The Geography of Family Differences and Intergenerational Mobility

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Abstract

A recent series of studies by the Equality of Opportunity Project has documented substantial geographical differences in intergenerational income mobility. These spatial differences are important because they suggest that place matters more than previously thought in determining economic well-being. In this paper, we show that family characteristics vary widely across areas and simulations indicate that differences these family characteristics can explain a substantial share of the variation in intergenerational income mobility across places documented by the Equality of the Opportunity Project. Additionally, we show that the characteristics of families that move differ substantially from families that do not move, which raise doubts about the external validity of causal inferences based on the Equality of Opportunity Project's analysis of movers.

1. Introduction

The United States is an incredibly diverse country consisting of a large number of places with distinctive physical characteristics, varied populations, and different economic circumstances. A recent, groundbreaking study by Chetty et al. (2014) has added to this list of differences. In this study, Chetty et al. (2014) document previously unknown, large geographical differences in intergenerational income mobility. For example, Chetty et al. (2014) reported that the income of a 30-year-old person from a low-income family who grew up in Cook County, IL (Chicago) is nearly 30% ($7,420) lower than for a person of the same age from a similarly low-income family who grew up in DuPage County, a mere 20 miles west. The present value of this future income difference is substantial—$167,000—assuming 40 years of working life and a three percent discount rate.

The large geographic differences in intergenerational income mobility documented by Chetty et al. (2014) are important because they raise the possibility, arguably in a more compelling way than in any previous research, that places, independently of the people that live there, matter in determining economic wellbeing. It is likely, that the findings reported in Chetty et al. (2014) will become one of the key facts in the "people versus place" debate in economic development (Kain and Persky 1969; Bartik 1991; Galster and Killen 1995; Bartik 2003; Kline and Moretti 2014).

While the Chetty et al. (2014) study is innovative, it remains a descriptive analysis. The place differences documented in Chetty et al. (2014) are not causal estimates and are potentially confounded by differences between the families that live in these places. Chetty et al. (2014) were aware of the potential confounding issue:

"…[O]ur descriptive analysis does not shed light on whether the differences in outcomes across areas are due to the causal effect of neighborhoods or differences in the characteristics of people living in those neighborhoods." (Chetty et al. 2014, p. 1559)

However, Chetty et al. (2014) did not investigate in a meaningful way the extent of the possible confounding by differences in family characteristics most likely because of the use of income tax records that have little information about family characteristics.

The authors did assess, in a limited way, the extent to which differences in the racial composition of families could explain differences in intergenerational income mobility between places. Specifically, Chetty et al. (2014) calculated intergenerational income mobility using their entire sample and then again using a sample consisting largely of non-Hispanic whites. The correlation between the two measures of intergenerational income mobility by place was quite high—0.91. This result is not surprising, however, because, as reported in Chetty et al. (2014), non-Hispanic whites make up 68% of the entire sample. Therefore, the intergenerational income mobility of the limited sample would mechanically be highly correlated with the intergenerational income mobility of the full sample. In addition, for this particular analysis, approximately 20% of places were dropped presumably because they had no zip codes where at least 80% of the residents were non-Hispanic white, which was one of the criteria used to select the sample. In other words, places with relatively high concentrations of non-white (non-Hispanic white) people were omitted. This approach to assessing whether race is a confounding influence is quite indirect and does not rule out the possibility that the racial composition of families living in different places accounts for a non-trivial fraction of the geographic variation in intergenerational income mobility.[1] Thus, the following statement by the authors seems misplaced:

"The main lesson of this analysis is that both blacks and whites living in areas with large African American populations have lower rates of upward income mobility." (Chetty et al. 2014, p. 1607).

The only instance that Chetty et al. (2014) explicitly examined whether individual differences confounded place differences in intergenerational income mobility was with respect to family structure. Here the evidence suggests strongly that the place-based estimates of income mobility may be significantly confounded by family-level differences. Specifically, when intergenerational income mobility is recalculated using only children who grew up in two-parent families, the correlation between

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[1] In fact, Chetty et al. (2014) recommend undertaking the analysis that we conduct in this paper: "To distinguish between these two channels, we would ideally control for race at the individual level, essentially asking whether whites have lower rates of upward mobility in areas with a larger black population." (Chetty et al. 2014, p. 1605).

this measure of intergenerational income mobility by place and the baseline measure that used the entire sample was only 0.66. While still relatively large, the correlation between the two measures of intergenerational income mobility is far from perfect and indicative of a substantial amount of confounding of place effects by family characteristics.[2]

In a companion study, Chetty and Hendren (2016a) address the issue of whether individual-level characteristics confound place effects of intergenerational income mobility by focusing on families that move. The motivation for this analysis is straightforward. If place matters, then moving to a place with greater income mobility should improve children's income mobility relative to those children who do not move, and the improvement should be larger the longer the child spent in the better place. Indeed, this is exactly what Chetty and Hendren (2016a) find—every year living in a place with 1 percentile higher intergenerational income mobility rank increases the child's rank in the income distribution by 0.04 percentage points. This result holds whether the comparison is to children in other families who moved at different ages or a comparison of children in the same family who were different ages when the family moved. According to Chetty and Hendren (2016b), if a child spends 20 years in a place with one standard deviation higher rank of income mobility, their earnings at age 26 will be 10% higher. Finally, Chetty and Hendren (2016a) estimate that approximately two-thirds of observed differences in intergenerational income mobility across places is due to place-based differences.

While the Chetty and Hendren (2016a) analysis is compelling, providing substantial and highly credible evidence that places exert a causal effect on children's later life outcomes, it is limited by a lack of external validity. A few pieces of evidence are relevant. First, as Chetty and Hendren (2016a) report, movers are different from stayers. Families that move have incomes that are approximately 12% higher than non-movers. Second, out of 16.5 million possible movers, Chetty and Hendren (2016a) use only a

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[2] It should be noted that Chetty et al. (2014, p. 1604) did conduct an analysis that estimated associations between intergenerational income mobility in an area and several area-wide aggregate characteristics including racial composition and family structure. These estimates suggest that these family differences matter, and in fact, the fraction of an area's families headed by a single mother explained the most variation among the several variables examined. The other variables examined were commuting patterns, income inequality (Gini index), high school dropout rate, and social capital index.

small fraction (1.55 million, nine percent) in most of their analyses. Third, the return to moving (the

convergence of origin outcome to destination outcome) differs by the distance of the move and the

number of moves, which suggests strongly that the types of families differ by the distance of the move

and number of moves. In short, there appears to be considerable heterogeneity among movers, which

suggests that the analysis limited to a fraction of movers may lack external validity even among movers.

However, and more importantly, there is a substantial literature on internal migration in the U.S. that

demonstrates that movers and stayers differ significantly (Sjaastad 1962; Greenwood 1969, 1997; Mincer

1978; Crowder and South 2005; Kling et al. 2007; South et al. 2011; Molloy et al. 2011). This point is

recognized by Chetty and Hendren (2016a):

"An important caveat in interpreting this estimate is that it is a local average treatment effect

estimated based on house-holds who choose to move to certain areas. The mean

exposure effect of moving a randomly selected household to a new area may differ,

since households that choose to move to a given area may be more likely to benefit from that

move than the average household in the population." (Chetty and Hendren 2016a, p. 5)

Despite this important caveat, Chetty and Hendren (2016b) conclude:

"This paper has estimated the causal effect of childhood exposure to each county in the U.S. on

children's outcomes in adulthood by analyzing the outcomes of children whose families

move across areas. …. We use our estimates to construct predictions of the causal effect of

growing up in each county that can be used to guide families seeking to move to better areas."

(Chetty and Hendren 2016b, p. 43)

This conclusion implies broad external validity that seems somewhat speculative given the authors

acknowledgment of the potential lack of external validity and the points we noted earlier about

differences between movers and stayers. Accordingly, the use of the results from the mover analysis to

provide causal estimates of the effect of place more generally, as Chetty and Hendren (2016b) do, is

arguably going beyond the evidence of the study.

2. Contribution: Observable Differences of Families and Movers

The brief review of Chetty et al. (2014) and Chetty and Hendren (2016a, 2016b) highlights two key issues pertinent to the conclusions of these studies. The first is whether there are differences in family characteristics by place that may confound estimates of differences in intergenerational income mobility by place, and, if so, how large is the potential confounding. Notably, this issue is largely not addressed in Chetty et al. (2014), and although Chetty and Hendren (2016a) use statistical methods to take account for differences in people characteristics across places, the differences remain unmeasured and are specific to a limited population of movers. Therefore, the conclusion by Chetty and Hendren (2016a) that two-thirds of the differences across places in intergenerational income mobility is due to place relies solely on the efficacy of the statistical approach and sample used in that study. The second issue is the external validity of the analysis of Chetty and Hendren (2016a, 2016b), which depends on whether there are differences between movers and stayers. Here, too, the issue is largely unaddressed despite its centrality to an assessment of the external validity, and therefore overall usefulness, of the causal estimates in Chetty and Hendren (2016a, 2016b). Economist tend to value greatly internal validity, and downplay the importance of external validity, but the argument to favor one over the other is not clear (Cartwright 2011; 2012; 2013).

In this paper, we provide direct evidence derived from Census data of differences in family characteristics across places and differences in characteristics between movers and stayers. This descriptive information is useful, if not essential, for assessing the potential confounding of differences in intergenerational income mobility by place, and whether results from analyses based on movers has plausible external validity. In addition, using measured differences in family characteristics across places, we simulate differences in intergenerational income mobility across places that could be due to these differences in family characteristics.

