Rachel Franklin, Kevin McHugh, and audiences at the 2023 meeting of the Population Association of America, and the Spatial Analysis and Data (SAD) Seminar.

References

Abramitzky, R., Boustan, L. P., Jácome, E., & Pérez, S. (2021). Intergenerational Mobility of Immigrants in the US over Two Centuries. *American Economic Review*, *111*(2), 580–608.

Abreu, M., & Öner, Ö. (2020). Disentangling the Brexit vote: The role of economic, social and cultural contexts in explaining the UK's EU referendum vote. *Environment and Planning A: Economy and Space*, *52*(7), 1434–1456.

Austin, B. A., Glaeser, E. L., & Summers, L. H. (2018). *Jobs for the Heartland: Place-based policies in 21st century America*. National Bureau of Economic Research.

Berger, T., & Engzell, P. (2019). American geography of opportunity reveals European origins. *Proceedings of the National Academy of Sciences*, *116*(13), 6045–6050.

Berger, T., & Engzell, P. (2022). Industrial automation and intergenerational income mobility in the United States. *Social Science Research*, 102686.

Case, A., & Deaton, A. (2020). *Deaths of Despair and the Future of Capitalism*. Princeton University Press.

Chetty, R., Friedman, J. N., Hendren, N., Jones, M. R., & Porter, S. R. (2018). *The opportunity atlas: Mapping the childhood roots of social mobility*. National Bureau of Economic Research.

Chetty, R., Hendren, N., & Katz, L. F. (2016). The effects of exposure to better neighborhoods on children: New evidence from the moving to opportunity experiment. *American Economic Review*, *106*(4), 855–902.

Chetty, R., Hendren, N., Kline, P., & Saez, E. (2014). Where is the land of opportunity? The geography of intergenerational mobility in the United States. *The Quarterly Journal of Economics*, *129*(4), 1553–1623.

Chetty, R., Hendren, N., Lin, F., Majerovitz, J., & Scuderi, B. (2016). Gender gaps in childhood: Skills, behavior, and labor market preparedness childhood environment and gender gaps in adulthood. *The American Economic Review*, *106*(5), 282–288.

Chetty, R., Jackson, M. O., Kuchler, T., Stroebel, J., Hendren, N., Fluegge, R. B., Gong, S., Gonzalez, F., Grondin, A., & Jacob, M. (2022). Social capital I: Measurement and associations with economic mobility. *Nature*, *608*(7921), 108–121.

Combes, P.-P., Duranton, G., & Gobillon, L. (2008). Spatial wage disparities: Sorting matters! *Journal of Urban Economics*, *63*(2), 723–742. https://doi.org/10.1016/j.jue.2007.04.004

Connor, D. S., Gutmann, M. P., Cunningham, A. R., Clement, K. K., & Leyk, S. (2019). How Entrenched Is the Spatial Structure of Inequality in Cities? Evidence from the Integration of Census and Housing Data for Denver from 1940 to 2016. *Annals of the American Association of Geographers*, 1–18.

Connor, D. S., & Storper, M. (2020). The changing geography of social mobility in the United States. *Proceedings of the National Academy of Sciences*, *117*(48), 30309–30317.

Connor, D. S., Uhl, J. H., Xie, S., Talbot, C., Hester, C., Jaworski, T., Gutmann, M., Leyk, S., & Hunter, L. (2022). *Rising community poverty reduces social mobility for rural children*. Available at SSRN: https://ssrn.com/abstract=4127500

Cramer, K. J. (2016). *The politics of resentment: Rural consciousness in Wisconsin and the rise of Scott Walker*. University of Chicago Press.

Delajara, M., Campos-Vazquez, R. M., & Velez-Grajales, R. (2022). The regional geography of social mobility in Mexico. *Regional Studies*, *56*(5), 839–852.

Dijkstra, L., Poelman, H., & Rodríguez-Pose, A. (2020). The geography of EU discontent. *Regional Studies*, *54*(6), 737–753.

Eckert, F., Hejlesen, M., & Walsh, C. (2022). The return to big-city experience: Evidence from refugees in Denmark. *Journal of Urban Economics*, 103454.

Egge, M., & Ajibade, I. (2021). A community of fear: Emotion and the hydro-social cycle in East Porterville, California. *Journal of Political Ecology*.

Ehrlich, M. v, & Overman, H. G. (2020). Place-based policies and spatial disparities across European cities. *Journal of Economic Perspectives*, *34*(3), 128–49.

Essletzbichler, J., Disslbacher, F., & Moser, M. (2018). The victims of neoliberal globalisation and the rise of the populist vote: A comparative analysis of three recent electoral decisions. *Cambridge Journal of Regions, Economy and Society*, *11*(1), 73–94.

Ewing, R., Hamidi, S., Grace, J. B., & Wei, Y. D. (2016). Does urban sprawl hold down upward mobility? *Landscape and Urban Planning*, *148*, 80–88.

Fotheringham, A. S., Li, Z., & Wolf, L. J. (2021). Scale, context, and heterogeneity: A spatial analytical perspective on the 2016 US presidential election. *Annals of the American Association of Geographers*, *111*(6), 1602–1621.

Fuguitt, G. V. (1971). The places left behind: Population trends and policy for rural America. *Rural Sociology*, *36*(4), 449.

Ganong, P., & Shoag, D. (2017). Why has regional income convergence in the US declined? *Journal of Urban Economics*, *102*, 76–90.

Goodchild, M. F. (2022). *The Openshaw effect*. Taylor & Francis.

Goodchild, M. F., Anselin, L., & Deichmann, U. (1993). A framework for the areal interpolation of socioeconomic data. *Environment and Planning A*, *25*(3), 383–397.

Gordon, I. R. (2018). In what sense left behind by globalisation? Looking for a less reductionist geography of the populist surge in Europe. *Cambridge Journal of Regions, Economy and Society*, *11*(1), 95–113.

Gyourko, J., Mayer, C., & Sinai, T. (2013). Superstar cities. *American Economic Journal: Economic Policy*, *5*(4), 167–99.

Heckman, J. J. (2008). Schools, skills, and synapses. *Economic Inquiry*, *46*(3), 289–324.

Hendrickson, C., Muro, M., & Galston, W. A. (2018). Countering the geography of discontent: Strategies for left-behind places. *Brookings, November*.

Hitson, H. (2022, 51/12). Uniontown residents protest state's response to Arrowhead Landfill concerns. *Montgomery Advertiser*.

Houlden, V., Robinson, C., Franklin, R. S., Rowe, F., & Pike, A. (2022). *Locating "Left Behind" Places and People in England: Scale, Trajectory, and the Challenge of Multidimensionality*. OSF Preprints.

Hunter, L. M., Talbot, C. B., Connor, D. S., Counterman, M., Uhl, J. H., Gutmann, M. P., & Leyk, S. (2020). Change in US Small Town Community Capitals, 1980–2010. *Population Research and Policy Review*, 1–28.

Iammarino, S., Rodriguez-Pose, A., & Storper, M. (2019). Regional inequality in Europe: Evidence, theory and policy implications. *Journal of Economic Geography*, *19*(2), 273–298.

Jackson, M. I. (2015). Early childhood WIC participation, cognitive development and academic achievement. *Social Science & Medicine*, *126*, 145–153.

Jennings, W., & Stoker, G. (2018). The divergent dynamics of cities and towns: Geographical polarisation after Brexit. *The Political Quarterly*.

Jones, C. I., & Klenow, P. J. (2016). Beyond GDP? Welfare across countries and time. *American Economic Review*, *106*(9), 2426–57.

Kemeny, T., & Storper, M. (2020). Superstar cities and left-behind places: Disruptive innovation, labor demand, and interregional Inequality. *LSE International Inequalities Institute Working Paper #41*.

Kemeny, T., & Storper, M. (2022). *The changing shape of spatial inequality in the United States*.

Kim, S. (2008). Spatial inequality and economic development: Theories, facts, and policies. *Urbanization and Growth*, 133–166.

