Mobility in Economic Status Among People and Places

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Abstract

Family background and the characteristics of an individual's neighborhood are both important factors affecting individual economic opportunity. Both have been widely studied, yet recent empirical work using data from field experiments has brought new interest to questions at the intersection of family background and neighborhood characteristics. We review these literatures, with an eye towards understanding the complementarity between intergenerational and neighborhood factors, discuss policy development in the context of multiple factors that hamper individual opportunity, and conclude with a discussion of areas for future research.

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1 Introduction

In a society with low intergenerational economic mobility, advantage endowed by an individual's parents drives an individual's economic stature. Someone born without the advantage of wealthy parents is unlikely to be near the top of the income distribution solely based on individual talent and effort. For this reason, many policymakers and citizens tend to prefer a more mobile society, in which individual talent and effort serve to overcome disadvantages outside of one's control; in the United States, this possibility is central to the ideology termed the "American Dream." Economic mobility provides a foothold for policymakers seeking to provide opportunities for advancement to disadvantaged individuals, and social scientists have responded by studying individual economic mobility in a variety of ways.

Many scholars have chosen to focus on intergenerational economic mobility, or the link between the economic status of an individual and the economic status of his/her parents. The empirical literature on intergenerational economic mobility falls largely into two distinct segments. The first focuses solely on the individual and his/her parents, built on the Becker and Tomes (1979) theory of the family that emphasizes the role of parental human capital and income in determining an individual's income later in life. The second emphasizes the importance of an individual's neighborhood as a factor that facilitates the intergenerational transmission of economic status, and within economics, it draws heavily on theoretical work by Loury (1977). Loury's key insight is that an individual's community bounds the set of inputs he/she can receive while developing human capital as a child, playing a key role in intergenerational income dynamics and in opportunity.

In this article, we review some of the key economic and econometric insights underlying this vast literature, review important empirical findings, and discuss what we believe to be promising directions for policy development and future research. To develop a sense of the scope of this literature, Table 1 summarizes the main types of models that have been used to investigate intergenerational economic mobility; these models include cross-sectional models, panel data models (to study time trends), models of neighborhood effects, and experimental and quasi-experimental studies. We discuss the basic econometric model of individual mobility, as well as several extensions of that model in order to understand the extent to which common modifications of the basic model generate new empirical insights. We also summarize the key mechanisms through which neighborhood characteristics influence individual economic mobility. Our review of these literatures complements and synthesizes other excellent reviews of intergenerational income mobility (Solon, 1999; Black and Devereux, 2011), neighborhood effects (Durlauf, 2004; Leventhal and Brooks-Gunn, 2000), and international comparisons of intergenerational mobility estimates (Corak, 2006; Blanden, 2013).

Our review also provides a synthesis of recent research that focuses on the interactions between neighborhood effects and individual economic mobility. Much of this work has relied on field experiments, and has revitalized the field for at least two reasons. First, these field experiments provide exogenous assignment of treatment (i.e., moving from a poor neighborhood to a rich or middle income neighborhood), which removes many potential sources of bias that are thought to influence many estimates of treatment effects based on observational data. Second, these experiments naturally integrate two traditionally distinct sources of economic advantage and disadvantage: families and neighborhoods. Our goal with this discussion is to clarify what we know about the intersection of people and places in terms of economic mobility, and to characterize the current frontier of research.

At this frontier, a number of questions remain unanswered. Regression models focused on specific neighborhood mechanisms often lack a compelling identification strategy because it is difficult to rigorously link cause and effect in a context characterized by so many interacting choices and influences. On the other hand, more plausibly identified approaches, typically based on randomized housing relocation, produce a treatment effect that is likely causal but cannot easily measure specific mechanisms, as relocation changes multiple neighborhood characteristics simultaneously; these approaches struggle to explain what drives the effect. We discuss what these empirical studies can tell us, given both their strengths and limitations.

We make headway towards a common ground in these strands of the literature through recent theoretical work on poverty traps – defined by Azariadis and Stachurski (2005) as "self-reinforcing mechanisms that cause poverty to persist," and can exist at the individual or community level. The poverty trap literature is conceptually related to intergenerational mobility because it emphasizes human capital, access to investment, and dynamics that may produce multiple equilibria depending on individual and/or environmental factors. Each of these factors influence where an individual starts in the income distribution, and the extent to which he/she is able to move away from that position. This perspective serves as a means to unify much of the literature on individual economic opportunity, and clarifies new directions for both empirical research and for policy development. A relevant insight from this work is the consensus that multiple types of frictions must be present to generate a true poverty trap, and policy must simultaneously address multiple frictions in order to lead to real improvements in economic mobility.

The outline of our review is as follows. Section 2 describes the individual-parent model of intergenerational mobility, describes a variety of alternative model specifications, and summarizes general findings and implications of this research. Section 3 describes the early literature on the impact of neighborhood characteristics on individual economic status, and Section 4 describes recent work based on experimental and observational housing relocation that explores causal reduced form models of the relationship between

neighborhoods and intergenerational mobility. Section 5 discusses lessons from recent theoretical work on poverty traps that relates to policy development for individual economic opportunity. We offer our final thoughts in Section 6.

2 Intergenerational Mobility

2.1 The Classic Intergenerational Mobility Model

Dating back at least as far as Sewell and Hauser (1975), social scientists have estimated a society's level of economic mobility using the regression model

$$Y_i = \alpha + \beta Y_i^{\pi} + \epsilon_i, \qquad i = 1, 2, \ldots, n \tag{1}$$

where Y_i is individual i's permanent income, Y_i^{π} is his/her parent's permanent income, ϵ_i is the disturbance, and the parameter β captures the relationship between Y_i^{π} and Y_i. We refer to Y as permanent income to be consistent with a majority of this literature, noting that it might be more appropriately called lifetime average income. If the variances in income are the same for both generations, the regression slope β is equal to the intergenerational correlation in income, $cor(Y, Y^{\pi})$, and is interpretable as a dollar-for-dollar coefficient if incomes are measured in levels, or as an elasticity if they are measured in logs (Solon, 1999; Lee and Solon, 2009; Black and Devereux, 2011). Otherwise, the regression coefficient β is a biased estimate of either intergenerational income relationship, and without knowledge of the change in income variances, both the size and sign of this bias is unknown (Zimmerman, 1992; Solon, 1992).[1] We summarize key results from the literature employing this model in Table 2.