We find that there are large differences across places in family characteristics (holding income constant) and that these differences are significantly correlated with differences in intergenerational income

mobility. Simulations indicate that differences in a relatively small set of family characteristics across places can explain a substantial share of the variation in intergenerational income mobility across places documented by Chetty et al. (2014). For example, we find that differences in the income of adult children associated with mother's race, age, education, marital status and nativity explain 80 to 120 percent of the difference in intergenerational income mobility between the lowest and next lowest quintiles of absolute mobility in Chetty et al.'s (2014) place-based distribution of intergenerational income mobility. The same limited set of characteristics explains 40 to 60 percent of the difference in intergenerational income mobility between the lowest and highest quintiles of absolute mobility in Chetty et al.'s (2014) place-based distribution of intergenerational income mobility.

We also find that there are substantial differences in family characteristics of movers and stayers. Whether based on a comparison with families in the origin or destination locations, families that move are more likely to have mothers who are more educated, married, white, and younger than mothers of families that do not move. In addition, families that move are a more homogenous group, compared to families that choose not to move. Therefore, differences in family characteristics of movers explain much less of the differences in intergenerational income mobility across places (for a sample of movers). This is consistent with findings in Chetty and Hendren (2016a), which uses a sample of movers, that suggests a real place effect on intergenerational income mobility. However, the significant differences between families that do and do not move imply that these place-based differences do not necessarily generalize to most families because the vast majority of them are non-movers.

3. Empirical Approach

3.a. Data

The demographic data used for this study come from the 5% public use samples (PUMS) of the 1990 and 2000 U.S. Decennial Censuses (Ruggles et al., 2015). For each Census, we selected observations from

family units having at least one child aged 0-12 with their mother and/or father present.[3] Each family unit receives a single observation within its respective sample, where the mother's characteristics describe the family if a she is present; otherwise, the father's characteristics are used.[4]

The advantage of using PUMS data for the analysis is that they allow us to observe a set of family-level characteristics, such as race and education attainment, that are not available in the IRS data used by Chetty et al. (2014). Our starting point is to explore how certain families' characteristics correlate across space with county-level measures of intergenerational income mobility provided by Chetty et al.[5] The finest geographic variable in the PUMS files is a family's public use microdata area, or PUMA.[6] For most families this identifies the county of residence. Where a PUMA crosses county lines, we assign its families to "super-counties". A super-county is constructed as the smallest possible group of contiguous counties that fully contains all overlapping PUMAs, but whose individual county components do not fully contain all of their overlapping PUMAs.[7] Going forward, we make no distinction between individual counties and super-counties, referring to each unit of geography as a "super-county".

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[3] Chetty et al. (2014) used a sample of children born between 1980 and 1982 in their analysis, whose families can therefore be viewed as a subset of our larger sample of families. We do not limit our sample exclusively to families whose children would have belonged to the 1980-82 birth cohort because we are not limited by data availability, as were Chetty et al. (2014). Because we are interested in documenting differences in family characteristics across space, we desire to use the largest, most representative sample of families for each area. We use the 2000 Census to assess whether the main findings from the 1990 Census are somehow unique. Families in the year 2000 sample are limited to those with children between the ages of 0 to 12.

[4] A mother's characteristics are assigned to 96 and 94 percent of the observations in the 1990 and 2000 samples, respectively.

[5] Chetty et al. conduct analyses and construct measures of intergenerational income mobility for geographical units defined by commuting zone and counties, which are two standard geographical divisions. The choice of geography is not consequential, as their findings do not depend in a meaningful way on what level of geography is used. We use counties, although for some portion of our sample, we need to combine observations into what we refer to as "super-counties" (discussed below).

[6] PUMAs have populations of at least 100,000 but, typically, no more than 200,000. PUMAs generally follow the borders of counties, groups of counties, or census-defined places. Individual PUMAs do not cross state boundaries.

[7] This approach yields 897 geographic units of analysis that we can match to microdata observations, 386 counties and 511 super-counties. Super-counties are built up from an average of 5.3 individual counties. Using this approach, for the 1990 sample we are able to assign 711,264 family observations to individual counties and 460,375 family observations to super-counties. For the 2000 sample, we assign 751,382 observations to 382 individual counties and 405,074 observations to 499 super-counties. Observations that we cannot assign to either a specific county or super-county are dropped from the samples.

The key metric of intergenerational income mobility highlighted by Chetty et al. (2014) is the absolute intergenerational income mobility (AIIM) of children whose parents' incomes fell within the 25th percentile of the national income distribution (for years 1996 – 2000). Accordingly, we limit our samples to families whose parents' incomes fell within the 3rd decile of the national income distribution in each Census year. In each year, 1990 and 2000, we derive the distribution of family incomes using self-reported earnings data provided in the PUMS files. Family income is calculated as the sum of the mother's and, if present, the father's personal incomes. This approach mimics that used by Chetty et al. (2014). For convenience, we refer to our family income measure as "nuclear family income". For families whose super-county consists of only a single county, their county's AIIM is taken directly from the actual county-level AIIM estimates made available in Chetty et al.'s online data appendix.[8] For families assigned to super-counties that are made up of multiple counties, their super-county's AIIM is calculated as the weighted average of the county-level AIIM estimates provided by Chetty et al.[9]

We then go on to measure several characteristics of families in our sample: race, Hispanic origin, educational attainment, marital status, immigration status, and age. We also measured whether the family was a recent mover determined by comparing their super-county at the time of the Census survey (i.e., 1990 or 2000) with their super-county from five years prior, if it can be identified.[10] We assigned to each family its super-county's AIIM quintile, which simply measures their super-counties position along the AIIM distribution (across all super-counties). We chose these family attributes with exception of migration status because they overlap with data from the National Longitudinal Survey of Youth—1997 Cohort (NLSY97). We use the NLSY97 to construct measures of predicted adult incomes. We describe how we construct predicted income in more detail below. In addition to these family characteristics that

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[8] This appendix is currently available at the Equality of Opportunity Project website, www. http://www.equality-of-opportunity.org/data/.

[9] Weighted average AIIM scores for super-counties are constructed using person-level sample weights. Weighted averages do not differ substantially from non-weighted averages.

[10] 1990 and 2000 PUMS files provide information on a person's PUMA of residence five year prior. However, a family's migration status cannot be measured for a small number of cases due to differences in how PUMS records identify a family's current and previous PUMA. That is, for a handful of cases, it is not clear whether or not a family that indicated that it had moved actually crossed super-county boundaries.

overlap with information in the NLSY97, we measure several others: home ownership, status as a welfare recipient, number of own children in household, number of children ever born, and number of family members in household.

3.b. Analysis

The purpose of the analysis that follows is to assess the degree to which certain family characteristics vary across super-county AIIM quintiles and the extent to which any variation in family-level characteristics can be used to explain the inter-quintile variation in AIIM. If the variation in AIIM across areas was purely a function of place-level characteristics and not family- or person-level characteristics, then we would expect little variation across areas in family characteristics. Conversely, if low-income families' characteristics differ across areas, then it may very well be just the families themselves that explain an area's AIIM, either directly or through their influence on an area's institutional characteristics.[11]

To begin, we calculate the share of families in the kth AIIM quintile that have characteristic j, which we abbreviate by β_{jk}.[12] Next, we assess if family-level characteristics vary by whether the family was a recent (within five years) mover out of a super-county, relative to non-movers originating from the same super-county. Here, families are assigned the AIIM quintile of their previous (i.e., "origin") super-county, $AIIM_{ik}^o$, which is determined by their super-county of residence five years prior. We then

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[11] We note, however, that the families in our sample make up less than 10% of all families because our sample is limited to families with children and who are in the third decile of the income distribution. Therefore, the direct influence of these families on county (commuting zone) institutions, or policies, that influence intergenerational income mobility is likely quite small.

[12] In order to more easily make tests of significance for differences in β_{jk} across the super-county quintiles we actually estimate the following equation separately for the set of J family-level characteristics:

$$x_{ij} = \sum_{k=1}^{5} \beta_{jk} AIIM_{ik} + \varepsilon_{ij}, \quad j = 1, \dots, J \tag{1}$$

where x_{ij} is a dichotomous 0-1 indicator equal to unity if family i has characteristic j, and $AIIM_{ik}$ is also a dichotomous 0-1 indicator that is equal to unity if family i's super-county belongs to the kth quintile of the AIIM distribution. Because the five $AIIM_{ik}$ variables included in the model are each mutually exclusive, the parameter β_{jk} in the j equation can be interpreted as measuring the share of families residing in a kth-quintile super-county that have characteristic j.

calculate the share of all movers *from* quintile k super-counties with characteristic j, β_{jk}^m, and the share of

all non-mover families in quintile k counties with characteristic j, β_{jk}^{nm}.[13]

Share estimates using the 1990, 5% PUMS file described above are provided in Tables 1 and 2,

respectively. Analogous estimates using the 2000 PUMS sample are provided in Tables A1, A3 and A4 of

the appendix. Within each table, individual columns are grouped into larger panels based on the broader

demographic characteristic being described (e.g., race, educational attainment, etc.). Also, within each

column, asterisks next to a share estimate indicates the degree to which that estimate is statistically

different from the share estimated for the 3rd quintile of AIIM (reported in the middle row).

Estimates reported in Table 1 show clearly that there is substantial demographic heterogeneity across

super-counties of different AIIM status. Most notably, the racial composition of low-income families

becomes increasingly black as AIIM declines, as does the share of low-income families reporting that the

parent is not married. For example, about 36 percent of low-income families within bottom quintile

super-counties are black, whereas blacks account for about only four percent of all families within top-

quintile super-counties. Alone, this striking nine-fold difference in racial composition suggests that

spatial differences in AIIM may be as much, if not more, about the characteristics of the low-income

families themselves and their *individual* burdens, as it is about the actual places within which they reside.