Kline, P., & Moretti, E. (2014). Local economic development, agglomeration economies, and the big push: 100 years of evidence from the Tennessee Valley Authority. *The Quarterly Journal of Economics*, *129*(1), 275–331.

Kwan, M.-P. (2018). The Limits of the Neighborhood Effect: Contextual Uncertainties in Geographic, Environmental Health, and Social Science Research. *Annals of the American Association of Geographers*, 1–9.

Lee, N., Morris, K., & Kemeny, T. (2018). Immobility and the Brexit vote. *Cambridge Journal of Regions, Economy and Society*, *11*(1), 143–163.

Leonard, B., & Smith, S. M. (2021). Individualistic culture increases economic mobility in the United States. *Proceedings of the National Academy of Sciences*, *118*(37).

Leyk, S., Nagle, N. N., & Buttenfield, B. P. (2013). Maximum entropy dasymetric modeling for demographic small area estimation. *Geographical Analysis*, *45*(3), 285–306.

Lobao, L., & Stofferahn, C. W. (2008). The community effects of industrialized farming: Social science research and challenges to corporate farming laws. *Agriculture and Human Values*, *25*, 219–240.

Long, J., & Ferrie, J. (2013). Intergenerational Occupational Mobility in Great Britain and the United States Since 1850: Reply. *The American Economic Review*, *103*(5), 2041–2049.

MacKinnon, D., Kempton, L., O'Brien, P., Ormerod, E., Pike, A., & Tomaney, J. (2022). Reframing urban and regional 'development'for 'left behind'places. *Cambridge Journal of Regions, Economy and Society*, *15*(1), 39–56.

Martin, R., Gardiner, B., Pike, A., Sunley, P., & Tyler, P. (2021). *Levelling up Left Behind Places: The Scale and Nature of the Economic and Policy Challenge*. Routledge.

McCann, P. (2020). Perceptions of regional inequality and the geography of discontent: Insights from the UK. *Regional Studies*, *54*(2), 256–267.

Méndez-Barrientos, L. E., Fencl, A. L., Workman, C. L., & Shah, S. H. (2022). Race, citizenship, and belonging in the pursuit of water and climate justice in California. *Environment and Planning E: Nature and Space*, 25148486221133280.

Miller, J. A., & Grubesic, T. H. (2021). A spatial exploration of the halo effect in the 2016 US presidential election. *Annals of the American Association of Geographers*, *111*(4), 1094–1109.

Monnat, S. M., & Brown, D. L. (2017). More than a rural revolt: Landscapes of despair and the 2016 presidential election. *Journal of Rural Studies*, *55*, 227.

O'Brien, R., Bair, E. F., & Venkataramani, A. S. (2022). Death by robots? Automation and working-age mortality in the United States. *Demography*, *59*(2), 607–628.
Openshaw, S. (1984). *The modifiable areal unit problem*.
Parker, E., Tach, L., & Robertson, C. (2022). Do Federal Place-Based Policies Improve Economic Opportunity in Rural Communities? *RSF: The Russell Sage Foundation Journal of the Social Sciences*, *8*(4), 125–154.
Pompeii, B. (2020). The Social Production of the Great California Drought, 2012–2017. *Yearbook of the Association of Pacific Coast Geographers*, *82*(82), 15–37.
Putnam, R. D. (2016). *Our kids: The American dream in crisis*. Simon and Schuster. https://books.google.com/books?hl=en&lr=&id=OsrNCwAAQBAJ&oi=fnd&pg=PA1&dq=putnam+our+kids&ots=R02ojrM-jg&sig=WsXjCf0xUkFq3YGqFfdwfW4Risg
Rice, P. G., & Venables, A. J. (2021). The persistent consequences of adverse shocks: How the 1970s shaped UK regional inequality. *Oxford Review of Economic Policy*, *37*(1), 132–151.
Rodríguez-Pose, A. (2018). The revenge of the places that don't matter (and what to do about it). *Cambridge Journal of Regions, Economy and Society*, *11*(1), 189–209.
Rothwell, J., & Massey, D. (2015). Geographic effects on intergenerational income mobility. *Economic Geography*, *91*(1), 83–106.
Sampson, R. J. (2019). Neighbourhood effects and beyond: Explaining the paradoxes of inequality in the changing American metropolis. *Urban Studies*, *56*(1), 3–32.
Scott, S. (2015). *In Guadalupe, one of Arizona's smallest towns, residents push back against persistent poverty*. The Arizona Republic. https://www.azcentral.com/story/news/local/tempe/2015/09/25/guadalupe-arizona-town-poverty/72820934/
Singh, G. K., Daus, G. P., Allender, M., Ramey, C. T., Martin, E. K., Perry, C., Andrew, A., & Vedamuthu, I. P. (2017). Social determinants of health in the United States: Addressing major health inequality trends for the nation, 1935-2016. *International Journal of MCH and AIDS*, *6*(2), 139.
Sitaraman, G., Ricks, M., & Serkin, C. (2020). Regulation and the Geography of Inequality. *Duke LJ*, *70*, 1763.
Song, X., Massey, C. G., Rolf, K. A., Ferrie, J. P., Rothbaum, J. L., & Xie, Y. (2020). Long-term decline in intergenerational mobility in the United States since the 1850s. *Proceedings of the National Academy of Sciences*, *117*(1), 251–258.
Tan, H. R. (2022). A Different Land of Opportunity: The Geography of Intergenerational Mobility in the Early 20th-Century US. *Journal of Labor Economics*.
Tomlinson, J. (2016). De-industrialization not decline: A new meta-narrative for post-war British history. *Twentieth Century British History*, *27*(1), 76–99.
Trujillo, O. V. (1998). The Yaqui of Guadalupe, Arizona: A Century of Cultural Survival through Trilingualism. *American Indian Culture and Research Journal*, *22*(4), 67–88.
Uhl, J. H., Hunter, L. M., Leyk, S., Connor, D. S., Nieves, J. J., Hester, C., Talbot, C., & Gutmann, M. (2023). Place-level urban–rural indices for the United States from 1930 to 2018. *Landscape and Urban Planning*, *236*, 104762.
Weber, B., Fannin, J. M., Joseph, S., & Johnson, T. (2017). Upward mobility of low-income youth in metropolitan, micropolitan, and rural America. *The ANNALS of the American Academy of Political and Social Science*, *672*(1), 103–122.
Wilson, W. J. (1996). *When work disappears: The world of the new urban poor*. Random House LLC.
Wimberley, R. C., & Morris, L. V. (2002). The regionalization of poverty: Assistance for the Black Belt South? *Journal of Rural Social Sciences*, *18*(1), 11.

Tables and Figures

Table 1. Classification of left behind places by trajectory

Trajectory	1980 or 1990	2010 or 2018	N	Share
(1)	(2)	(3)	(4)	(5)
Long-term left behind	Yes	Yes	2,573	13%
Recently left behind	No	Yes	1,934	9%
No longer left behind	Yes	No	1,688	8%
Never left behind	No	No	14,375	70%

Notes: A table highlighting the criteria used to categorize the trajectory of left behind and other places. Column 1 shows the trajectory names. Columns 2-3 show are a matrix of the conditions required in the base (1980 or 1990) and end periods (2010 or 2018) to be classified to each trajectory based on the average percentile rank of college attainment, median household income, unemployment share, and the share in poverty. We refer to the combination of these variables as the "Left Behind Index". Columns 4 and 5 show the count and total share of places in each trajectory.