In any case, β is a descriptive statistic that provides insight into how closely related an individual's permanent income is to his/her parent's permanent income (Hertz, 2005, 2007). A large value of β (i.e., β close to 1) implies that a society is not economically mobile across generations, meaning that an individual's economic status is closely tied to his/her parent's economic status – the rich stay rich, and the poor stay poor. A small value of β (i.e., β close to 0) means that a society is almost perfectly economically mobile across generations, as an individual's economic status is almost unrelated to his/her parent's economic status – all other things being equal, two people have the same chance of ending up at a certain point in the income distribution, regardless of who are their parents.

An estimate of β can also be used to compute the probability that an individual

[1] This is because the regression slope is equal to $\rho \times (\sigma_Y / \sigma_{Y^{\pi}})$, where ρ denotes the intergenerational correlation in income, and σ is the standard deviation. If there is a difference between σ_Y and $\sigma_{Y^{\pi}}$, then the parameter β is not equal to the intergenerational correlation in income (or the intergenerational elasticity, if income is in logs).

ends up in a particular part of the income distribution given his/her parents' location in the income distribution (e.g., Solon, 1992; Björklund and Jäntti, 1997). Assuming Y and Y^{π} are jointly normally distributed, and using μ and σ as the mean and standard deviation of the income distribution,

$$Y|(Y^{\pi} = y^{\pi}) \sim \mathcal{N}\left[\frac{\sigma_Y}{\sigma_{Y^{\pi}}}(\alpha + \beta y^{\pi}), \frac{1}{(1-\beta^2)}\sigma_Y^2\right] \tag{2}$$

can be used to compute the probability that an individual achieves a particular level of income (e.g., above the median) conditional on his/her parents' income level.

This classic model is subject to three potential criticisms. The first is that the model assumes a simple parametric functional form, and a distributional assumption when $\widehat{\beta}$ is used to compute transition probabilities via equation (2). Scholars have challenged both the distributional assumption and the parametric structure of this model based on empirical evidence of asymmetry in terms of upward and downward mobility (e.g., Solon, 1992; Dearden et al., 1997); asymmetry implies that these assumptions do not hold. The second criticism relates to the reliability of empirical measures of permanent income, and the third relates to heterogeneity in the intergenerational elasticity (or correlation) in income. These latter two criticisms have been subject to a substantial amount of empirical work, and in the following subsections we discuss each in turn.

2.2 Correcting for Measurement Error in Permanent Income

Whether an estimate of β from the classic model is useful as a descriptive statistic related to intergenerational mobility depends on the extent to which the income measurements capture permanent income. The distinction between permanent and transitory income is important because the theory that motivates much of the literature focuses on the intergenerational persistence of earning ability, which is best captured by permanent income that reflect an individual's earnings, earning ability, and position in the income distribution. In a typical dataset, an individual is not observed over a long enough time period for which permanent income might be directly observed. Hence, there are two potential sources of bias: mismeasurement of annual income, and the timing of the income observations used. It is straightforward why mismeasurement in annual income is problematic, and may not accurately reflect permanent income. The timing of the income observations is important for comparability: if different individuals' income is measured at different age ranges, some individuals will be at the height of their earning potential while others are measured early in their careers. Yet, consistently measuring annual income across individuals but at an age that is not likely to be correlated with permanent income may lead to biased estimates; for instance, estimating intergenerational income relationships for individuals in their early 20's may not generate unbiased estimates (because income

measured in one's 20's may be a biased measurement of permanent income).

These questions of measurement have generated wide-ranging scholarly debate in the intergenerational mobility literature. Atkinson (1980) and Solon (1992) point to measurement error in parental income and nonrandom sampling as a source of downward bias in estimates of β, and both Solon (1992) and Zimmerman (1992) describe how the use of short-run income as a measure of long-run income induces an errors-in-variables bias. The discrepancy between short-run and long-run income can be caused by idiosyncratic shocks to annual income, or by systematic differences in income by stage of life (a lifecycle bias). To the extent that the measurement error comes through annual fluctuations in income, averaging the income measures across a number of years will reduce the effects of annual fluctuations on the income measures; an alternative strategy would be to use instrumental variables to correct for measurement error in parental income. Also, Solon (1992) uses the Panel Study of Income Dynamics (PSID) data as a nationally representative survey to overcome previous difficulties with non-random sampling (e.g., Sewell and Hauser, 1975); however, Atkinson (1980) cautions that such a survey may not be immune to attrition or endogenous adjustment in individual behavior because these surveys operate through repeated measurements of respondents (continued participation).

The lifecycle bias is more challenging to address. Haider and Solon (2006) show that the correlation between yearly earnings and lifetime permanent income varies by age, and that this correlation is lower during early adulthood and higher around age forty. They also show that the use of temporary income as a proxy for permanent income attenuates estimates of β, and consistent with their evidence that the correlation between yearly and permanent income is highest around age forty, the size of the attenuation bias is smallest around age forty. Their evidence of a lifecycle bias contradicts the conventional belief that deviations between short-run and long-run income are caused only by transitory shocks. Additionally, Mazumder (2005) shows that if there is autocorrelation in the measurement error, which is consistent with the lifecycle bias of Haider and Solon (2006), that standard methods will substantially underestimate the intergenerational elasticity. As a result, both Mazumder (2005) and Haider and Solon (2006) recommend using averages over periods longer than five years for both individual and parental income, and the results from Haider and Solon (2006) specifically point towards measuring income around age forty.