Indeed, with the exception of age, the relationships observed in Table 1 indicate clear patterns of selection

across AIIM quintiles based on race, ethnicity, and family structure. For educational attainment,

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[13] Again, we use a regression framework to make significance testing easier. In particular, the following equation is estimated:

$$x_{ij} = \sum_{k=1}^{5} \beta_{jk}^m AIIM_{ik}^o \times mover_i + \sum_{k=1}^{5} \beta_{jk}^{nm} AIIM_{ik}^o \times nonmover_i + \varepsilon_{ij}, \quad j = 1, \dots, J \tag{2}$$

where $mover_i$ and $nonmover_i$ are mutually exclusive 0-1 indicator variables set equal to unity if the household did or did not change super-counties within the five years prior to being surveyed, respectively. Here, the parameter β_{jk}^m measures the share of families who moved out of a kth-quintile super-county that had characteristic j. Conversely, β_{jk}^{nm} measures the share of families who stayed in the kth-quintile super-county that had characteristic j.

Alternative estimates of Eq. (2) were made using the AIIM quintile of a family's current (i.e., "destination") super-county, $AIIM_{ik}$. Here, the parameters β_{jk}^m would measure the share of families moving into a kth-quintile super-county that had characteristic j. These estimates are provided in Table A2 of the appendix. Appendix tables A3 and A4 report estimates of Eq. (2) using the 2000 PUMS file.

statistical differences are observed between the lowest and highest quintiles for the two endpoint categories of education (i.e., <HS and BA+), with low-income parents in bottom quintile super-counties 20 percent more likely to have not completed high school relative to parents in the highest quintile super-counties. Similarly, parents in the bottom quintile super-counties are 23 percent less likely to have graduated from college. Families in the lowest AIIM quintile are approximately twice as likely as those in the top AIIM quintile to be headed by a never-married parent, and half as likely to have a foreign-born parent. These significant differences in low-income family characteristics across places with different AIIM are notable because they are present even though all families in the sample are in the same third decile of the national income distribution. It is clear that adjusting only for family income, as in Chetty et al. (2014), is not sufficient to make families comparable.

[insert Table 1 about here]

In Appendix Table A5 we present estimates similar to those in Table 1, but for family characteristics that do not overlap with information in the NLSY79. These estimates also show significant differences in family characteristics between counties. The share of families that own their home in the bottom AIIM quintiles is significantly lower (20%) than in the top AIIM quintile. The number of family members within a household is also significantly lower among families in the lowest AIIM quintile relative to those in the highest AIIM quintile. There are also differences in the share of families receiving welfare across super-counties, although these differences are not monotonically related to AIIM. The figures in Table A5 serve to reinforce the conclusion we drew from Table 1—despite having roughly similar incomes, there are substantial differences in family characteristics between super-counties and these differences are correlated with the super-county AIIM.

Table 2 takes a deeper look into the variation observed in Table 1 by highlighting demographic differences across families' location in the AIIM distribution *and* mover status, focusing on the AIIM

quintile of the family's super-county of origin.[14] Here, in addition to the asterisks that indicate differences *within* a column, the "a", "b", or "c" superscripts next to an estimate in the "mover column" indicate how that estimate differs from the estimate in the "non-mover" column within the same AIIM quintile.

Low-income families who moved out of the lowest AIIM super-counties, when compared to low-income non-movers from the same super-counties, are 27% more likely to be white; 52% more likely to have a college educated parent; and 20% more likely to be headed by a married couple. All of these family characteristics are favorable predictors of a child's future earnings (shown below). Similar differences characterize low-income movers and non-movers from other quintiles, but, in general, movers and non-movers tend to be more similar in the top quintile and less similar in the bottom quintile. Overall, there is much less "selection" on family characteristics by AIIM among movers than non-movers. Of course, this table reveals nothing about the type of move that a low-income family makes when choosing to leave an area with low AIIM scores. These families could be moving to areas with significantly better AIIM rankings, marginally better rankings, or simply be making "lateral" moves across areas with relatively similar rankings.

To investigate this issue further, we limit our sample to low-income families originating in super-counties in the a lowest AIIM quintile and estimate the share of those families moving to a super-county Δk quintiles higher along the AIIM distribution that have characteristic j, $\beta^m_{j,\Delta k}$. Similarly, we also estimate the share of low-income families who choose not to move and have characteristic j, β^{nm}_j.[15]

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[14] Table A2 in appendix reports estimates using county of destination as comparison. Estimates are very similar to those reported in text.

[15] For the reasons noted above, we estimate these shares from the following equation for only those families whose origins are in super-counties belonging to the 1st quintile of the AIIM distribution:

$$x_{ij} = \sum_{\Delta k=0}^{4} \beta^m_{j,\Delta k} AIIM_{i,\Delta k} \times mover_i + \beta^{nm}_j \times nonmover_i + \varepsilon_{ij}, \quad j = 1,\dots,J \tag{3}$$

where $AIIM_{i,\Delta k}$ is a 0-1 indicator variables equal to unity if the family moved to a super-county Δk quintiles higher along the AIIM distribution relative to their super-county of origin (which falls within the 1st-quitile).   The parameter $\beta^m_{j,\Delta k}$ thus measures, among the families whose move yielded a Δk increase in their super-county's AIIM ranking, the share who exhibited characteristic j. Similarly, the parameter β^{nm}_j returns the share of non-movers with characteristic j.

Share estimates of this type are reported in Table 3. The differences reported here, particularly between

non-movers and movers to counties with greater income mobility, are quite striking. For example,

comparing low-income non-movers to those who move to super-counties with the highest AIIM, it is

clear that the latter group exhibits characteristics that are traditionally more favorable predictors of

income. That is, compared to families that remain in their least upwardly mobile super-counties (i.e., they

do not move), families moving from the lowest to the highest upwardly mobile super-counties are 35%

more likely to be white; 117% more likely to have a college educated parent present; and 18% more likely

to be a married, two-parent family.

Taken together, the findings in Tables 1 - 3 point to a significant amount of sorting between low-income

families and their areas of residence, with families that possess the most "favorable" attributes both

residing in *and* moving to the most upwardly-mobile super-counties. The implication of these results is

that the place-based differences documented in Chetty et al (2014) are likely to be considerably

confounded by differences in family characteristics, and that the causal estimates of place on

intergenerational income mobility in Chetty and Hendren (2016a, 2016b) are likely to lack external

validity.

[insert Tables 2-3 about here]

3.c. Simulation

The patterns observed in Tables 1 through 3 suggest that, for low-income families, variation in

family-level characteristics may explain a sizeable share of the difference in AIIM across communities.

If this share explained by measured characteristics is indeed large, then this raises questions about the

interpretation of Chetty et al.'s (2014) and Chetty and Hendren's (2016a, 2016b) results. That is, the

channels through which AIIM is determined may be more directly linked to an individual child's person-

and family-level characteristics, and less so to a particular place's characteristics.

To assess how much of the variation in AIIM is due to the characteristics found in Table 1, we employ a

two-step approach to gauge the share of AIIM that can be explained by low-income families' own

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characteristics without regard for where they live. In our first step, we use data from the National

Longitudinal Survey of Youth 1997 Cohort to estimate the conditional correlations between an adult's

(nuclear) family income and their mother's characteristics. The sample consists of adults ages 27 to 31 in

2011, which corresponds closely with the age of adults used in Chetty et al. (2014). Mother's

characteristics are measured in 1997 when the children were between the ages of 12 and 17. We further

limit the sample to adults (in 2011) whose family's income in 1997 was at or below the sample median of

1997 family incomes because we want to focus on children living in lower income households that are

roughly comparable to the children in Chetty et al. (2014) from the 25th percentile of the income

distribution. We estimate the following regression model:

$$ninc_i^{11} = \delta_0 + \sum_j \delta_j x_{ij}^{97} + \sum_a \gamma_a age_{ia}^{11} + \varepsilon_i^{11} \tag{4}$$

where $ninc_i^{11}$ measures the person's nuclear family income in 2011 and x_{ij}^{97} measures their mother's j[th]

characteristic in 1997. These maternal characteristics are, with two exceptions, the same as those used in

Table 1 and include dummy variables for education (high school, some college, and BA or more), dummy

variables for marital status (married and divorced/separated/widowed), mother's age, mother's age

squared, a dummy variable for foreign born, and dummy variables for race/ethnicity (white, black, and

Hispanic).[16] In some models, we also include the family's income in 1997 and family income squared to

adjust for income differences among the sample. Because of small sample sizes, we use a sample of

families from the lower half of the income distribution instead of from the 3rd decile (or 25th percentile as

in Chetty et al. 2014). The variables age_{ia}^{11} are a set of dichotomous indicators that identify person i's age

in 2011 (ages 27 to 31). We include this variable to control for difference sin adult age that may influence

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[16] Please note that, as in Tables 1 - 3, the dichotomous x_{ij}^{97} variables measuring specific classes of educational attainment, race, and marital status are mutually exclusive within the broader demographic characteristic that they are describing. Thus, each of these parameter estimates should be interpreted relative to the excluded "base" variable. For example, the estimated coefficients for the variables *Married* and *Divorced/Separated/Widowed* should be interpreted as measuring their correlation with 2011 nuclear family income relative to those who were never married.

income. Equation 4 makes no reference to a family's place of residence. It is estimated to identify family determinants of upward mobility. Estimates of Eq. 4 are reported in Table 4 below.