Table 2. Descriptive statistics on all independent and dependent variables

	Period	All places	Long term left behind	Recently left behind	No longer left behind	Never left behind
N		20,570	2,573	1,934	1,688	14,375
%		(100%)	(13%)	(9%)	(8%)	(70%)
Input variables						
Income	1980	49,581	33,081	42,831	34,974	55,161
	2018	66,645	40,384	45,271	55,391	75,362
Poverty share	1980	0.13	0.25	0.15	0.20	0.10
	2018	0.15	0.29	0.24	0.16	0.12
College share	1980	0.12	0.06	0.09	0.05	0.14
	2018	0.22	0.09	0.12	0.13	0.26
Unemployment share	1980	0.07	0.11	0.07	0.11	0.06
	2018	0.06	0.11	0.10	0.05	0.05
Upward mobility						
All	1980-2015	0.45	0.41	0.42	0.45	0.46
Stayed in CZ	1980-2015	0.43	0.40	0.40	0.42	0.44
Moved from CZ	1980-2015	0.47	0.44	0.45	0.48	0.48
Female	1980-2015	0.41	0.37	0.38	0.40	0.42
Male	1980-2015	0.49	0.45	0.46	0.49	0.50
White	1980-2015	0.46	0.42	0.43	0.46	0.47
Black	1980-2015	0.41	0.40	0.39	0.40	0.42
Hispanic	1980-2015	0.45	0.44	0.43	0.44	0.46
Asian	1980-2015	0.57	0.51	0.52	0.55	0.57
Native American	1980-2015	0.38	0.39	0.40	0.41	0.37
Demographics & controls						
Non-White share	1980	0.07	0.19	0.12	0.08	0.05
White share	1980	0.93	0.81	0.88	0.92	0.95
Hispanic share	1980	0.03	0.06	0.03	0.04	0.03
Native American share	1980	0.01	0.03	0.01	0.01	0.01
Single Parent share	1980	0.11	0.15	0.13	0.11	0.10
Population	1980	7641	3363	4291	1235	9532
Rural Share	1980	0.40	0.62	0.44	0.63	0.33
Rank change	1980-2018	-0.32	-1.10	-15.36	17.76	-0.01
Ten nearest neighbors						
Long-Term LB share	1980-2018	0.12	0.35	0.19	0.19	0.06
Recently LB share	1980-2018	0.09	0.14	0.18	0.09	0.07
No Longer LB share	1980-2018	0.08	0.13	0.09	0.16	0.06
Never left behind share	1980-2018	0.70	0.38	0.55	0.55	0.80

Notes: A descriptive statistics table showing the share of places that input variables for generating the trajectories, social mobility measures, the share of neighbors by trajectory, and other demographic characteristics. We split these descriptive statistics by the place-level trajectory. "Period" refers to the years of measurement. The "input variables" show the average differences over time of the variables used to generate the place-level trajectories. The "upward mobility" measures refer to the adult income ranks of children from households that were at 25th percentile of the national income distribution. The "rural share" shows the share of places that are classified as rural in each trajectory. "Rank change" shows the average change in the composite measure of the ranks of the four input variables. The "ten nearest neighbors" refers to the average share of the four trajectories among each place's ten nearest neighboring places.

Table 3. Five exemplar left behind places

Name	Classification	LB neighbors	Left Behind Index		Population		Income mobility
			1980/1990	2010/2018	1980	2018	
Gary, Lake, IN	Long-term LB	70%	21.00	13.75	151,953	76,677	0.40
Guadalupe, Maricopa, AZ	Long-term LB	10%	9.75	7.50	4,506	6,405	0.38
Uniontown, Perry, AL	Long-term LB	40%	16.25	5.25	2,112	1,969	0.39
Porterville, Tulare, CA	Recently LB	100%	32.5	15.00	19,707	59,797	0.42
Holly Springs, Wake, NC	No longer LB	0%	13.00	85.25	688	33,341	0.40
USA average	-	20%	50.47	50.45	7,467	10,645	0.45

Notes: A table showing statistics on five exemplar left behind places. The scores on the Left Behind Index are based on the lowest index value in either 1980 or 1990 and 2000 or 2018. We also show the population and average adult household income of children born to parents at the 25th percentile in this place ("Income mobility"). The LB neighbors column is calculated from the share of a place's neighbors that fall into either the recently or long-term left behind categories.

Table 4. Regression of upward mobility on place-level trajectories

	Upward income mobility		
	(1)	(2)	(3)
Trajectory (ref = "Never left behind")			
Long-Term left behind	-0.045***	-0.014***	-0.007***
	(0.001)	(0.001)	(0.001)
Recently left behind	-0.040***	-0.013***	-0.010***
	(0.001)	(0.001)	(0.001)
No Longer left behind	-0.010***	-0.004***	-0.002**
	(0.001)	(0.001)	(0.001)
Constant	0.458***	0.375***	0.393***
	(0.0004)	(0.005)	(0.005)
Observations	20,562	20,555	20,555
R^2	0.111	0.607	0.627
Adjusted R^2	0.111	0.592	0.613
CZ FE		X	X
Controls			X

*p < 0.10 **p < 0.05 ***p<0.01

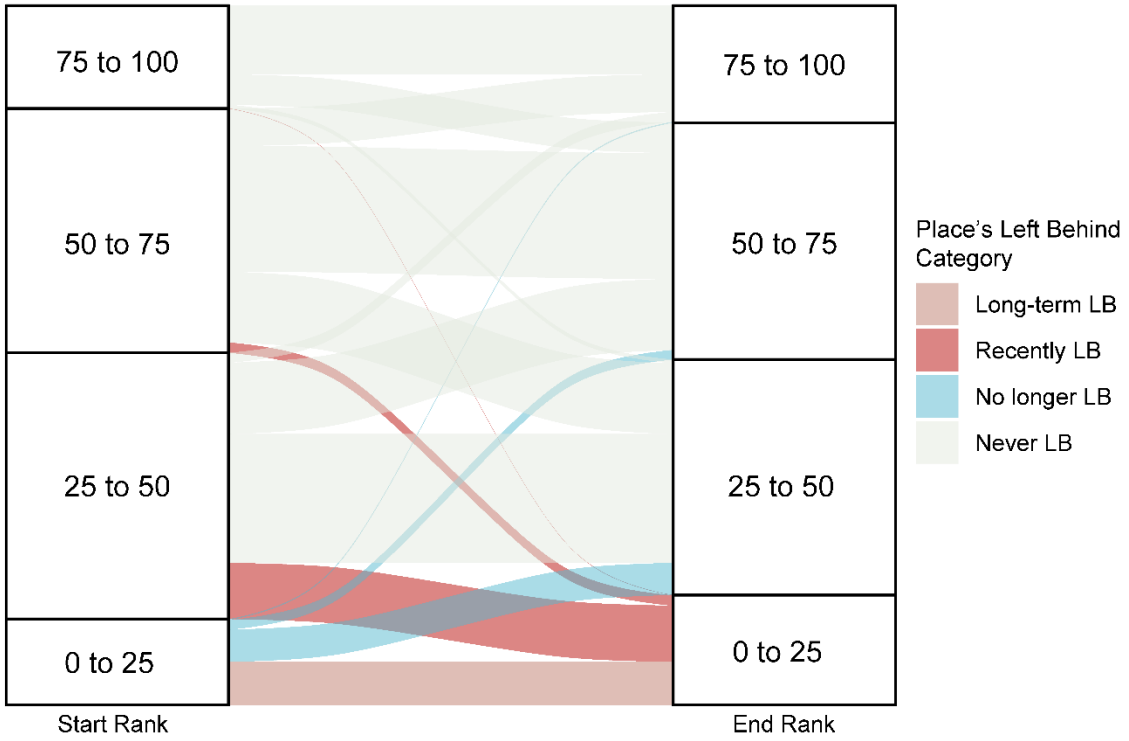
Notes: A table showing estimates from three regression models, where the dependent variable is the adult income rank of children born to households at the 25th percentile of the national income distribution ("upward income mobility"). The independent variables of interest are the place-level trajectories, referenced against the "Never left behind" category. Model (1) has no additional control variables. Model (2) adds a fixed effect for commuting zone. Model (3) adds additional place-level controls for rural and urban status, share Native American, share of single parent households, share non-White, share Hispanic, and the total population, all measured in 1980.