More recently, Mitnik et al. (2015) have reignited debates over the details of measurement and estimation in mobility models, arguing that the elasticity of the conditional mean of income with respect to parental income is a better measure of mobility than the elasticity of the conditional geometric mean of income, though the latter is what is technically estimated in the log-log regression model.[2] However, in practice the

[2]This point is somewhat technical, and we direct the reader to Section 3 of Mitnik et al. (2015). The crux of the argument is that the log transformation of income makes the intergenerational elasticity

difference between the standard approach and their preferred method is fairly small. In contrast, Chetty et al. (2014) have argued that the combination of a rank-based measure of income and a large dataset alleviate concerns over attenuation and lifecycle biases, but Mazumder (2015) shows that the Chetty et al. (2014) estimates do not necessarily eliminate these biases. Through sample selection criterion analogous to those in Chetty et al. (2014), Mazumder (2015) shows that the income measures those authors use tend to produce a lower intergenerational elasticity estimate, which he attributes to these sources of bias. He notes, however, that these biases are relatively small.

An alternative strategy is to use instrumental variables to overcome multiple sources of measurement error (e.g., Solon, 1992; Zimmerman, 1992; Lucas and Kerr, 2013; Lefranc et al., 2014). By the summary in Table 2, the instrumental variables approach does not provide much insight beyond the traditional (non instrumental variables) estimates of β. Apart from these papers, however, little work has been done to use instrumental variables to resolve identification concerns, in part because finding relevant and valid instruments for parental income is difficult.

What do the debates over measurement error tell us about intergenerational mobility? The statistical analyses in Mazumder (2005) and Haider and Solon (2006) suggest that measurement error leads to a substantial downward bias in estimates of β. This conclusion bears important implications for measuring income and interpreting estimates of β, and also suggests that the intergenerational elasticity is likely to be higher than indicated by traditional estimates. For instance, this measurement error may have contributed to the earlier findings that the United States is relatively mobile (i.e., a relatively small β).

2.3 Heterogeneity in Intergenerational Mobility Estimates

Another refinement of the basic model which frequently been considered is the question of whether the intergenerational elasticity is constant across groups and over time – in essence, the extent to which the intergenerational income relationship is heterogeneous. Related to this point is a literature that has evolved by trying to understand factors or mechanisms that are reflected in β.

2.3.1 Trends in Mobility

To what extent is the intergenerational elasticity (or correlation) in income changing over time? It is conceivable that structural changes in an economy over time lead to changes in the intergenerational elasticity (or correlation). One common question, for instance, is whether the United States is becoming more intergenerationally mobile.

estimate a geometric expectation instead of the arithmetic expectation that is consistent with economic theory of economic mobility.

Levine and Mazumder (2002), Hertz (2007), and Lee and Solon (2009) use repeated cross-sectional models to test for trends in the intergenerational elasticity, but they find no evidence of a trend. Aaronson and Mazumder (2008) offer a dissenting perspective: they create synthetic parental generations from average values of the census data, and use these synthetic parents to estimate the individual-parent correlation. They find that mobility is decreasing over time. Lee and Solon (2009) have argued against this result, noting that the validity of the intergenerational elasticity estimates computed using the synthetic data rests on the assumption that the unobserved families are relatively close to the average of census data observations. Using the population of intergenerationally-linked tax data for people born over several years in the 1980's, Chetty et al. (2014) confirm earlier findings of stable mobility in the late 20th century United States.

2.3.2 International Comparisons

Scholars of intergenerational mobility have also developed an interest in comparing mobility between countries, as the relative ease of obtaining data for OECD countries makes potentially illuminating comparisons a natural extension of the literature. Table 3 summarizes these results, which generally suggest that the United States is less mobile than many European countries, particularly Nordic countries, and that the intergenerational elasticity falls between approximately 0.15 and 0.5 in the developed world.

Solon (2002) cautions that the methodological challenges associated with intergenerational mobility estimates may be compounded by cross-national comparisons, as the patterns of bias may vary between countries. He cautions that cross-country differences may have more to do with data preparation and modeling choices than with true cross-national differences. In general, researchers making these international comparisons have been circumspect in making claims about what drives these differences, because data limitations combined with statistical and conceptual difficulties makes testing hypotheses about these differences difficult. Corak (2006) highlights returns and/or access to education as an important component of intergenerational mobility, noting that both rose dramatically through the 20th century in the developed world. Blanden (2013) finds a positive association between mobility and educational spending, as well as a negative association between mobility and both returns to education and inequality.

2.3.3 Heterogeneity in Mobility Across Groups

When considering heterogeneity in β, it becomes clear that many different possible mechanisms are built into $\widehat{\beta}$; parents affect the economic status of their children in many ways. For instance, Becker and Tomes (1979) describe the intergenerational transfer of family background and resources; Solon (1999) describes the division of family resources

among different children in the household; and Durlauf (1996) develops a model in which parents sort into neighborhoods that have different characteristics that influence the intergenerational transmission of economic well-being. Hence, the mechanisms by which parents affect the economic status of their children are both numerous and difficult to observe (or measure). The homogeneous β is some agglomeration of these forces, but may not be representative of the intergenerational link for any particular individual-parent pair. Keeping in mind that the intergenerational elasticity parameter is fundamentally a descriptive statistic, allowing for heterogeneity within the econometric model does not allow one to draw causal inferences about how family background influences adulthood outcomes. Nevertheless, econometric heterogeneity moves beyond the baseline intergenerational elasticity model by generating subpopulation parameters that may lead to the generation of new hypotheses related to intergenerational mobility for these subgroups of individuals, although intergroup heterogeneity in this descriptive statistic cannot answer these questions itself.

In the simplest sense, modeling heterogenity in β amounts to estimating group-specific mobility parameters, as in Hertz (2005), where an intercept offset for black individuals is a source of different transition probabilities for this population, even in the presence of a relatively small difference in the level of black and white intergenerational elasticities. A natural way to model these differences is by specifying interactions between socio-demographic characteristics and parental income in the intergenerational regression model. Research in this area has indeed found that different groups experience different values of the intergenerational elasticity. A more ambitious goal is to try to capture causal effects of neighborhood characteristics as mechanisms through which intergenerational income links are forged. We return to this issue after presenting our review of the neighborhood effects literature in the following sections.