[insert Table 4 about here]

Overall, the parameter estimates for each of these variables appear reasonable and align with intuition and previous evidence. Adults having had more educated mothers during childhood earn more in adulthood than those with less educated mothers. For example, depending on the specification, someone whose mother had a BA or more earns $7,600 to $9,400 more than someone whose mother had less than a high school degree. Other estimates are similarly unsurprising. Adults whose mothers were married, or were not a racial minority, earn more than adults whose mothers were never married or who were non-white. Interestingly, adults whose mother was foreign-born earn more than adults whose mother was born in the U.S.

Denoting all estimated values using the symbol "^" we simulate the expected 2011 nuclear family income for someone residing in a kth AIIM quintile community as:

$$\widehat{ninc}_k = \hat{\delta}_0 + \sum_j \hat{\delta}_j \beta_{jk} \tag{5}$$

where β_{jk} is the estimated share of families with characteristic j and residing the in the kth quintile super-county, as reported in Table 1.[17]

Baseline simulations of 2011 the nuclear family incomes of adult children from low-income families for each super-county quintile, $\widehat{ninc}_k$, are reported in the top panel of Table 5. Here, differences between the values displayed in columns (1) – (4) of the top panel simply reflect the differences between the coefficients reported in columns (1) – (4) of Table 4, respectively. Focusing on column (4), these values suggest that, on their own, the relatively limited number of 1990 family-level characteristics entering into

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[17] Simulations based on columns (3) – (4) of Table 4, which include 1997 family income variables as covariates, assume a 1997 family income of $18,500, which is the 25th percentile of the NSLY sample's 1997 family income distribution. These simulations are reported in columns (2) – (4) of tables 5 and 6.

the simulation predict a substantial difference between the 2011 nuclear family incomes of those who grew up in the least and most upwardly mobile super-counties (i.e., $28,625 and $33,872, respectively), with the greatest increase in simulated income occurring between the lowest and second-lowest upwardly mobile super-counties.

The bottom panel of Table 5 gauges the significance of these simulated income differences by reporting the share that they explain of the differences that Chetty et al.'s (2014) own AIIM indices would have predicted.[18] For example, focusing again on column (4), we see that, per our model, incomes simulated from 1990 family-level characteristics explain 114 percent of the AIIM-score-based predicted dollar difference in nuclear family incomes (and 93 percent of the percentage point change) between the lowest and second-lowest upwardly mobile super-counties. On the low end, simulated incomes predict just above 50 percent of the AIIM-score-based predicted dollar difference (about 40 percent of the percentage point change) between the lowest and highest upwardly mobile super-counties. Note that the explained share of variation in AIIM does not depend on the specification of the earnings model used in Table 4. Altogether, these shares are relatively large and suggest that most of the spatial variation in AIIM observed by Chetty et al. (2014) is due to unobserved variation in family-level characteristics.

[insert Table 5 about here]

Table 6 reports the simulated incomes of both movers and non-movers within each AIIM quintile. The difference between movers and non-movers is particularly striking within the least upwardly mobile areas. Adult children of low-income families that moved out of these areas have predicted nuclear family incomes about 13 percent greater than those of non-movers who stay behind ($31,481 compared to

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[18] To estimate the level of income for a super-county predicted by Chetty et al.'s own AIIM scores, we simply apply the average AIIM score for a super-county to the "child family" income distribution provided by Chetty et al. in their online data appendix. For example, super-counties belonging to the lowest and highest AIIM quintile have average AIIM scores of 36.5 and 48.4, respectively, which translate into respective nuclear family incomes of approximately $23,300 and $33,520.

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$27,794), which, at the very least, suggests that the experiences of movers cannot be unconditionally extrapolated onto non-movers, as these two groups are fundamentally different from one another. This is less the case, however, when comparing the simulated incomes of out-movers and non-movers from the most upwardly mobile areas.

[insert Table 6 about here]

Notice that it would also be a mistake to take the experience of the children of low-income movers into a top quintile super-county and use that to estimate the true effect of their destination. This is because, as described in detail in Table 3, families that move from the least to the most upwardly mobile super-counties tend to exhibit much more favorable income-predicting characteristics when compared to those families that choose not to move from the least upwardly mobile areas. To see this, Table 7 simulates the nuclear family income for children of low-income parents who once resided in the least upwardly mobile super-counties by type of move made.[19] Comparing Tables 5 and 7, we predict that children of low-income movers from the least to the most upwardly mobile super-counties have expected nuclear incomes only about 3.4% less than the expected incomes for children of low income parents currently residing in top quintile super-counties. This suggests that, among those low-income parents who started out in the least mobile super-counties, those that choose to move to the most upwardly mobile areas are very similar, in terms of their income-predicting characteristics, to the average parent residing in these areas (movers and non-movers alike). However, the children of low-income parents who choose not to move from the least upwardly mobile super-counties have expected incomes about 18% less than children of non-mover, low-income parents residing in the top quintile super-counties, suggesting that these two groups differ considerably in their income-predicting characteristics.

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[19] For Table 7, income in each cell is simulated as $\widehat{ninc}_{\Delta k} = \hat{\delta}_0 + \sum_j \hat{\delta}_j \beta^m_{j,\Delta k} \times mover_i + \sum_j \hat{\delta}_j \beta^{nm}_j \times nonmover_i$, where the values for $\hat{\delta}_0$ and $\hat{\delta}_j$ come from Table 4.

4. Conclusion

The descriptive, and previously unknown facts about the geographic variation in intergenerational mobility, documented by Chetty et al. (2014), and the causal estimates of the effect of place on intergenerational mobility reported in Chetty and Hendren (2016a, 2016b) are extremely important. They shine a light on a child's place of residence and the institutional features of those places as a potentially important source of lifetime wellbeing. However, given the evidence we presented, it seems premature to suggest that families should use estimates in Chetty and Hendren (2016b) to guide their choices about where to live, as the authors suggested. We find that much of the differences documented by Chetty et al. (2014) are arguably not place differences at all, but people differences. Indeed, a very limited set of people differences explain most of the place differences in intergenerational income mobility. Specifically, we show that earnings predicted from a relatively few characteristics of low-income parental households generates simulated incomes for adult children that account for 40% to 100% of the inter-quintile differences reported in Chetty et al. (2014). A large portion of the spatial pattern of upward mobility can be generated without reference to space. It seems reasonable to conclude that differences between places in intergenerational mobility would be even further reduced, perhaps to zero, with the addition of more family characteristics. We also show that low-income movers are a very different group than low-income non-movers, which raises a question about the external validity of the more compelling causal estimates in Chetty and Hendren (2016a, 2016b).

The intuition that place matters for children's development and future success is strong, and perhaps most clearly reflected in families' locational decisions vis-à-vis school quality (Hoxby 2003). However, the "place" in this fundamental family decision is the school district, which may differ from the "place" where parents work, and differ from the "place" that sets public safety policy. A family may simultaneously access the institutions and amenities that affect children's wellbeing of several different,

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often geographically unique, "places". Notably, the research of Chetty et al. (2014) and Chetty and

Hendren (2016a, 2016b) is not based on a well specified conceptual model linking place to proximate

causes of child development and adult wellbeing, for example, as in Galsten and Killen (1995). Here is

the main justification from Chetty et al. (2014):

"One way to conceptualize the choice of a geographical partition is using a hierarchical model in

which children's outcomes depend on conditions in their immediate neighborhood (such as peers

or resources in their city block), local community (such as the quality of schools in their county),

and broader metro area (such as local labor market conditions). To fully characterize the

geography of intergenerational mobility, one would ideally estimate all of the components of such

a hierarchical model." (p. 1586, Chetty et al. 2014)

"As a first step toward this goal, we characterize intergenerational mobility at the level of

commuting zones. CZs are aggregations of counties based on commuting patterns in the 1990

 census…. CZs are designed to span the area in which people live and work, they

provide a natural starting point as the coarsest partition of areas." (p. 1586, Chetty et al. 2014)

As noted by the Chetty et al. (2014), commuting zones (or counties), which rarely organize school

districts, police departments, social services, and other community influences that may affect children's

development and their future success are distal causes of children's success.[20] At best, counties and

commuting zones are most closely related to economic activity that may influence employment and wage

opportunities that affect children's development and future success.

Within any county or commuting zone there is often wide variation in school quality, public safety and

other potential influences of child development and future success. Therefore, finding that

intergenerational income mobility differs by commuting zone or county should be viewed skeptically

from a causal perspective because the premises and plausibility of the investigation were not well

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[20] Chetty et al. (2014) argue that using the broader geographic areas for the analysis lessens concerns about sorting
that could confound estimates. However, this concern with endogenous sorting still applies at the broader level of
geography, as we demonstrate, and the analysis in Chetty et al. (2014) is purely descriptive, as acknowledged by the
authors. Thus, the justification for using the larger geographical units is not strong.

established. There does not appear to be a prior literature suggesting that institutions, or policies, at the level of commuting zone, or county, would be particularly important to intergenerational income mobility. Of course, scientific inquiry sometimes makes discoveries incrementally, and the data, study, and findings in Chetty et al. (2014) are novel.

There is considerable heterogeneity in family and neighborhood characteristics within counties that underscores the potential disconnect between a plausible conceptual model and the analysis of Chetty et al. (2014). To illustrate the extent of this variation, we selected the largest county in each of the five quintiles of AIIM. These counties are: Cook, IL (lowest quintile), Maricopa, AZ, Harris, TX, Los Angeles, CA, and Orange, Ca (highest quintile). For each county, we repeated the above exercise, but using PUMA as the geography of interest. We constructed the mean, predicted adult income for children of low-income families in each PUMA in those five counties. Table 8 reports the predicted adult incomes based on family characteristics.