Table 5. Regression of upward mobility on place-level and neighboring trajectories

	Upward income mobility		
	All Places		
	(1)	(2)	(3)
Trajectory (ref = "Never left behind")			
Long-Term left behind	-0.017***	-0.012***	-0.005***
	(0.001)	(0.001)	(0.001)
Recently left behind	-0.019***	-0.011***	-0.009***
	(0.001)	(0.001)	(0.001)
No Longer LB	-0.00005	-0.003***	-0.001
	(0.001)	(0.001)	(0.001)
Neighbor %			
Long-Term left behind	-0.008***	-0.002***	-0.002***
	(0.0002)	(0.0002)	(0.0002)
Recently left behind	-0.011***	-0.003***	-0.003***
	(0.0003)	(0.0003)	(0.0003)
No Longer left behind	0.002***	-0.001***	-0.002***
	(0.0003)	(0.0003)	(0.0003)
Constant	0.470***	0.381***	0.398***
	(0.0005)	(0.005)	(0.005)
Observations	20,562	20,555	20,555
R^2	0.236	0.610	0.631
Adjusted R^2	0.236	0.596	0.618
CZ FE		X	X
Controls			X

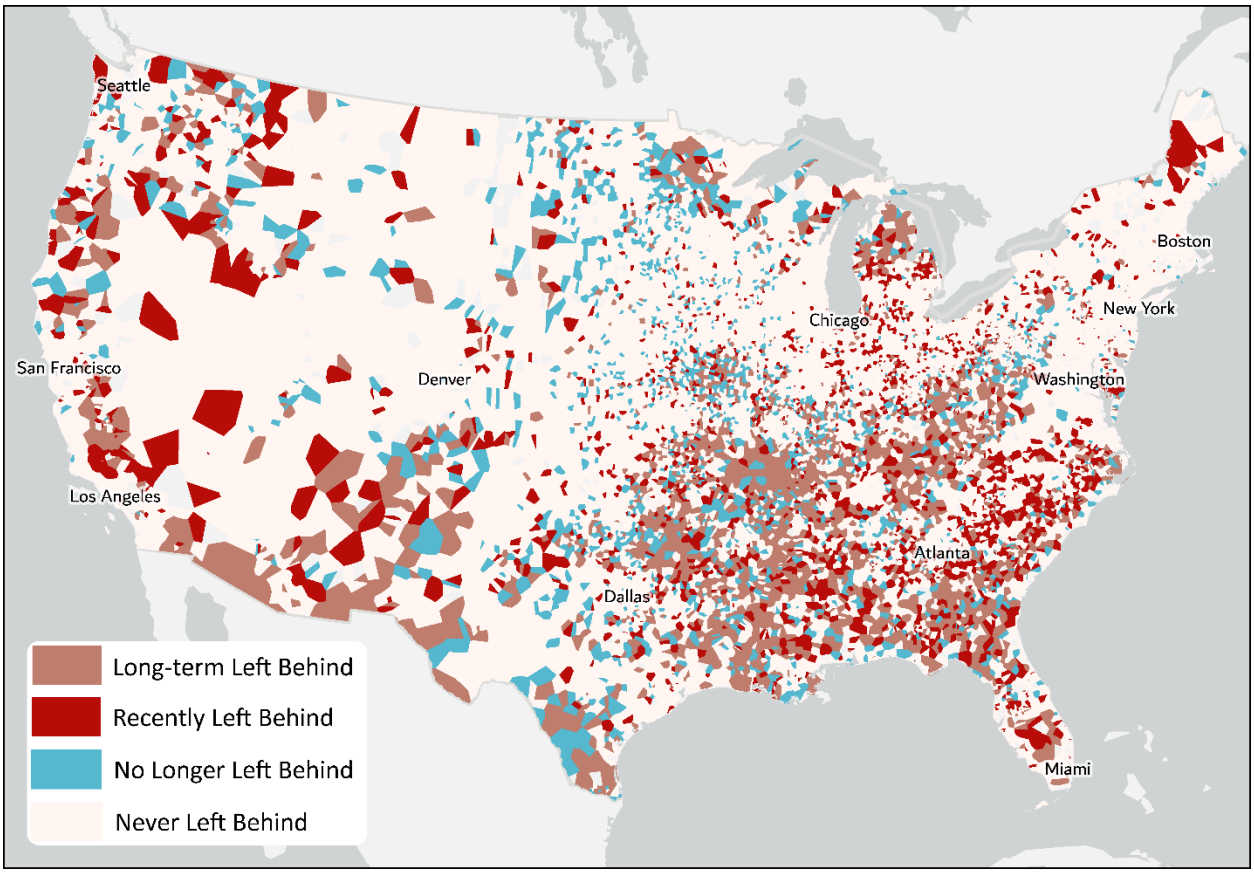
Notes: A table showing estimates from three regression models, where the dependent variable is the adult income rank of children born to households at the 25th percentile of the national income distribution ("upward income mobility"). The independent variables of interest are the place-level trajectories, referenced against the "Never left behind" category, and also the share of long-term, recently, and no longer left behind places among the ten nearest neighboring places. Model (1) has no additional control variables. Model (2) adds a fixed effect for commuting zone. Model (3) adds additional place-level controls for rural and urban status, share Native American, share of single parent households, share non-White, share Hispanic, and the total population, all measured in 1980.

Figure 1. Trajectories of places across economic rank quartiles



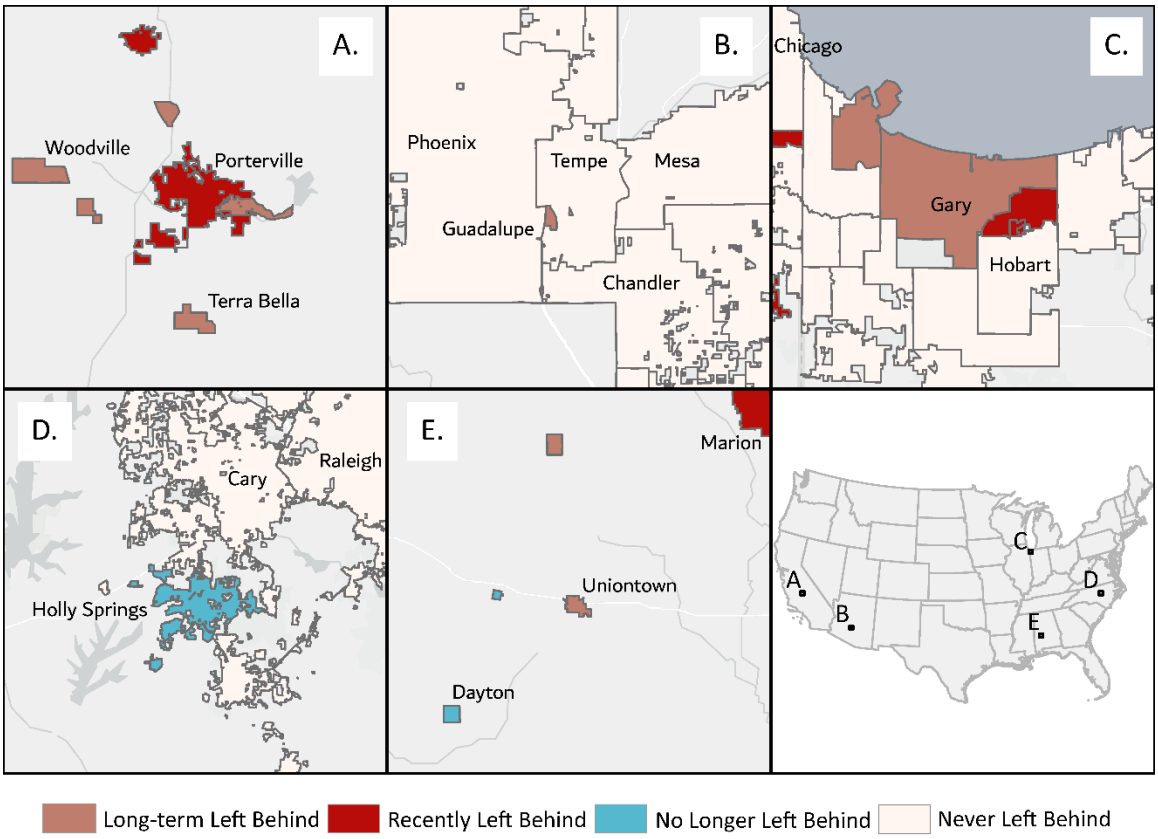
Notes: A flow chart highlighting the movement of places by economic quartile. The rank measure is defined in Equation 1. The starting period refer to 1980 or 1990 and the end period refers to 2010 or 2018. We color the flows according to the four trajectories. The salmon flow represents long-term left behind places. The red flow shows the downward movement in rank for recently left behind places. The blue flow shows the upward movement of no longer left behind places. The light green flows show the movement of never left behind places, which remain outside of the 25th percentile categories.