2.4 Contributions from Economic History

The need for many generations of data plays to a comparative advantage of economic historians, who have made substantial advances in matching individuals to their forebears, sometimes tracing families as far back as 1850. Like the other studies we discuss, historical economic research on intergenerational economic mobility focuses on links between individuals; yet, this research is unique in providing inventive ways to learn about intergenerational economic mobility, marking recent advances in the economic history of mobility as an exciting frontier in the mobility literature. We summarize this work in Table 4.

This literature makes three contributions. First, using further-reaching datasets provides data on additional generations, allowing researchers to estimate grandparent and great-grandparent effects that are not feasible to study using PSID, NLSY, or tax return

data (Chetty et al., 2014). Second, the focus on change over long periods of time allows researchers to study sources of mobility in ways that complement the traditional mobility literature. For example, asking whether or not the Great Depression affected mobility (Feigenbaum, 2015a) or measuring mobility among the descendants of former slaves in the early 20th century (Collins and Wanamaker, 2017), is impossible with datasets such as the NLSY and PSID. Finally, economic historians have also developed a unique instrumental variables strategy based on similarities among names that provides alternative estimates of intergenerational mobility that are much higher (intergenerational elasticities of around 0.75 or higher) than standard estimates.

Scholars are interested in the role of grandparents on intergenerational economic mobility because grandparents often make monetary investments in their grandchildren, because of genetic bequests across generations, and because there may be interactive effects between parents' and grandparents' income that affects the individual (Solon, 2014, 2015). These ideas are relevant for the rate of income convergence across generations, as a grandparent effect implies slower convergence. The existence of a grandparent correlation conditional on a parental correlation also implies, contrary to the canonical Becker and Tomes (1979) model, that intergenerational income relationships last longer than a single generation. This literature is relatively new, however; a broad consensus has not emerged on the size and interpretation of the grandparent coefficient. Ferrie et al. (2016) find positive and significant elasticities, but acknowledge measurement error concerns, while Olivetti et al. (2016) and Modalsli (2016) find positive grandparent elasticities. These results suggest that the typical parent-child model is missing the child-grandparent link.

The economic history literature also focuses on long term trends in mobility, based on datasets that stretch back farther than the PSID and NLSY surveys. In addition to estimating and explaining long term trends, this literature provides insight into how major events in U.S. history, such as the Great Depression and the Civil Rights Movement, affected economic mobility. Evidence suggests that mobility did decrease between the early 20th century and the 1970's in the U.S.: Feigenbaum (2015b) estimates the intergenerational elasticity to be about 0.2 during this period, while Hilger (2017a) finds a gradual decrease in the intergenerational elasticity between 1930 and 1970, and an increase after 1970. This research has also uncovered new directions for future work. Hilger (2017a), for example, finds that many changes in U.S. law and society – such as the G.I. bill, the Civil Rights movement, and the integration of the education system – had a limited impact on mobility rates, but that rising incomes and equality did have an impact. Emphasizing the role of racial disparities, Collins and Wanamaker (2017) find that since 1880 African-Americans have experienced lower rates of upward mobility than white Americans across the income distribution, and attribute this finding to persistent differences in human capital attainment that is related, in part, to neighborhood differences.

Analyses using long-term data is important because through these data scholars directly observe the evolution in intergenerational economic mobility over a long time horizon, and also allow researchers to link changes in this evolution to discrete, historical events. Hence, this kind of analysis can more credibly relate change in the intergenerational elasticity to structural changes in the economy, compared to cross-sectional or cohort analyses of short term trends in mobility. There are certainly many unanswered questions in this segment of the literature, but these papers, as well as those summarized in Table 4, provide a foundation for a complementary perspective on these different approaches.

The final strand of economic history research that we discuss here approaches intergenerational mobility in a totally different way, capturing persistence in economic status between individuals in different generations matched using rare surnames. Clark (2014) – the earliest application of this approach – studies people and groups with distinctive surnames, often arising from specific circumstances in their countries' histories, and finds that individuals with distinctive surnames associated with high income and wealth are massively overrepresented in high prestige occupations and in upper wealth and income quantiles. He shows that his results are consistent with an intergenerational elasticity of approximately 0.8 across several countries, suggesting a much lower level of short-term mobility than the mobility literature building on labor economics; he notes that this value is consistent over time, implying long-run reversion to the mean.

Yet, the surname approach is subject to methodological criticisms based on the distinction between group-based and person-based mobility measures. Torche and Corvalan (2016) argue that comparing the surname-based aggregate measures with intergenerational elasticities estimated using individual data is invalid, because Clark's use of surname averages conflates group-level and individual mobility measures. Standard intergenerational elasticity models average incomes within individuals to reduce the influence of measurement error; Clark argues that he averages within surnames for the same reason, but Torche and Corvalan argue that this shifts the unit of analysis to the surname groups. It is important to partial out within-individual variation, but partialing out within-surname variation results in a regression that finds within-group persistence by construction. The implication is that Clark's claim that standard intergenerational elasticity estimates overstate mobility are incorrect, as his measure does not capture the same relationship as the traditional intergenerational elasticity measure. Finally, between-group estimates like Clark's are typically much higher than individual analogues (Torche and Corvalan, 2016).

2.5 Alternative Model Specifications

2.5.1 Capturing Non-Monetary Influences

The mobility literature, going back to Becker and Tomes (1979, 1986) relies on the intergenerational elasticity as its primary summary statistic not because scholars expect parents' money to define adulthood outcomes per se, but because microeconomic theory suggests that an individual's permanent income is related to his/her parents' permanent income through both direct investment and non-monetary inputs. Several authors have examined the distinction between these categories of mobility-relevant inputs. Mayer (1997) uses data from a variety of sources – including Great Society era anti-poverty interventions – to study the intrinsic role of money. She finds that doubling parental income is associated with only a modest improvement in a child's educational outcome, but that non-monetary factors associated with income (e.g., residence in a single parent household, parental psychological help, or parental time investment) are closely associated with a range of outcomes, such as employment, educational attainment and achievement, or the avoidance of teenage pregnancy. In a similar vein, Shea (2000) exploits random shocks to family income ('luck') during an individual's childhood (specifically, temporary unemployment, changes in pay, or industry of employment) to identify the effect of parental money income on individual income later in life. He finds that the relationship between instrumented parental income and individual income is not significant, indicating that statistically significant intergenerational correlations reported in other studies may be driven by factors other than income – for instance, non-monetary bequests. Lefgren et al. (2012) take a different, but related approach in estimating a three-factor intergenerational elasticity, in which the factors are 'luck' income and human capital factors. They evaluate the bounds of each factor's contribution to the overall elasticity estimate, and find that, at most, income itself accounts for 37 percent of the intergenerational elasticity, with the rest coming from human capital transmission. Their results are consistent with Shea (2000) and Mayer (1997).