As the figures in Table 8 suggest, there is considerable variation in family characteristics and predicted adult incomes within each of the five counties except for Orange County, CA. In Cook County, IL, predicted adult incomes range from $18,763 to $35,458 and there are several PUMAs in Cook County, IL, which is in the lowest quintile of AIIM, with predicted adult incomes are equal to or greater than the predicted adult incomes in Orange County, CA, which is in the top quintile of AIIM. Similarly, in Los Angeles County, CA predicted adult incomes range from $24,560 to $36,761. The variation in family characteristics and predicted adult incomes within counties matches intuition that there is considerable neighborhood segregation by race, education and family structure within counties (holding income constant). There is also considerable variation in amenities and public goods by neighborhood. For example, there are 23 independent school districts in Harris County, TX and 46 municipal police departments in Los Angeles County, CA.

The variation documented in Table 8 also bears directly on the exploratory analyses of Chetty et al. (2014) that attempt to identify factors that explain geographic variation in AIIM. Chetty et al. (2014) obtained associations between AIIM and racial segregation, income segregation (inequality), school

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quality, commuting patterns and family structure. However, what does average school quality measure in Harris County, TX when there are 23 independent school districts? Similarly, what do commuting patterns measure in Los Angeles County, CA? With the type of within county (commuting zone) variation that is common, the average characteristic of a county (commuting zone) is a poor measure of the underlying causal mechanism that affects AIIM. Notably, the results of this analysis suggested that family structure and commuting patterns explain most of the variation in AIIM. While commuting patterns may reflect some place-based policy that affects child development, although hich policies is not obvious, family structure is clearly not caused by place-based policies. Therefore, it is notable that this family characteristic explains most of the variation in intergenerational income mobility and consistent with the findings we showed earlier.

Overall, the lack of a plausible conceptual model linking commuting zones, or counties, to proximate causes of child development and adult success is an a priori reason to be skeptical of the causal possibilities of the Chetty et al. (2014) line of inquiry.[21] A legitimate question is whether the "facts" presented by Chetty et al. (2014) should be something future research investigates. While Chetty and Hendren (2016a, 2016b) provide credible evidence of causal effects of commuting zones on intergenerational mobility, the external validity of this evidence is debatable. Families that move are different and there is no way of knowing whether similar moves by stayers would result in the same consequences (Cartwright 2011; 2012; 2013). The arguably weak premise of the Chetty et al. (2014) study combined with the substantial evidence of significant differences in family characteristics between counties and between movers and non-movers that we presented raises questions about the usefulness and interpretation of the evidence of the research of Chetty and colleagues.

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[21] An arguably more promising approach to these questions is suggested in Chetty et al (2016). In this study, the authors examine whether neighborhoods affected adult wellbeing among participants in the Moving to Opportunity randomized experiment. In our view, and in a large literature (e.g., Wilson 1996; Rosenbaum et al. 2002; Kling et al. 2007), the geography of neighborhoods is much more compelling unit of analysis conceptually than the geography of counties. However, external validity of the findings may again be an issue, as the experiment was conducted in only a few cities, only 40-48% of the children in "winning" families actually took up the offered vouchers for moving to better neighborhoods, and movers were different from non-movers (Kling et al. 2007; Chetty et al. 2016).

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Table 1
Distribution of Parent Characteristics within Upward Mobility Quintiles, 1990 Census

Upward Mobility Quintile	Race			Hispanic	Educational Attainment				Marital Status			Foreign Born	Age
	White	Black	Other		< HS	HS only	Some College	BA+	Married	Div./Sep. /Wid.	Never Married		
q1 (lowest)	0.589***	0.364***	0.047***	0.048***	0.248***	0.393	0.298***	0.061	0.569***	0.295***	0.136***	0.049***	31.9**
	[0.003]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.001]	[0.003]	[0.003]	[0.002]	[0.002]	[0.046]
q2	0.741***	0.162***	0.0988***	0.138***	0.263	0.397**	0.282	0.059	0.634*	0.275***	0.091	0.093***	31.6*
	[0.003]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.001]	[0.003]	[0.003]	[0.002]	[0.002]	[0.046]
q3	0.757	0.126	0.117	0.157	0.268	0.386	0.285	0.061	0.642	0.263	0.095	0.144	31.7
	[0.003]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.002]	[0.002]	[0.048]
q4	0.737***	0.072***	0.190***	0.264***	0.309***	0.365***	0.267***	0.059	0.662***	0.248***	0.090*	0.220***	32.0***
	[0.003]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.002]	[0.002]	[0.049]
q5 (highest)	0.864***	0.041***	0.095***	0.120***	0.206***	0.415***	0.300***	0.079***	0.695***	0.233***	0.072***	0.110***	31.9**
	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.004]	[0.003]	[0.002]	[0.004]	[0.003]	[0.002]	[0.002]	[0.057]

Table 1: All values are based on family-level observations (N = 118,857) provided by the U.S. Census' 1990 PUMS file (5% sample). This sample is restricted to families with own children between the ages of 0-12 who have incomes within the 3rd decile of the national income distribution. The characteristics assigned to each family are based on those of the mother, if present, or those of the father if the mother is not present. Families with no mother or father present are omitted from the sample as are families with multiple mothers or fathers present. All values are calculated using sample weights. A family's absolute upward mobility quintile is determined by assigning it to one of 897 counties or "super" counties. Asterisks indicate the statistical significance of the difference between the value reported in that cell and the value reported in the cell that corresponds to areas with an absolute intergenerational mobility ranking of 3 (i.e., the middle row). *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$

Table 2
Distribution of Parent Characteristics within Upward Mobility Quintiles
by Mover Status in Origin Location, 1990 Census

Upward Mobility Quintile of Origin	Race						Hispanic	
	White		Black		Other			
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.702***,a	0.554***	0.251***,a	0.399***	0.047***	0.047***	0.039***,c	0.049***
	[0.006]	[0.003]	[0.005]	[0.002]	[0.004]	[0.002]	[0.005]	[0.002]
q2	0.805a	0.724***	0.112a	0.171***	0.083a	0.105***	0.095*,a	0.152
	[0.006]	[0.003]	[0.005]	[0.002]	[0.004]	[0.002]	[0.004]	[0.002]
q3	0.808a	0.746	0.103a	0.136	0.089a	0.118	0.108a	0.163
	[0.006]	[0.003]	[0.005]	[0.003]	[0.004]	[0.002]	[0.005]	[0.002]
q4	0.790**,a	0.716***	0.081***,b	0.070***	0.128***,a	0.214***	0.163***,a	0.305***
	[0.006]	[0.003]	[0.005]	[0.003]	[0.004]	[0.002]	[0.005]	[0.003]
q5 (highest)	0.853***,c	0.865***	0.058***,a	0.039***	0.090	0.096***	0.105a	0.129***
	[0.006]	[0.004]	[0.005]	[0.003]	[0.004]	[0.003]	[0.005]	[0.003]

Upward Mobility Quintile of Origin	Educational Attainment							
	< HS		HS only		some college		BA+	
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.202*,a	0.262***	0.373a	0.396	0.342*,a	0.288***	0.083a	0.054
	[0.006]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.003]	[0.002]
q2	0.214a	0.279	0.378a	0.406*	0.325a	0.265	0.082a	0.049*
	[0.006]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.003]	[0.002]
q3	0.218a	0.279	0.376a	0.397	0.327a	0.270	0.08a	0.054
	[0.006]	[0.003]	[0.007]	[0.004]	[0.006]	[0.003]	[0.003]	[0.002]
q4	0.229a	0.338***	0.361	0.362***	0.328a	0.248***	0.082a	0.053
	[0.006]	[0.003]	[0.007]	[0.004]	[0.006]	[0.003]	[0.003]	[0.002]
q5 (highest)	0.179***,a	0.217***	0.360*,a	0.428***	0.355***,a	0.284***	0.107***,a	0.071***
	[0.006]	[0.004]	[0.007]	[0.004]	[0.007]	[0.004]	[0.004]	[0.002]

Table 2 (Continued)
Distribution of Parent Characteristics within Upward Mobility Quintiles
by Mover Status in Origin Location, 1990 Census

Upward Mobility Quintile of Origin	Marital Status						Foreign Born		Age	
	Married		Div./Sep./Wid.		Never Married					
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.654***,a	0.547***	0.249a	0.304***	0.097***,a	0.149***	0.055***,c	0.047***	29.6**,a	32.5***
	[0.006]	[0.003]	[0.006]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.099]	[0.052]
q2	0.673a	0.621	0.258a	0.282**	0.069a	0.097	0.08***,a	0.095***	29.9a	32.2
	[0.006]	[0.003]	[0.006]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.098]	[0.053]
q3	0.684a	0.628	0.25a	0.272	0.066a	0.1	0.103a	0.151	29.9a	32.3
	[0.007]	[0.003]	[0.006]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.102]	[0.054]
q4	0.69a	0.654***	0.235*,b	0.249***	0.075a	0.097	0.139***,a	0.251***	30.1a	32.6***
	[0.006]	[0.004]	[0.006]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.1]	[0.056]
q5 (highest)	0.69	0.696***	0.237	0.232***	0.072	0.072***	0.107	0.113***	30.0a	32.5**
	[0.007]	[0.004]	[0.006]	[0.004]	[0.004]	[0.003]	[0.005]	[0.003]	[0.109]	[0.065]

Table 2: All values are based on family-level observations (N = 118, 209) provided by the U.S. Census' 1990 PUMS file (5% sample). This sample is restricted to families with own children between the ages of 0-12 who have incomes within the 3rd decile of the national income distribution. The characteristics assigned to each family are based on those of the mother, if present, or those of the father if the mother is not present. Families with no mother or father present are omitted from the sample as are families with multiple mothers or fathers present. All values are calculated using sample weights. A family's absolute upward mobility quintile is determined by assigning it to one of 897 counties or "super" counties. Movers in Table 2 are identified by comparing a family's current location to its location five year prior, as reported in the 1990 PUMS file. The absolute intergenerational mobility ranking of a mover's county or super county is determined by that family's *origin* location. That is, movers are defined as having recently moved *out of* that area. Statistics calculated after assigning movers to their origin location (i.e., location five years earlier) are not substantially different from those reported here (see Appendix Table 1). Asterisks indicate the statistical significance of the difference between the value reported in that cell and the value reported in the cell that corresponds to areas with an absolute intergenerational mobility ranking of 3 (i.e., the middle row for that same column). *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. For the "mover columns", the letters reported in the superscripts indicate if there is a statistically significant difference between movers and non-movers *within* areas having been assigned that ranking for absolute intergenerational mobility. [a] $p \leq 0.01$, [b] $p \leq 0.05$, [c] $p \leq 0.1$.