Figure 2. Map of place-level trajectories across the United States



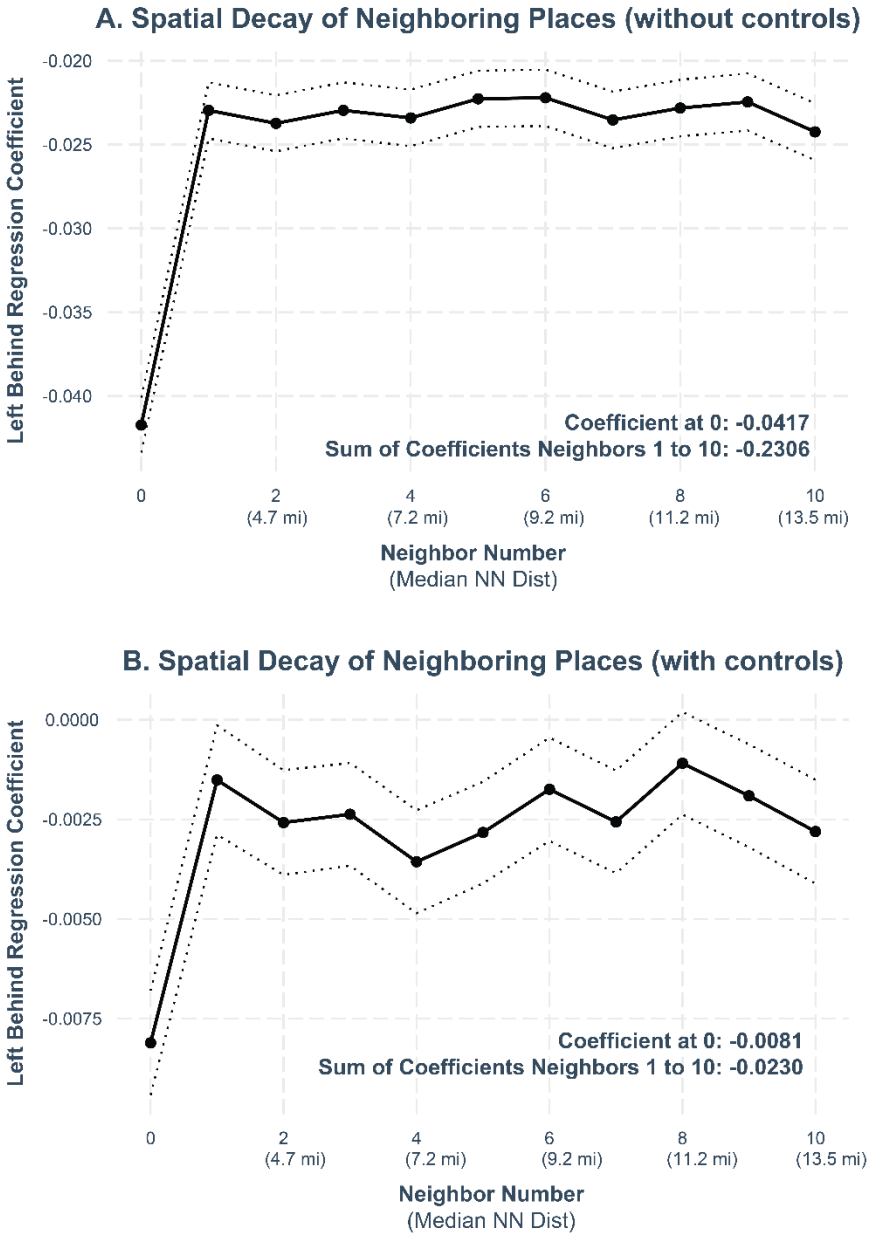
Notes: A map showing the geography of place-level trajectories across the United States. This map is generated using exploded place polygons to improve visualization at this scale. These shapefiles were generated by Uhl et al. (2023).

Figure 3. Map of five exemplar places



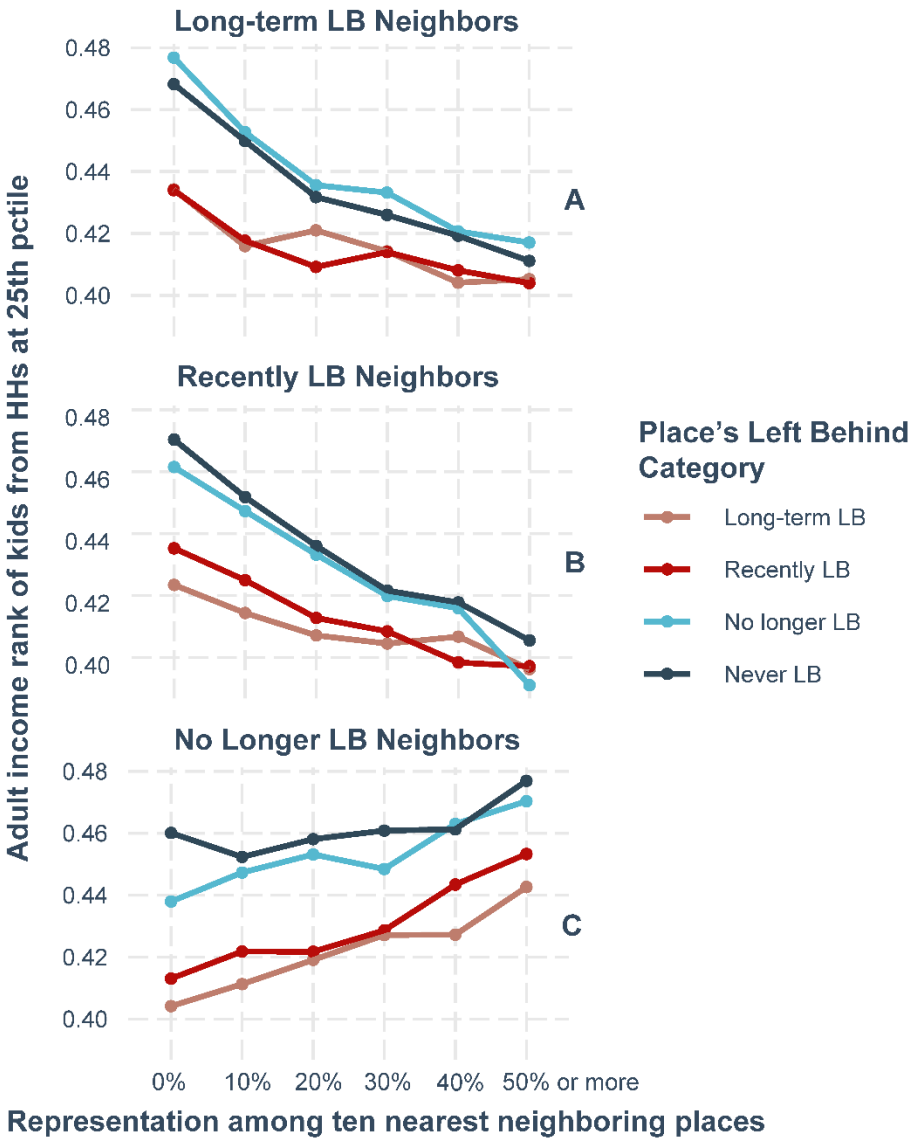
Notes: A six panel map showing the locations of five places: A) Porterville, California; B) Guadalupe, Arizona; C) Gary, Indiana; D) Holly Springs, North Carolina; E) Uniontown, Alabama; and the locations of these five places on the US map.