2.5.2 The Sibling Correlation Model

One interesting alternative to estimating β in the benchmark model is to measure the correlation in income among sibling pairs. A high sibling correlation implies a high level of family determinism and low individual mobility, analogous to a high intergenerational elasticity measured with a high β. Yet, unlike the benchmark (individual-parent) model, the sibling model does not require as long of a time series, and is relatively robust given that siblings typically have a common childhood background. Further, the sibling model accounts for sources of family correlation beyond parental earnings or income (Solon, 1999), though decomposing a sibling correlation into different potential family mechanisms can be difficult. Solon (1999) shows how the sibling correlation model can be

written as a function of the individual-parent correlation and a second term that represents additional sources of within-family correlation. The sibling correlation model is a complement to the individual-parent model, because an estimate of the individual-parent correlation makes it possible to derive the second component of the sibling correlation model, which captures the impact of common influences not related to family income.[3]

The sibling pair approach has produced substantially different results than the intergenerational approach. As early as the 1970's, empirical work employing this framework estimated sibling correlations to be as high as 0.34 (Solon et al., 1991) and 0.44 (Brittain, 1977), suggesting less mobility than contemporaneous intergenerational elasticity estimates. Since the sibling correlation model captures sources of within-family correlations beyond income, the interpretation of these estimates is not analogous to the interpretation of the intergenerational elasticity estimate from the individual-parent model; nevertheless, these estimates suggest a markedly lower level of mobility than the early intergenerational elasticity estimates of 0.1 to 0.2. This lower level of mobility may be driven by both income and non-income sources.

2.5.3 A Role for Genetic Bequests?

Another interesting angle that has been studied is the effect of genetics on economic outcomes. Some scholars have studied the role of genetics in economic mobility through samples of adopted and biological children, in order to decouple prenatal and genetic factors from other factors that drive economic outcomes. Björklund et al. (2006) find a significantly positive correlation between an individual's educational attainment and the educational attainment of his/her parents, regardless of adoption/biological status, and some evidence of a correlation with his/her biological father's income and not the income of an adopted father. Sacerdote (2007) finds the opposite, concluding that genetics and prenatal health are more than twice as important as family environment for explaining variance in education and income. Similarly, Liu and Zeng (2009) estimate a significantly higher intergenerational elasticity for children living with their biological parents (0.37) than for children who were adopted (0.10), which confirms that there may be a large genetic/perinatal component.

These results are fairly striking, and suggest that there is a strong biological component to economic mobility and potentially only a limited role for environmental factors. It is worth bearing in mind that it is difficult to differentiate between perinatal

[3]Specifically, Solon shows that $\sigma_a^2 = \rho^2\sigma_x^2 + \sigma_z^2$, where σ_k^2 refers to the variance for variable k, a denotes the family component of a sibling correlation, ρ is a coefficient, x is permanent income, and z is a set of common family factors unrelated to income. Dividing by the variance of individual income, σ_y^2, yields $\frac{\sigma_a^2}{\sigma_y^2} = Corr(y_{ij}, y_{ij'}) = (\rho^2\frac{\sigma_x^2}{\sigma_y^2}) + (\frac{\sigma_z^2}{\sigma_y^2})$, where y_{ij} and $y_{ij'}$ denote incomes for each of a pair of siblings, which in turn can be written as $Corr(y_{ij}, y_{ij'}) \approx \rho^2 + (\frac{\sigma_z^2}{\sigma_y^2})$. This final expression states that the sibling correlation is the sum of the intergenerational correlation and the ratio of the variances of income and non-income inputs during childhood. This second term is what we discuss in the text.

health and genetic bequests; these results suggest that policymakers interested in economic mobility and opportunity may be wise to consider mother and child health soon before and after birth. The implications of the empirical results regarding genetics per se are harder to parse; one implication is that genetics cannot explain all the variation in the economic outcomes of a child. It is also worth noting that while it is difficult to differentiate between genetics and perinatal environment, only the latter can be influenced by policy.

3 Early Investigation of Neighborhood Impacts

3.1 The Scope of the Literature

A parallel literature is based on the notion that an individual's neighborhood influences individual economic outcomes by affecting this process is not controversial, and a vast social science literature points towards "reduced buying power, increased welfare dependence, high rates of family disruption, elevated crime rates, housing deterioration, elevated infant mortality rates, and decreased educational quality" (Massey, 1990, p. 342) as important influences on these human capital inputs. Seminal papers – summarized here and in Table 5 – have explored racial and class segregation, social externalities, and local structural economic change as drivers of heterogeneity in neighborhood characteristics across the United States.[4] Yet, the early empirical literature investigating the role of neighborhood characteristics on the economic status of individuals and intergenerational economic mobility struggled to surmount the econometric challenge of distinguishing between correlations describing equilibria and causal effects. Many empirical analyses instead describe a particular mechanism through which neighborhood characteristics might affect economic mobility, and provide statistical evidence that is consistent with that mechanism. To proceed, we withhold discussion of the experimental and observational relocation studies until Section 4, to first describe several important mechanisms through which neighborhoods affect individual opportunity and intergenerational economic mobility.