Table 3
Distribution of Parent Characteristics by Type of Move Made for Families Originating in the Lowest Quintile Super-Counties, 1990 Census

Mover Type	Race			Hispanic	Educational Attainment				Marital Status			Foreign Born	Age
	White	Black	Other		< HS	HS only	Some College	BA+	Married	Div./Sep. /Wid.	Never Married		
No Move (remain in q1)	0.554 [0.004]	0.399 [0.004]	0.047 [0.002]	0.049 [0.002]	0.262 [0.003]	0.396 [0.004]	0.288 [0.003]	0.054 [0.002]	0.547 [0.004]	0.304 [0.003]	0.149 [0.003]	0.047 [0.002]	32.5 [0.055]
Move: q1 to q1	0.638*** [0.012]	0.338*** [0.011]	0.024*** [0.005]	0.012*** [0.005]	0.210*** [0.010]	0.360*** [0.012]	0.341*** [0.011]	0.088*** [0.006]	0.630*** [0.012]	0.261*** [0.011]	0.109*** [0.008]	0.034** [0.005]	29.5*** [0.178]
Move: q1 to q2	0.729*** [0.013]	0.217*** [0.012]	0.054 [0.006]	0.039* [0.005]	0.222*** [0.011]	0.380 [0.013]	0.331*** [0.012]	0.067** [0.006]	0.656*** [0.013]	0.245*** [0.012]	0.099*** [0.009]	0.058* [0.006]	29.5*** [0.197]
Move: q1 to q3	0.758*** [0.016]	0.182*** [0.016]	0.059 [0.007]	0.069*** [0.007]	0.182*** [0.014]	0.371 [0.016]	0.36*** [0.015]	0.087*** [0.008]	0.666*** [0.016]	0.239*** [0.015]	0.094*** [0.011]	0.063** [0.007]	29.9*** [0.249]
Move: q1 to q4	0.718*** [0.020]	0.220*** [0.019]	0.062* [0.009]	0.058 [0.008]	0.169*** [0.017]	0.415 [0.020]	0.338*** [0.019]	0.077** [0.010]	0.708*** [0.020]	0.234*** [0.018]	0.058*** [0.014]	0.072*** [0.009]	29.1*** [0.305]
Move: q1 to q5	0.750*** [0.027]	0.171*** [0.027]	0.080*** [0.012]	0.071* [0.012]	0.187*** [0.024]	0.339** 0.027]	0.357*** [0.026]	0.117*** [0.013]	0.643*** [0.028]	0.260* [0.026]	0.096*** [0.019]	0.1*** [0.012]	30.5*** [0.423]

Table 3: All values are based on family-level observations (N = 23,641) provided by the U.S. Census' 1990 PUMS file (5% sample). This sample is restricted to families whose origin super-county belongs to the 1st-quintile of the AIIM distribution. For families that move to different super-counties, the AIIM quintile of their destination super-county is used to determine their "type" of move. See the caption of Table 1 for additional information on the sample.
Asterisks indicate the statistical significance of the difference between the value reported in that cell and the value reported in the "No Move" cell (i.e., the first row). *** $p \le 0.01$, ** $p \le 0.05$, * $p \le 0.1$

Table 4
2011 Nuclear Family Income Correlated with Mother's 1997 Characteristics, 1997 NLSY Sample

Mother's Characteristics in 1997	[1]	[2]	[3]	[4]
H.S.	5,575***	5,666***	4,356***	4,326***
	[1,631]	[1,622]	[1,628]	[1,629]
Some College	9,116***	9,682***	7,758***	7,679***
	[1937]	[1,929]	[1,947]	[1,951]
BA or more	9,386***	10,068***	7,712***	7,609***
	[2,858]	[2,843]	[2,857]	[2,861]
Married	4,988**	5,494***	3,198	3,149
	[2,106]	[2,096]	[2,123]	[2,124]
Divorced/Separated/Widowed	3,036	3,342	3,207	3,203
	[2,182]	[2,171]	[2,157]	[2,157]
Mother's Age	-184	-522	-1,099	-1,058
	[975]	[972]	[972]	[974]
Mother's Age Squared	3.95	6.36	13.3	12.8
	[11.8]	[11.7]	[11.7]	[11.7]
Foreign-born				
	6,376***	6,533***	6,363***	6,369***
	[2,215]	[2,202]	[2,188]	[2,188]
White	6,376***	6,443***	6,678***	6,617***
	[2,246]	[2,233]	[2,219]	[2,221]
Black	-9,472***	-9,445***	-7,932***	-8,026***
	[2,604]	[2,588]	[2,586]	[2,590]
Hispanic	-1,298	-1,177	138	67.8
	[2,168]	[2,154]	[2,153]	[2,156]
Family Income [in 1000s]			356***	206
			[64]	[229]
Family Income Squared				3.93
				[5.74]
Constant Term	26,355	29,174	35,460*	35,711*
	[20,137]	[20,079]	[19,980]	[19,985]
Respondent's 2011 Age Indicators	No	Yes	Yes	Yes

Table 4: N = 2,272. Sample limited to persons aged 27 – 31 in 2011 whose 1997 family income was at or below the sample median. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

Table 5
Simulated Nuclear Family Income of Persons Ages 27 to 31 in 2011 within Upward Mobility Quintiles
Based on 1990 Parent Characteristics

Chetty et al.'s Absolute Intergenerational Mobility Quintile (Mean within Quintile)	Simulated Income in 2011 Based on 1990 Parent Characteristics			
	[1]	[2]	[3]	[4]
q1 (36.5)	34,270	29,451	29,149	28,625
q2 (39.8)	37,423	32,691	32,150	31,626
q3 (42.2)	38,162	33,420	32,814	32,292
q4 (44.3)	38,667	33,887	33,308	32,789
q5 (48.4)	40,140	35,400	34,395	33,872
Share of Chetty et al.'s $ Change Explained				
q2 *less* q1	1.19	1.23	1.14	1.14
q3 *less* q1	0.85	0.87	0.8	0.8
q4 *less* q1	0.69	0.70	0.66	0.66
q5 *less* q1	0.57	0.58	0.51	0.51
Share of Chetty et al.'s % Change Explained				
q2 *less* q1	0.81	0.97	0.91	0.93
q3 *less* q1	0.58	0.69	0.64	0.65
q4 *less* q1	0.47	0.55	0.52	0.53
q5 *less* q1	0.39	0.46	0.41	0.42

Table 5: Simulated incomes in the top panel are calculated by applying the coefficients reported in Table 1 to the coefficients reported in Table 4. See Eq. (5). Footnote 16 provides further details. The bottom panel reports the share of the dollar change or percentage change in AIIM-score based predicted incomes that can be explained by the simulated incomes reported in the top panel. See Footnote 17 for a discussion of how AIIM-score based predicted incomes are calculated.

Table 6
Simulated Nuclear Family Income of Persons Ages 27 to 31 in 2011 within Upward Mobility Quintiles and Mover Status Based on 1990 Parent Characteristics

Chetty et al.'s Absolute Intergenerational Mobility Quintile (Mean within Quintile)	Simulated Income in 2011 Based on 1990 Parent Characteristics							
	Movers (origin)				Non-Movers			
	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]
q1 (36.5)	36,759	32,447	32,034	31,481	33,520	28,567	28,312	27,794
q2 (39.8)	38,839	34,485	33,885	33,339	37,035	32,181	31,662	31,144
q3 (42.2)	39,074	34,716	34,092	33,547	37,886	33,029	32,433	31,917
q4 (44.3)	39,259	34,881	34,262	33,718	38,451	33,549	33,004	32,491
q5 (48.4)	40,228	35,886	35,075	34,528	40,066	35,214	34,175	33,658

Table 6: Simulated incomes are calculated by applying the coefficients reported in Table 2 to the coefficients reported in Table 4.

Table 7
Simulated Nuclear Family Incomes of Persons Ages 27 to 31 in 2011 by Type of Move Made and Parent Characteristics in 1990

Move Type	Simulated Income in 2011 Based on 1990 Parent Characteristics			
	[1]	[2]	[3]	[4]
no move (remain in q1)	33,520	28,567	28,312	27,794
Move: q1 to q1	35,310	31,002	30,748	30,193
Move: q1 to q2	37,055	32,741	32,337	31,788
Move: q1 to q3	38,023	33,677	33,094	32,543
Move: q1 to q4	37,587	33,391	32,878	32,318
Move: q1 to q5	38,370	33,925	33,251	32,708

Table 7: Simulated incomes are calculated by applying the coefficients reported in Table 3 to the coefficients reported in Table 4. See Footnote 16.