Figure 4. Spatial decay of left behindness on neighboring places



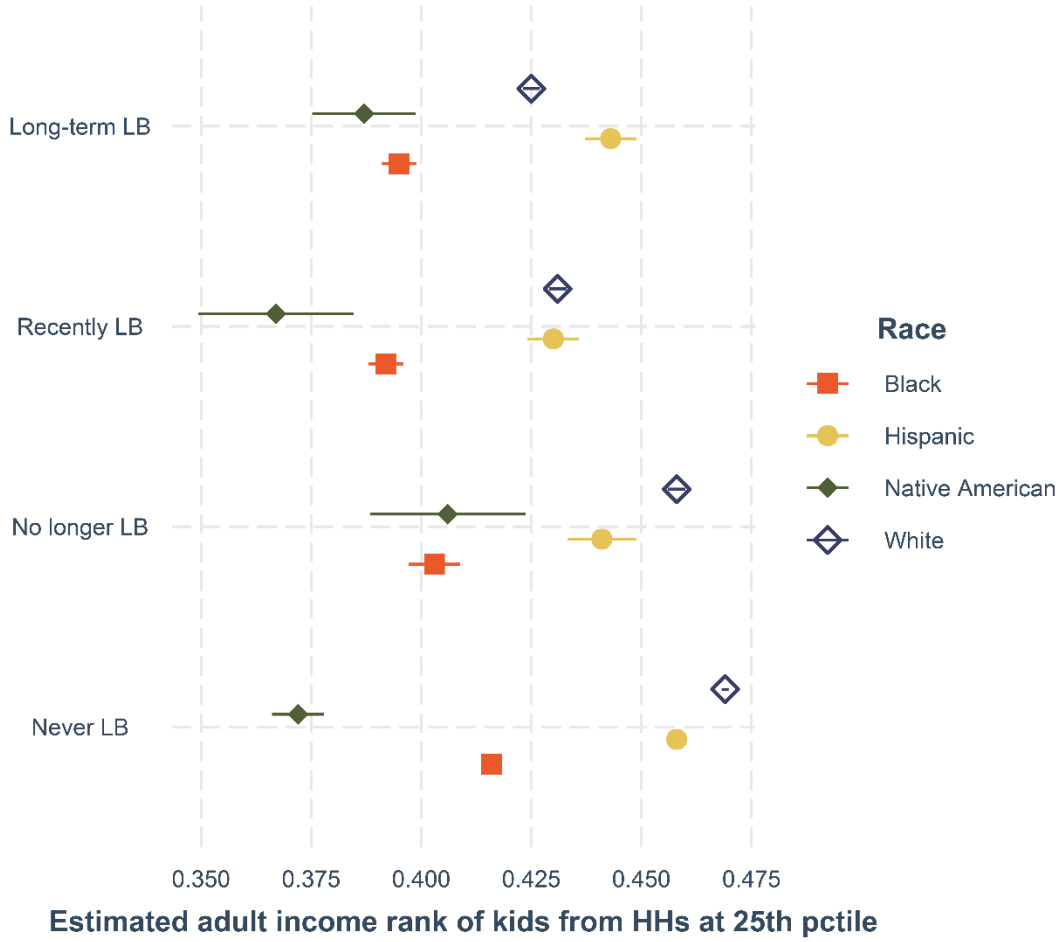
Notes: Two figures inspired by Chetty et al. (2018), Figure VII, showing the regression coefficients for left behind places on upward mobility based for focal places (neighbor number 0) and their ten nearest neighbors (neighbor number 1 to 10). In Panel A and B, are each based on 11 separate regressions models. In Model 0, we only examine the association between an indicator for whether a place is left behind, as defined by the long-term and recently left behind categories, and the upward mobility of the place. In Model 1, we assess the impact of the first neighbor's left behindness on a focal place's upward mobility, conditional on whether the focal place is left behind. In Model 2, we assess the impact of the second neighbor's left behindness on a focal place's upward mobility, conditional on whether the focal place is left behind, and so on.

Figure 5. Upward mobility by trajectories of neighbors, split by place trajectory



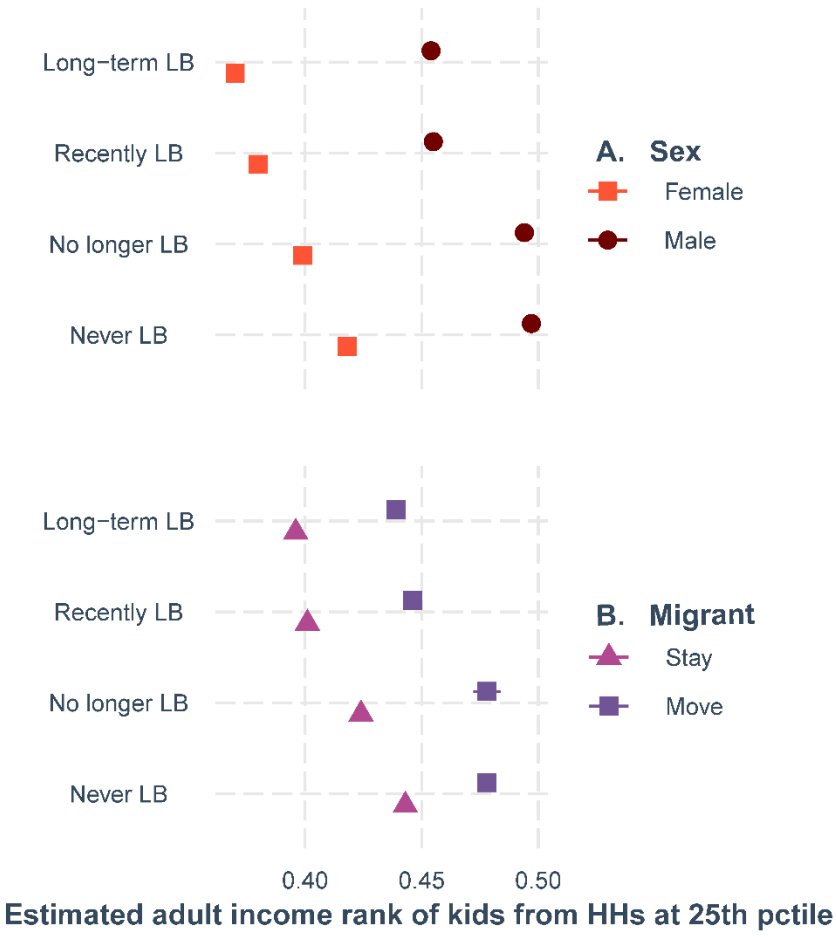
Notes: Three-line graphs showing the average adult income of kids from households at the 25th percentile (base period) based on a place's ten nearest neighbors left behind category, split by place's own trajectory. We shown neighbors for long-term left behind (A), recently left behind (B), and no longer left behind (C). The vertical axis shows the average adult income rank or upward mobility. The horizonal axis shows the share of neighbors that are categorized according to three of the four different trajectories. A place at 0% has zero neighbors in a given category and 50% is equivalent to having 50% of the neighbors in that category. The top panel (A) shows the mobility change for each additional neighbor that is classified as long-term left behind. The middle panel represents the mobility change for each additional recently left behind neighbor. The bottom panel (C) highlights the change in upward mobility for each additional no longer left behind neighbor.