3.2 Key Empirical Findings

In a seminal theoretical contribution, Loury (1977) describes the neighborhood as a factor that influences childhood absorption of human capital both through the inputs the neighborhood provides, and through its role in forming an individual's expectations about the returns to certain activities, such as schooling. In this model, neighborhood characteristics can have far-reaching effects on the lifelong economic status of an individual,

[4]Social externalities refers to a self-reinforcing dearth of community engagement and weakens community cohesion.

even holding parental attributes constant. In an effort to understand these mechanisms, scholars have found evidence that neighborhood characteristics significantly correlate with individual economic outcomes such as employment, income, single-parenthood, and labor market participation. Table 5 summarizes some important contributions; we conclude that neighborhood characteristics are at least associated with long-term differences in individuals' economic status.

3.2.1 Neighborhoods and Opportunity

Some scholars have noted the relevance of community characteristics for attempts to understand intergenerational mobility. Building on sibling correlation models common in this literature, Solon et al. (2000) and Page and Solon (2003) estimate neighborhood correlations in both educational attainment and men's earnings. They find robust associations that suggest that neighborhood characteristics have a significant impact on long-run educational attainment and earnings, linking individual economic mobility and the community, although the neighborhood correlation is much weaker than the family correlation. Brooks-Gunn et al. (1993) and Leventhal and Brooks-Gunn (2000) find relatively strong neighborhood effects. One important difference between these sets of papers is that Solon et al. (2000) and Page and Solon (2003) are agnostic about the underlying neighborhood effects mechanism. Page and Solon (2003) find evidence that growing up in an urban area is associated with higher earnings in adulthood, but they are unable to determine where this relationship comes from, and so they do not point to any specific mechanism through which neighborhoods influence mobility. In contrast, Brooks-Gunn et al. (1993), Leventhal and Brooks-Gunn (2000), and others, emphasize the role of peer influences stemming from neighbors' characteristics (e.g., income, education, single parent status, or drug use). Nevertheless the empirical findings indicate that neighborhood characteristics affect individual economic outcomes, and therefore play a role in intergenerational mobility.

3.2.2 Racial Discrimination and Segregation

Other scholars have approached neighborhood effects by studying statistical differences between racial and ethnic groups, largely because of the degree of racial segregation common in American cities prior to and during the 1970's. This research has wide-ranging implications for the mobility literature, both because of its implications for neighborhood effects, and because a substantial racial disparity in income and socioeconomic opportunity bears strong intergenerational implications. Wilson (1987) and Massey (1990) provide seminal contributions in the development of this race-place-opportunity literature. Wilson (1987) argues that economic structural change, particularly the combined decline of manufacturing and the out-migration of middle-class blacks from the distressed

inner city neighborhoods, led to concentrated black poverty in inner cities. Massey (1990) argues that while structural economic change provided the impetus for black poverty, pre-existing racial and class segregation was the necessary condition for the focus of those changes to be on the inner-city black population. It is both interesting and important to recognize that segregation need not coincide with racial discrimination for it to foster localized poverty. Durlauf (2004) notes that segregation arises when "individuals have a preference [for] others of similar ethnicity" (page 2197), which need not develop out of racial discrimination; but despite its origin, "segregation creates a structural niche within which a self-perpetuating cycle of minority poverty and deprivation can survive and flourish" (Massey, 1990, p. 350).

A number of papers have empirically studied racial disparities, often focusing explicitly on segregation as a measure of disadvantages faced by minority groups. Cutler and Glaeser (1997) evaluate the effects of segregation on city-level black employment, income, and family structure, and find evidence that blacks in segregated areas suffer worse outcomes than blacks in less-segregated areas. They conjecture that racial segregation coincides with income segregation, negative social externalities (e.g., lack of positive role-models), as well as structural economic disadvantage (e.g., workers live farther from their jobs); however, the negative association between segregation and economic outcomes seems to pertain only to data collected from the 1990 census (Collins and Margo, 2000). Ananat (2011) finds that segregation increases poverty and inequality for the black population (relative to the white population), but has the opposite effect on whites. The positive effect on whites is consistent with intuition in Massey (1990): while segregation magnifies the harmful effects of economic shocks on vulnerable groups in the population, especially minorities, segregation also insulates relatively well-off groups. Massey et al. (1991) show that joblessness, teenage pregnancy, and single motherhood are associated with segregation, which is in turn influenced by the economic structure of the city, and Massey et al. (1994) find evidence that the geographic concentration of poverty in inner cities is, at least in large part, the result of racial segregation in housing.

Borjas (1992, 1995), and Vigdor (2002) provide a different perspective, focusing on social externalities that result from ethnic clustering. Borjas (1992) focuses on the intergenerational effects of ethnic community characteristics as suggested by Loury (1981), which he terms "ethnic capital." Ethnic capital is, essentially, a human capital externality, arising from the influence of members of a particular ethnic group of younger members, through their roles as role models, vectors of information, etc., which affects outcomes for the next generation within that group. Borjas (1995) expands this work by using neighborhood-level measurements of ethnic capital as well as neighborhood fixed effects, and concludes that much of the effect of ethnic capital estimated in Borjas (1992) was, in fact, driven by ethnic sorting into neighborhoods, rather than by the human capital externalities. Vigdor (2002) uses the concept of ethnic capital as a theoretical

foundation on which to reconcile inconsistent findings regarding the relationship between segregation and economic outcomes for blacks over time (Cutler and Glaeser, 1997; Collins and Margo, 2000). He argues that the self-selection of skilled workers away from segregated cities induces changes in the level of ethnic capital, which affects intergenerational mobility.

The literature on race and segregation is, also, somewhat limited in its discussion of the mechanisms by which the observed effects occur, but it still has valuable implications for our understanding of race and opportunity. First, racial disparities exist, and working to understand those disparities within the broader context of mobility and space may be helpful in clarifying which mechanisms may influence both intergenerational mobility and racial disparities in economic outcomes. An important policy implication arising from this literature is that understanding the role of racial (or class) segregation must be an integral part of efforts to develop policy prescriptions designed to overcome neighborhood poverty in the context of the United States. Second, some papers seem to side with either a structural or social explanation; that is, focusing on a mechanism rooted in interactions between neighbors, either in the 'ethnic capital' sense (Borjas, 1992) or in the more traditional peer effects terms (Brooks-Gunn et al., 1993). Yet, one need not accept an either-or framing: it is likely the case that both structural and social effects are active determinants of individual economic mobility.