Table 8: Simulated Incomes by PUMA: Reported for the Largest County within each AIIM Quintile

Puma Rank	County				
	Cook, IL	Maricopa, AZ	Harris, TX	Los Angeles, CA	Orange, CA
1	18,763	29,843	23,098	24,560	32,040
2	19,007	30,807	26,739	25,211	32,535
3	19,192	31,838	26,771	25,441	32,541
4	20,008	32,187	27,375	25,677	32,566
5	20,323	32,470	27,560	26,418	32,827
6	22,511	32,807	28,103	26,794	32,963
7	23,491	32,994	28,995	28,392	33,467
8	25,932	33,513	29,760	29,028	33,834
9	26,548	33,770	29,987	29,165	33,940
10	27,246	34,083	30,105	29,190	34,404
11	27,835	34,211	30,319	29,765	34,813
12	28,954	34,625	30,422	29,937	35,164
13	29,055	34,796	30,804	30,268	35,789
14	29,208	34,887	30,997	30,349	35,807
15	29,652	35,058	31,147	30,682	
16	29,715	35,649	32,034	30,792	
17	29,758		32,380	31,174	
18	29,802		32,731	31,212	
19	30,203		32,975	31,248	
20	30,842		33,072	31,450	
21	31,380		33,146	31,490	
22	31,713		33,462	31,502	
23	31,828		33,633	31,530	
24	32,549		33,899	31,562	
25	33,349		34,959	31,707	
26	33,958			31,728	
27	34,122			31,759	
28	34,229			31,794	
29	34,468			31,806	
30	34,569			31,893	
31	34,623			32,025	
32	35,114			32,086	
33	35,458			32,103	

34	32,189
35	32,417
36	32,484
37	32,555
38	32,586
39	32,814
40	32,823
41	32,977
42	33,455
43	33,588
44	33,860
45	33,966
46	34,044
47	34,277
48	34,345
49	34,381
50	34,399
51	34,431
52	34,590
53	34,688
54	34,785
55	34,991
56	35,349
57	36,018
58	36,761

Table 8: Simulated incomes for each PUMA are calculated using methods similar to those applied in Tables 5-7. Here, the share of families within the 3rd income decile sharing a particular characteristic is measured for each PUMA, not for a broad AIIM quintile. See Footnote 16 for further details.

Appendix Table A1
Distribution of Parent Characteristics within Upward Mobility Quintiles, 2000 Census

Upward Mobility Quintile	Race			Hispanic	Educational Attainment				Marital Status			Foreign Born	Age
	White	Black	Other		< HS	HS only	Some College	BA+	Married	Div./Sep. /Wid.	Never Married		
q1 (lowest)	0.484***	0.413***	0.103***	0.104***	0.222***	0.362***	0.339***	0.077	0.442***	0.288***	0.270***	0.116***	32.9
	[0.003]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.002]	[0.003]	[0.050]
q2	0.623***	0.191***	0.185***	0.240	0.256	0.353	0.319	0.072	0.525***	0.279**	0.196***	0.207***	32.8
	[0.003]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.002]	[0.003]	[0.049]
q3	0.657	0.135	0.208	0.237	0.257	0.348	0.320	0.074	0.546	0.270	0.184	0.233	32.9
	[0.003]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.002]	[0.003]	[0.050]
q4	0.649*	0.069***	0.282***	0.366***	0.314***	0.317***	0.294***	0.076	0.613***	0.234***	0.153***	0.335***	33.4***
	[0.003]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.002]	[0.003]	[0.051]
q5 (highest)	0.745***	0.051***	0.204	0.225***	0.221***	0.345	0.328*	0.106***	0.581***	0.268	0.151***	0.246***	33.4***
	[0.004]	[0.003]	[0.003]	[0.003]	[0.003]	[0.004]	[0.004]	[0.002]	[0.004]	[0.003]	[0.003]	[0.003]	[0.061]

Appendix Table A1: All values are based on family-level observations (N = 120,883) provided by the U.S. Census' 2000 PUMS file (5% sample). This sample is restricted to families with own children between the ages of 0-12 who have incomes within the 3rd decile of the national income distribution. The characteristics assigned to each family are based on those of the mother, if present, or those of the father if the mother is not present. Families with no mother or father present are omitted from the sample as are families with multiple mothers or fathers present. All values are calculated using sample weights. A family's absolute upward mobility quintile is determined by assigning it to one of 881 counties or "super" counties. Asterisks indicate the statistical significance of the difference between the value reported in that cell and the value reported in the cell that corresponds to areas with an absolute intergenerational mobility ranking of 3 (i.e., the middle row). *** $p \leq 0.01$, ** $p \leq 0.05$, * p

Appendix Table A2
Distribution of Parent Characteristics within Upward Mobility Quintiles
by Mover Status in Destination Location, 1990 Census

Upward Mobility Quintile of Destination	Race						Hispanic	
	White		Black		Other			
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.720***,a	0.554***	0.234***,a	0.399***	0.046***	0.047***	0.044***	0.049***
	[0.006]	[0.003]	[0.005]	[0.002]	[0.004]	[0.002]	[0.005]	[0.002]
q2	0.789a	0.724***	0.135***,a	0.171***	0.076***,a	0.105***	0.097***,a	0.152
	[0.005]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.004]	[0.002]
q3	0.795a	0.753	0.091a	0.128	0.114	0.119	0.127a	0.149
	[0.006]	[0.003]	[0.005]	[0.003]	[0.004]	[0.002]	[0.004]	[0.003]
q4	0.809*,a	0.716***	0.080*,c	0.070***	0.111a	0.214***	0.130a	0.305***
	[0.006]	[0.003]	[0.005]	[0.003]	[0.004]	[0.002]	[0.005]	[0.003]
q5 (highest)	0.861***	0.865***	0.050***,c	0.039***	0.089***	0.096***	0.093***,a	0.129***
	[0.007]	[0.004]	[0.006]	[0.003]	[0.005]	[0.003]	[0.005]	[0.003]

Upward Mobility Quintile of Destination	Educational Attainment							
	< HS		HS only		some college		BA+	
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.197***,a	0.262***	0.379***,b	0.396	0.338a	0.288***	0.086a	0.054
	[0.006]	[0.003]	[0.007]	[0.003]	[0.006]	[0.003]	[0.003]	[0.002]
q2	0.214***,a	0.279	0.368a	0.406	0.333a	0.265	0.085a	0.049
	[0.005]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.003]	[0.002]
q3	0.234a	0.277	0.355a	0.400	0.329a	0.270	0.082a	0.054
	[0.006]	[0.003]	[0.006]	[0.004]	[0.006]	[0.003]	[0.003]	[0.002]
q4	0.213***,a	0.338***	0.377**,b	0.362***	0.331a	0.248***	0.080a	0.053
	[0.006]	[0.003]	[0.007]	[0.004]	[0.006]	[0.003]	[0.003]	[0.002]
q5 (highest)	0.166***,a	0.217***	0.373*,a	0.428***	0.356***,a	0.284***	0.105***,a	0.071***
	[0.007]	[0.004]	[0.008]	[0.004]	[0.007]	[0.004]	[0.004]	[0.002]

Distribution of Parent Characteristics within Upward Mobility Quintiles
by Mover Status in Destination Location, 1990 Census

Upward Mobility Quintile of Destination	Marital Status						Foreign Born		Age	
	Married		Div./Sep./Wid.		Never Married					
	Mover	Non-mover	Mover	Non-Mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.652***,a	0.547***	0.262***,a	0.304***	0.086a	0.149***	0.056***,b	0.047***	29.6***,a	32.5***
	[0.006]	[0.003]	[0.006]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.100]	[0.052]
q2	0.670**,a	0.621*	0.255**,a	0.282**	0.075a	0.097	0.088***	0.095***	29.9a	32.2
	[0.006]	[0.003]	[0.005]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.091]	[0.053]
q3	0.687a	0.630	0.236a	0.271	0.077a	0.099	0.112a	0.133***	30.0a	32.2
	[0.006]	[0.004]	[0.006]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.097]	[0.055]
q4	0.689a	0.654***	0.245	0.249***	0.066*,a	0.097	0.116a	0.251***	29.9a	32.6***
	[0.007]	[0.004]	[0.006]	[0.003]	[0.004]	[0.002]	[0.004]	[0.002]	[0.102]	[0.056]
q5 (highest)	0.692	0.696***	0.236	0.232***	0.072	0.072***	0.100*,b	0.113***	30.1.a	32.5***
	[0.008]	[0.004]	[0.007]	[0.004]	[0.005]	[0.003]	[0.005]	[0.003]	[0.119]	[0.065]

See notes to Table 2: The absolute intergenerational mobility ranking of a mover's county or super county is determined by that family's *current* location. That is, movers are defined as having recently moved *into* that area. N = 118,708.