Figure 6. Upward mobility, split by race and ethnicity



Notes: A point plot showing fitted values for upward mobility across different racial and ethnic groups. The dependent variable is the adult income of children from households at the 25th percentile with 95% confidence intervals.

Figure 7. Upward mobility, split by sex and migration status



Notes: Two point plots showing fitted values for upward mobility by sex and migrant status. The dependent variable is the adult income rank of children from households at the 25th percentile with 95% confidence intervals. Panel A Shows male and female differences. Panel B shows differences between individuals who left their childhood commuting zones (move) and those stayed (stay).

Appendix

Table A1. Regression of upward mobility on place-level and neighboring trajectories, with population weighted neighbors

	Upward income mobility				
		All Places		**Rural Only**	**Urban Only**
	(1)	(2)	(3)	(4)	(5)
Trajectory (ref = "Never left behind")					
Long-Term left behind	-0.027***	-0.012***	-0.006***	-0.006***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Recently left behind	-0.023***	-0.010***	-0.008***	-0.004***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No Longer LB	-0.005***	-0.003***	-0.001	-0.002*	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Neighbor Population %					
Long-Term left behind	-0.049***	-0.011***	-0.007***	-0.001	-0.007***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Recently left behind	-0.049***	-0.011***	-0.009***	-0.004*	-0.007***
	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
No Longer left behind	0.002	-0.014***	-0.016***	-0.012***	-0.007
	(0.004)	(0.003)	(0.003)	(0.005)	(0.005)
Constant	0.463***	0.376***	0.393***	0.388***	0.402***
	(0.0004)	(0.005)	(0.005)	(0.008)	(0.006)
Observations	20,562	20,555	20,555	8,416	12,139
R^2	0.173	0.609	0.629	0.746	0.550
Adjusted R^2	0.172	0.595	0.615	0.724	0.530
CZ FE		X	X	X	X
Controls			X	X	X

*p < 0.10 **p < 0.05 ***p<0.01

Notes: A table showing estimates from three regression models, where the dependent variable is the adult income rank of children born to households at the 25th percentile of the national income distribution ("upward income mobility"). The independent variables of interest are the place-level trajectories, referenced against the "Never left behind" category, and also the share population within long-term, recently, and no longer left behind places among the ten nearest neighboring places. Model (1) has no additional control variables. Model (2) adds a fixed effect for commuting zone. Model (3) adds additional place-level controls for rural and urban status, share Native American, share of single parent households, share non-White, share Hispanic, and the total population, all measured in 1980. Models 4 and 5 reproduce the estimates from Column 3, but only for rural and urban places. The place-level control for rurality is dropped from these latter two models.

Table A2. Regression of upward mobility on place-level and neighboring trajectories, with additional splits for rural and urban places

	Upward income mobility				
		All Places		**Rural Only**	**Urban Only**
	(1)	(2)	(3)	(4)	(5)
Trajectory (ref = "Never left behind")					
Long-Term left behind	-0.017***	-0.012***	-0.005***	-0.006***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Recently left behind	-0.019***	-0.011***	-0.009***	-0.005***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No Longer LB	-0.00005	-0.003***	-0.001	-0.002*	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Neighbor %					
Long-Term left behind	-0.008***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0003)
Recently left behind	-0.011***	-0.003***	-0.003***	-0.002***	-0.003***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)
No Longer left behind	0.002***	-0.001***	-0.002***	-0.001***	-0.002***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0005)
Constant	0.470***	0.381***	0.398***	0.394***	0.406***
	(0.0005)	(0.005)	(0.005)	(0.008)	(0.006)
Observations	20,562	20,555	20,555	8,416	12,139
R^2	0.236	0.610	0.631	0.747	0.554
Adjusted R^2	0.236	0.596	0.618	0.725	0.534
CZ FE		X	X	X	X
Controls			X	X	X

*p < 0.10 **p < 0.05 ***p<0.01

Notes: A table showing estimates from five regression models, where the dependent variable is the adult income rank of children born to households at the 25th percentile of the national income distribution ("upward income mobility"). The independent variables of interest are the place-level trajectories, referenced against the "Never left behind" category, and also the share of long-term, recently, and no longer left behind places among the ten nearest neighboring places. Model (1) has no additional control variables. Model (2) adds a fixed effect for commuting zone. Model (3) adds additional place-level controls for rural and urban status, share Native American, share of single parent households, share non-White, share Hispanic, and the total population, all measured in 1980. Models 4 and 5 reproduce the estimates from Column 3, but only for rural and urban places. The place-level control for rurality is dropped from these latter two models.

Table A3. Regression of upward mobility on place-level and neighboring trajectories with alternate classifications for Left Behind Places

	Upward income mobility		
	Left Behind < 18.75 index	Left Behind < 25 index	Left Behind < 31.25 index
	(1)	(2)	(3)
Trajectory (ref = "Never left behind")			
Long-Term left behind	-0.004***	-0.007***	-0.010***
	(0.001)	(0.001)	(0.001)
Recently left behind	-0.001	-0.010***	-0.004***
	(0.001)	(0.001)	(0.001)
No Longer LB	-0.008***	-0.002**	-0.012***
	(0.001)	(0.001)	(0.001)
Observations	20,555	20,555	20,555
R^2	0.625	0.627	0.630
Adjusted R^2	0.612	0.613	0.616
CZ FE	X	X	X
Controls	X	X	X

Notes: A table showing estimates from three regression models, where the dependent variable is the adult income rank of children born to households at the 25th percentile of the national income distribution ("upward income mobility"). The independent variables of interest are the place-level trajectories, referenced against the "Never left behind" category, and also the share population within long-term, recently, and no longer left behind places among the ten nearest neighboring places. The three models presented in this table reproduce Column 3 in Table 3, but we are we lower the threshold for being a left behind place by 25% (Left Behind Index = 18.75), keep it the same as in the main specification (Left Behind Index = 25) and where we increase the threshold by 25% (Left Behind Index = 31.25).

Table A4. Regression of upward mobility on place-level trajectories, rank change over study period

	Upward income mobility			
	(1)	(2)	(3)	(4)
Left Behind 1980	-0.028***	-0.040***	-0.010***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Rank Change		0.0002***	0.0001***	0.00005***
		(0.00001)	(0.00001)	(0.00001)
Left Behind 1980 x Rank Change		0.0001***	0.00002	-0.00001
		(0.00002)	(0.00001)	(0.00001)
Constant	0.452***	0.453***	0.372***	0.393***
	(0.0004)	(0.0004)	(0.005)	(0.005)
Observations	20,562	20,562	20,562	20,562
R^2	0.032	0.087	0.597	0.621
Adjusted R^2	0.032	0.086	0.582	0.607
CZ FE			X	X
Controls				X
Note:				*p**p***p<0.01

Notes: A table showing estimates from four regression models, where the dependent variable is the adult income rank of children born to households at the 25th percentile of the national income distribution ("upward income mobility"). The model's main predictors are a binary left behind classification (Below 25 in the Left Behind Index in 1980) and raw rank change (average 1980-1990 rank subtracted from average 2010-2018 rank). Column (1) shows the un-interacted raw model with just the left behind 1980 variable. The model shown in Column (2) builds upon the model in Column (1) with the addition of the rank change variable and an interaction term between the rank change and the 1980 left behindness. The model shown in Column (3) is of the same specification as Columns (1) & (2) but adds in a commuting zone (CZ) fixed effect. Finally, Column (4)'s model adds in place-based controls.