3.3 Focusing on Rural Poverty and Regional Economics

The micro-level literature on poverty and space – particularly as it pertains to opportunity and mobility – has focused primarily on urban areas, as much of the earlier literature is motivated by urban racial segregation. A parallel strand of the literature focuses on the economic status of places rather than people, and this literature is more engaged with rural poverty. Paying close attention to rural areas is important: Farrigan and Parker (2012) note that the persistent poverty of the same geographic groupings of U.S. counties (e.g., in the Mississippi Delta, Appalachia, the 'Cotton Belt' of the Southeast) bears some conceptual similarity to the concentration of urban poverty that motivated Wilson (1987). Beyond this shift in focus, engaging with the regional economics literature adds additional context in the discussion of local economies. Studying poverty of places, instead of individuals per se, makes clear that problems arising from region-based frictions may be solvable through a different set of levers than problems associated with individual or neighborhood poverty.

We summarize some results from this literature in Table 6. Several themes emerge from the regional poverty literature: an emphasis on labor market and spatial equilibria, a concern over whether persistently or extremely poor regions respond differently to economic change than areas that are not so poor, and an interest in place-based

– in contrast to people-based – policy solutions. The equilibrium emphasis manifests itself in an emphasis on the role of remoteness as a mechanism for regional poverty by influencing the equilibrium distribution of worker types and firms, and in the presence of structural equations models that model markets for labor, goods, and housing simultaneously (e.g., Wu and Gopinath, 2008; Gebremariam et al., 2011, for recent examples). Whether regional poverty responds differently to changes expected to foster growth, such as an increase in employment, is related to the idea of a poverty trap: in the presence of a poverty trap, benefits from positive developments may be blunted by the frictions creating the trap. Both of these themes naturally lead to an interest in place-based policy, because if regional poverty is the outcome of a spatial equilibrium, and if some economic changes are associated with stronger or weaker reductions in poverty rates, a policy aimed at shifting this equilibrium directly might be more effective than a policy that targets individuals. Since the community variables determined in equilibrium seem to contribute to mobility and opportunity, this regional literature is germane to these policy discussions.

As Table 6 shows, spatial remoteness is correlated with higher poverty rates, though persistently poor and remote counties do not respond differently to economic growth than other counties, suggesting that place-based policies may be effective. On the other hand, structural economic models suggest that amenities (e.g., access to attractive natural features, a more pleasant climate, and/or urban cultural amenities) influence the spatial distribution of workers, and so place-based interventions may be less effective if they are unable to alter the spatial distribution of amenities.

Studies in this literature typically employ national census data that is both large and geographically representative. An alternative that has become popular in recent years is to study the effects of specific place-based policies. A literature has developed around "Empowerment Zones," a policy intervention by which a state or federal government offers tax credits to firms in a particular distressed region, though evidence suggests that these interventions are not effective in reducing poverty (Hanson and Rohlin, 2013; Lockwood-Reynolds and Rohlin, 2015). Results suggest that at a higher level of aggregation (i.e., the county level) the structural perspective is most important, not social externalities, as the factors that seem to matter have to do with production structure and migration rather than compounding social factors, such as poverty rates or demographics. Like Wilson (1987), authors in this literature emphasize the role of structural economic forces rather than social factors.

3.3.1 A Brief Conclusion

As a whole, the early neighborhood effects literature provides a detailed descriptive analysis of multiple factors that connect an individual's childhood environment to his/her

socioeconomic outcome in adulthood. As Table 5 shows, there is strong empirical evidence that neighborhoods (or communities) play a role, even if the mechanisms driving these links are difficult to disentangle from each other. We also notice a particular emphasis on race as a factor that has complex links to neighborhood characteristics, and questions surrounding this "race-place" intersection are far from resolved. We believe that future research continuing to explore the race-place-mobility domain may yield valuable insight.

4 New Directions in the Mobility Literature

Recently, the conceptual and methodological orientation to studying intergenerational mobility shifted. Scholars increasingly approached questions of intergenerational mobility in terms of the causal effects of childhood circumstances on adulthood outcomes. For example, Chetty and Hendren (2015) focus on the (hypothetical) effect of growing up in a different county or commuting zone on adult income, obtaining precise estimates of neighborhood effects. This approach involves estimating local intergenerational elasticities, and uses geographic-specific intercept shifts to capture differences in absolute mobility; hence, emphasis is placed on geographic variation in intergenerational mobility, rather than on a single parameter. Such an analysis has implications for mobility and opportunity because it connects circumstances determined by previous generations (such as neighborhood choice) to individuals' outcomes.

4.1 Relocation Experiments

In the early 1990's scholars began using randomized relocation experiments to identify the effects of neighborhood characteristics on long-term economic outcomes such as earnings or educational attainment. Exploiting randomized relocation experiments is attractive because the randomization generates exogenous variation in neighborhood characteristics across individuals, allowing researchers to circumvent the endogeneity problem that motivated the equilibrium models of social interactions. Popkin et al. (1993) were the first to exploit such randomization as a source of identification via the Gautreaux Program, a relocation program for individuals living in Chicago's public housing. They found that treatment resulted in improved labor market participation, but had limited effects on wages. These findings are consistent with the spatial mismatch hypothesis – that poor workers in inner cities often struggle to find employment because of high transaction costs which foster continued unemployment (e.g., monetary costs of transportation, time costs of searching for work, and working in an unfamiliar place) that arise because of their location (Kain, 1968).

More recently, a series of studies have analyzed data from the Moving to Oppor-

tunity program (MTO), another randomized relocation program similar to the Gautreaux Program.[5] Follow-up interviews with members of treated households lead to the construction of a longitudinal data set, making the data increasingly useful for identifying the causal effects of neighborhood exposure on long term outcomes in an experimental setting. In Table 7, we summarize several studies that have exploited randomized relocation experiments to assess the impact of neighborhood characteristics on economic outcomes. This literature has investigated whether there are long-run neighborhood impacts on adults and also whether there are medium-run impacts on teenagers; in general, studies have not found much evidence that housing relocation led to improved economic status.