Appendix Table A3
Distribution of Parent Characteristics within Upward Mobility Quintiles
by Mover Status in Origin Location, 2000 Census

Upward Mobility Quintile of Origin	Race						Hispanic	
	White		Black		Other			
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.580***,a	0.467***	0.315***,a	0.448***	0.104***,a	0.084***	0.074***,c	0.085***
	[0.007]	[0.003]	[0.005]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]
q2	0.684a	0.621***	0.158***,a	0.201***	0.157***,a	0.177***	0.161***,a	0.238*
	[0.007]	[0.003]	[0.005]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]
q3	0.671	0.662	0.130b	0.142	0.199	0.195	0.185a	0.231
	[0.007]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]
q4	0.668a	0.645***	0.081***,b	0.069***	0.252***,a	0.286***	0.281***,a	0.394***
	[0.007]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]
q5 (highest)	0.727***,a	0.760***	0.083***,a	0.046***	0.190	0.193	0.192a	0.227
	[0.008]	[0.004]	[0.006]	[0.003]	[0.006]	[0.003]	[0.007]	[0.004]

Upward Mobility Quintile of Origin	Educational Attainment							
	< HS		HS only		some college		BA+	
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.175***,a	0.221***	0.333a	0.377***	0.382a	0.337***	0.109***,a	0.064
	[0.006]	[0.003]	[0.007]	[0.003]	[0.007]	[0.003]	[0.004]	[0.002]
q2	0.192a	0.262	0.333a	0.366	0.378a	0.309	0.096a	0.062*
	[0.006]	[0.003]	[0.007]	[0.003]	[0.007]	[0.003]	[0.004]	[0.002]
q3	0.199a	0.257	0.331a	0.359	0.376a	0.317	0.094a	0.066
	[0.007]	[0.003]	[0.007]	[0.003]	[0.007]	[0.003]	[0.004]	[0.002]
q4	0.253***,a	0.336***	0.315	0.320***	0.337***,a	0.279***	0.095a	0.066
	[0.007]	[0.003]	[0.007]	[0.003]	[0.007]	[0.003]	[0.004]	[0.002]
q5 (highest)	0.175***,a	0.226***	0.306**,a	0.359	0.390a	0.324	0.130***,a	0.091***
	[0.007]	[0.004]	[0.008]	[0.004]	[0.008]	[0.004]	[0.004]	[0.002]

Appendix Table A3 (Continued)
Distribution of Parent Characteristics within Upward Mobility Quintiles
by Mover Status in Origin Location, 2000 Census

Upward Mobility Quintile of Origin	Marital Status						Foreign Born		Age	
	Married		Div./Sep./Wid.		Never Married					
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.459***,a	0.415***	0.298***	0.298***	0.243***,a	0.287***	0.095***,c	0.084***	30.9a	33.5
	[0.007]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.115]	[0.056]
q2	0.538a	0.506***	0.276b	0.292**	0.186b	0.202***	0.133***,a	0.186***	31.1a	33.5
	[0.007]	[0.004]	[0.007]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.120]	[0.057]
q3	0.545b	0.529	0.263a	0.282	0.192	0.188	0.174a	0.214	31.0a	33.5
	[0.007]	[0.004]	[0.007]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.121]	[0.057]
q4	0.598***	0.606***	0.247	0.237***	0.155***	0.157***	0.247***,a	0.346***	31.1a	34.0***
	[0.008]	[0.004]	[0.007]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.121]	[0.057]
q5 (highest)	0.572**	0.572***	0.250a	0.277	0.178a	0.151***	0.184a	0.231***	31.2a	34.1***
	[0.008]	[0.004]	[0.008]	[0.004]	[0.007]	[0.003]	[0.007]	[0.003]	[0.134]	[0.070]

Appendix Table A3: All values are based on family-level observations (N = 113, 431) provided by the U.S. Census' 2000 PUMS file (5% sample). This sample is restricted to families with own children between the ages of 0-12 as well as only those families that fall within the 3rd decile of the national income distribution. The characteristics assigned to each family are based on those of the mother, if present, or those of the father if the mother is not present. Families with no mother or father present are omitted from the sample as are families with multiple mothers or fathers present. All values are calculated using sample weights. A family's absolute upward mobility quintile is determined by assigning it to one of 881 counties or "super" counties. Movers in Appendix Table 3 are identified by comparing a family observation's current location to its location five year prior, as reported in the 2000 PUMS file. The absolute intergenerational mobility ranking of a mover's county or super county is determined by that family's *previous* location. That is, movers are defined as having recently moved *out of* that area. Statistics calculated after assigning movers to their destination location (i.e., current location) are not substantially different from those reported here (see Appendix table 4). Asterisks indicate the statistical significance of the difference between the value reported in that cell and the value reported in the cell that corresponds to areas with an absolute intergenerational mobility ranking of 3 (i.e., the middle row for that same column). *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. For the "mover columns", the letters reported in the superscripts indicate if there is a statistically significant difference between movers and non-movers *within* areas having been assigned that ranking for absolute intergenerational mobility. a $p \leq 0.01$, b $p \leq 0.05$, c $p \leq 0.1$.

Appendix Table A4
Distribution of Parent Characteristics within Upward Mobility Quintiles
by Mover Status in Destination Location, 2000 Census

Upward Mobility Quintile of Destination	Race						Hispanic	
	White		Black		Other			
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.558***,a	0.467***	0.316***,a	0.467***	0.125***,a	0.084***	0.114***,a	0.085***
	[0.007]	[0.003]	[0.005]	[0.003]	[0.005]	[0.003]	[0.006]	[0.003]
q2	0.658a	0.621***	0.174***,a	0.621***	0.168***	0.177***	0.180***,a	0.238*
	[0.006]	[0.003]	[0.005]	[0.003]	[0.005]	[0.003]	[0.005]	[0.003]
q3	0.667	0.662	0.122a	0.662	0.211a	0.195	0.205a	0.231
	[0.007]	[0.003]	[0.005]	[0.003]	[0.005]	[0.003]	[0.006]	[0.003]
q4	0.710***,a	0.645***	0.083***,b	0.645***	0.207a	0.286***	0.201a	0.394***
	[0.007]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]
q5 (highest)	0.761***	0.760***	0.064***,b	0.760***	0.175***,b	0.193	0.159***,a	0.227
	[0.008]	[0.004]	[0.006]	[0.004]	[0.006]	[0.003]	[0.007]	[0.004]

Upward Mobility Quintile of Destination	Educational Attainment							
	< HS		HS only		some college		BA+	
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.190***,a	0.085***	0.320a	0.377***	0.380**,a	0.337***	0.110***,a	0.064
	[0.006]	[0.003]	[0.007]	[0.003]	[0.007]	[0.003]	[0.004]	[0.002]
q2	0.198***,a	0.238	0.328a	0.366	0.376a	0.309*	0.098a	0.062
	[0.006]	[0.003]	[0.006]	[0.003]	[0.006]	[0.003]	[0.004]	[0.002]
q3	0.222a	0.231	0.324a	0.359	0.362a	0.317	0.093a	0.066
	[0.006]	[0.003]	[0.007]	[0.003]	[0.007]	[0.003]	[0.004]	[0.002]
q4	0.191***,a	0.394***	0.326	0.320***	0.380*,a	0.279***	0.103*,a	0.066
	[0.007]	[0.003]	[0.007]	[0.003]	[0.007]	[0.003]	[0.004]	[0.002]
q5 (highest)	0.170***,a	0.227***	0.318a	0.359	0.377a	0.324	0.135***,a	0.091***
	[0.007]	[0.004]	[0.008]	[0.004]	[0.008]	[0.004]	[0.004]	[0.002]

Appendix Table A4 (Continued)
Distribution of Parent Characteristics within Upward Mobility Quintiles
by Mover Status in Destination Location, 2000 Census

Upward Mobility Quintile of Destination	Marital Status						Foreign Born		Age	
	Married		Div./Sep./Wid.		Never Married					
	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover	Mover	Non-mover
q1 (lowest)	0.490***,a [0.007]	0.415*** [0.003]	0.285**,c [0.006]	0.298*** [0.003]	0.225***,a [0.006]	0.287*** [0.003]	0.126***,a [0.006]	0.084*** [0.003]	30.8*,a [0.114]	33.5 [0.056]
q2	0.538a [0.007]	0.506*** [0.004]	0.264a [0.006]	0.292** [0.003]	0.198*** [0.005]	0.202*** [0.003]	0.156***,a [0.005]	0.186*** [0.003]	30.8*,a [0.107]	33.5 [0.057]
q3	0.544c [0.007]	0.529 [0.004]	0.264a [0.006]	0.282 [0.003]	0.192 [0.006]	0.188 [0.003]	0.187a [0.005]	0.214 [0.003]	31.1a [0.112]	33.5 [0.057]
q4	0.595*** [0.008]	0.606*** [0.004]	0.251c [0.007]	0.237*** [0.003]	0.153*** [0.006]	0.157*** [0.003]	0.174a [0.006]	0.346*** [0.003]	31.1a [0.124]	34.0*** [0.057]
q5 (highest)	0.549b [0.008]	0.572*** [0.004]	0.276 [0.008]	0.277 [0.004]	0.175***,a [0.007]	0.151*** [0.003]	0.173a [0.007]	0.231*** [0.003]	31.5**,a [0.135]	34.1*** [0.070]

See notes to Appendix Table A3: The absolute intergenerational mobility ranking of a mover's county or super county is determined by that family's *current* location. That is, movers are defined as having recently moved *into* that area N = 115, 021.

Appendix Table A5
Distribution of Additional Parent Characteristics within Upward Mobility Quintiles, 1990 Census

Upward Mobility Quintiles	Own Home	On Welfare	# Own Children in HH	# Children Ever Born	Family Members in HH
q1 (lowest)	0.399	0.067***	2.024***	3.034***	3.692***
	[0.003]	[0.002]	[0.007]	[0.010]	[0.008]
q2	0.424***	0.058***	2.042***	3.025***	3.759***
	[0.003]	[0.002]	[0.007]	[0.010]	[0.008]
q3	0.396	0.091	2.101	3.083	3.819
	[0.003]	[0.002]	[0.007]	[0.010]	[0.009]
q4	0.378***	0.090	2.213***	3.188***	3.999***
	[0.003]	[0.002]	[0.007]	[0.010]	[0.009]
q5 (highest)	0.474***	0.055***	2.145***	3.137***	3.911***
	[0.004]	[0.002]	[0.009]	[0.012]	[0.010]

Appendix Table A5: Please see the caption to Table 1 for additional details. Welfare recipients are identified as having received at least one of the following types of income: federal/state Supplemental Security Income, Aid to Families with Dependent Children, and other forms of general income assistance.