Table A5. Regression of upward mobility on place-level trajectories, removing marginal cases of entry and exit from left behindness

	Upward income mobility		
	(1)	(2)	(3)
Long-Term LB	-0.045***	-0.014***	-0.006***
	(0.001)	(0.001)	(0.001)
Recently LB	-0.044***	-0.016***	-0.015***
	(0.003)	(0.002)	(0.002)
No Longer LB	0.005*	-0.002	0.0003
	(0.003)	(0.002)	(0.002)
Constant	0.458***	0.376***	0.395***
	(0.0004)	(0.006)	(0.006)
Observations	17,630	17,624	17,624
R^2	0.100	0.593	0.616
Adjusted R^2	0.100	0.576	0.599
CZ FE		X	X
Controls			X
Note:			*p**p***p<0.01

Notes: A table showing estimates from three regression models, where the dependent variable is the adult income rank of children born to households at the 25th percentile of the national income distribution ("upward income mobility"). The independent variables of interest are the place-level trajectories, referenced against the "Never left behind" category. Model (1) has no additional control variables. Model (2) adds a fixed effect for commuting zone. Model (3) adds additional place-level controls for rural and urban status, share Native American, share of single parent households, share non-White, share Hispanic, and the total population, all measured in 1980. In this robustness analysis, we restrict the Recently left behind and the No longer left behind to places that make substantial upward and downward moves (25 ranks) in the Left Behind Index between the start and end periods.

Table A6. Baseline and change characteristics of left behind places on the Left Behind Index

	Levels		Change 80/90 – 10/18	
	1980/1990	2010/2018	Mean	SD
Long-term left behind	15.47	13.89	-1.71	7.29
Recently left behind	36.37	18.26	-18.11	9.45
No longer left behind	17.88	38.31	+20.43	12.49
Never left behind	36.37	18.27	-18.11	13.41

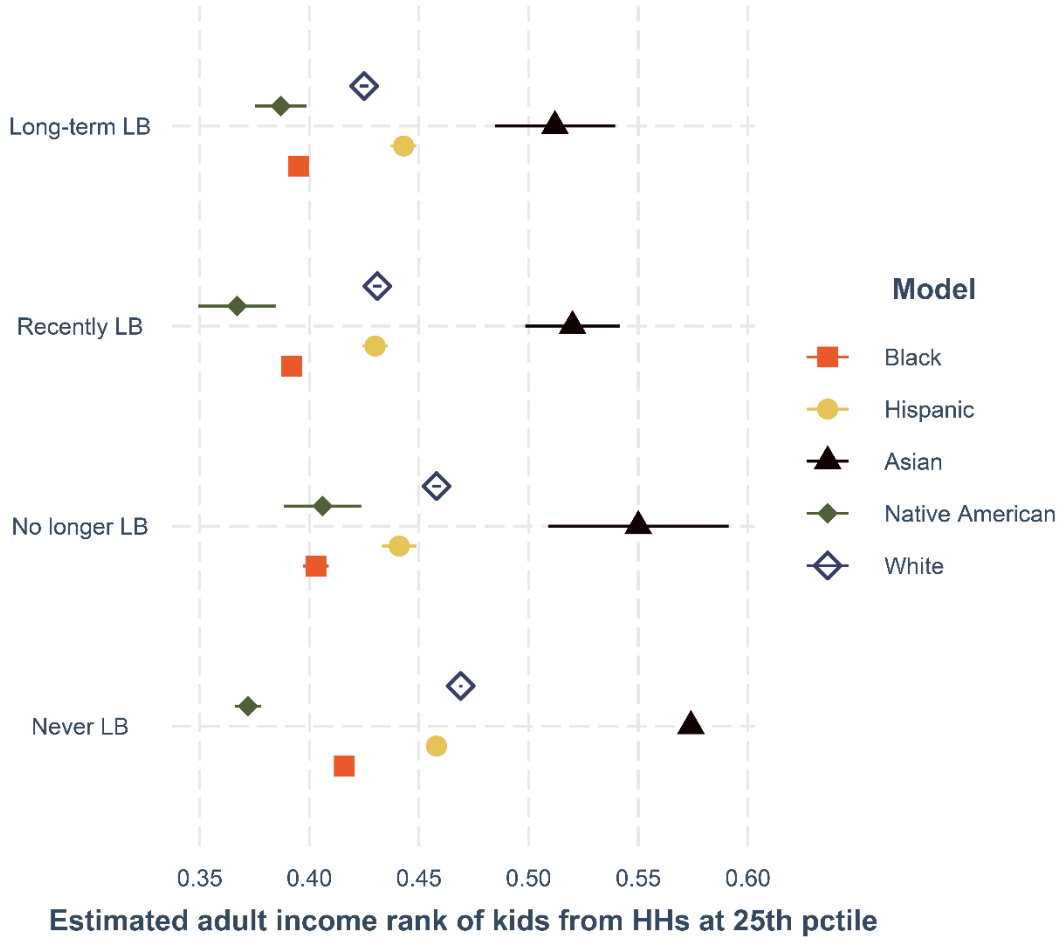
Notes: A table of highlighting average Left Behind Index levels within the four left behind categories. The first two columns under the "Levels" header show average Left Behind Index levels within the four left behind categories for 1980/1990 (Column 1) and 2010/2018 (Column 2). The next two columns under the header "Change 80/90 – 10/18" highlight the mean (Column 3) and standard deviation (Column 4) of the change in rank for places between the base period (1980/1990) and end period (2010/2018) grouped by left behind category.

Table A7. Regression of upward mobility on place-level trajectories, analysis at census tract scale

	Upward income mobility		
	(1)	(2)	(3)
Trajectory (ref = "Never left behind")			
Share in poverty 1990	-0.213***	-0.165***	-0.111***
	(0.002)	(0.002)	-0.009***
Long-Term left behind		-0.023***	-0.009***
		(0.001)	(0.001)
Recently left behind		-0.030***	-0.016***
		(0.001)	(0.001)
No Longer left behind		0.003***	0.004***
		(0.001)	(0.001)
Neighbor %			
Long-Term left behind			-0.006***
			(0.0001)
Recently left behind			-0.010***
			(0.0002)
No Longer left behind			0.004***
			(0.0002)
Constant	0.478***	0.476***	0.479***
	(0.0003)	(0.0003)	(0.0003)
Observations	78,270	78,270	78,270
R^2	0.121	0.155	0.237
Adjusted R^2	0.121	0.155	0.237
			*p < 0.10 **p < 0.05 ***p<0.01

Notes: A table showing estimates from three regression models at the census tract scale, where the dependent variable is the adult income rank of children born to households at the 25th percentile of the national income distribution ("upward income mobility"). The model's main predictors are the left behind classifications and proportion of left behind places among neighbors. These variables are measure at the place scale. Following Chetty et al. (2018), we include an additional control for the share of population in poverty.

Appendix Figure A1. Upward mobility, split by race and ethnicity, Asian category included



Notes: Two point plots showing fitted values for upward mobility across different racial and ethnic groups. The dependent variable is the adult income of children from households at the 25th percentile with 95% confidence intervals. Panel A Shows all racial and ethnic groups except for Asians. Panel B includes the estimates for Asians. We split the estimates out in this way because the high upward mobility levels of Asians obscure the differences among the other four groups.

Appendix Figure A2. Upward mobility by start and end decile on Left Behind Index

End period: Left Behind Index decile

Base period: Left Behind Index decile	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
0-10	0.409	0.424	0.436	0.452	0.474	0.471				
10-20	0.407	0.417	0.435	0.451	0.456	0.472				
20-30	0.411	0.417	0.426	0.443	0.461	0.48	0.469			
30-40	0.417	0.418	0.429	0.441	0.456	0.467	0.471	0.469		
40-50	0.42	0.428	0.431	0.443	0.453	0.462	0.474	0.461		
50-60		0.422	0.438	0.444	0.451	0.459	0.471	0.474		
60-70			0.419	0.437	0.447	0.456	0.465	0.475	0.482	
70-80					0.449	0.46	0.473	0.482	0.483	
80-90						0.463	0.476	0.506	0.517	
90-100								0.516	0.512	0.498

Notes: A figure showing the average income mobility level for children with parents at 25th percentile by place's start and end decile on the Left Behind Index. The starting period is from 1980 to 1990 and the ending period is from 2010 to 2018. Our definition of "left behind" at the beginning and the end is inferred from the 2nd and 3rd decile on the Left Behind Index.