In contrast to many papers in this area, Chetty et al. (2016) find evidence in support of the neighborhood effects hypothesis, using data that has only recently become available as individuals exposed to MTO as young children reach adulthood. They study the long-term effects on a group of individuals not studied in the previous papers – children who were younger than thirteen at the time of relocation – and find significant effects of relocation on a number of economic outcomes. Their findings are consistent with previous conclusions that MTO did not significantly affect individuals who were older teenagers at the time of relocation. Yet, the authors do not find an age-threshold at which relocation becomes effective; the relocation effect is decreasing in age at the time of relocation. From this evidence, the authors surmise that there are two opposing effects of relocation: a fixed developmental 'cost' of relocation arising from the disruption caused by moving (e.g., stress from moving and/or having to acclimate to a new social environment), and the positive effect of exposure to a better neighborhood. Since younger children ultimately spend more time in the better neighborhood, they can better overcome the disruption costs, even if the benefit of relocation is positive and constant across the age distribution. By contrast, an individual who relocates at an older age may show a moving effect that is close to zero (or even negative) as the cumulative positive effects of relocation may not be sufficient to overcome the disruption costs.[6] Chyn (2016) finds a similar result using data from randomized demolitions of housing projects in poor Chicago neighborhoods, and shows that relocation improves economic self-sufficiency and reduces the probability of being arrested among individuals treated as children or, in contrast

[5]The MTO sample includes approximately 4,600 low income families living in poor census tracts in Baltimore, Chicago, Boston, Los Angeles, and New York City. In the mid 1990's, these households were offered housing vouchers that would allow them to move to a better neighborhood, and some households offered vouchers faced the restriction of having to move to low poverty tracts. See, for example, Katz et al. (2001) for further details.

[6] Chetty et al. (2016) also discuss several new mechanisms that might drive the effects of MTO. First, they show that MTO children live in neighborhoods that are slightly richer and slightly less black than their previous neighborhoods, and interpret this evidence as evidence of segregation leading to poverty in the original neighborhood. They also revisit the gender heterogeneity observed in Kling et al. (2007) and Ludwig et al. (2013) and find effects are generally similar between genders, though one important area in which boys fare worse than girls is in the incidence of risky behavior. Chetty et al. (2016) speculate that the richer, safer environments to which MTO boys relocated punish risky behavior less severely.

with Chetty et al. (2016), as teenagers.

Yet, Durlauf (2004) cautions against drawing overzealous policy prescriptions from these relocation studies, because they ignore the possibility of general equilibrium effects that arise from the relocation of a large number of poor people to non-poor neighborhoods. The fact that MTO may have positive effects does not imply that poverty could be ended by moving everyone in poor neighborhoods to rich ones. Kling et al. (2007) argue that because the relocated individuals did not all relocate to the same area, the potential for general equilibrium effects is small; however, Chetty and Hendren (2015) note high frequencies of individuals relocating to certain popular areas. Nevertheless, it is clear that scaling up of relocation programs on the basis of certain successes of existing experiments may lead to general equilibrium effects, such as a change in behavior from relatively wealthy individuals (Durlauf, 2006).

Additionally, one might argue that the findings that relocation experiments do not induce positive effects for relocated individuals is inconsistent with the foundational theoretical perspectives of Wilson (1987) and Massey (1990), and of related empirical work (e.g., Borjas, 1992; Cutler and Glaeser, 1997). If the barriers to economic empowerment were caused by structural economic changes situated specifically in space (racial or class segregation, or ethnic capital) as previous research suggests, one would expect to see substantial effects of relocation; yet, the only effects are those for young children identified by Chetty et al. (2016). These findings are consistent with the neighborhood effects literature in sociology and psychology that finds significant neighborhood effects on health and behavior, particularly for women (e.g., Jencks and Mayer, 1990; Brooks-Gunn et al., 1993). Based on this empirical evidence, our perspective is that neighborhoods are important, as early work indicates, but the mechanics of these relationships seem to work through a more subtle channel than a direct correspondence between exposure to certain neighborhood characteristics and income.

4.2 Mobility and Neighborhood Inputs

Chetty et al. (2014) study variation in opportunity in the United States by estimating mobility measures for specific geographic units.[7] They show that the chances of achieving upward mobility vary widely across space: in Charlotte, North Carolina, the probability of moving from the 25th percentile to the top half of the income distribution is 4.4 percent,

[7]Chetty et al. (2014) use a rank-rank income regression that is conceptually similar to an intergenerational elasticity but measures movement across the income distribution rather than in dollar terms, to estimate the degree of mobility across U.S. counties and commuting zones. Their emphasis is on transition probabilities, particularly the probability of moving from the bottom quartile to the top, which they refer to as 'absolute mobility', in contrast to the 'relative mobility' denoted by the intergenerational elasticity. They argue that the intergenerational elasticity itself is a relative measure because all other things being equal, a given intergenerational elasticity characterizes how well a person born to poor parents will do compared to one born to rich parents.

while in San Jose, California, it is 12.9 percent. This difference is similar in magnitude to the difference between an intergenerational elasticity of 0.2 and an intergenerational elasticity of 0.4. This finding is particularly noteworthy because this variation suggests that there is a direct role for geographic mechanisms to influence economic mobility. Chetty and Hendren (2015) expand on this work, and find that moving to a more mobile place improves an individual's income later in life, and that at least 49 percent of the variation in adult income across space is based on differences in place of residence during childhood. Further, their model predicts, for example, that a year spent in Salt Lake City increases income at age 26 by $135.90, while a year spent in New Orleans reduces it by $175.30. Using these place-specific estimates, they correlate segregation, poor school quality, and a dearth of social capital as factors that suppress long-run incomes.

These papers emphasize geographic variation, and engage less with explaining the underlying mechanisms. Studies by Knapp and White (2016) and Bosquet and Overman (2016) take the opposite approach, emphasizing relationships between urbanity and rurality and mobility, and taking steps towards explaining these relationships. Knapp and White (2016) find that a negative association between childhood-county poverty rates and wages, and that this association is much stronger in rural counties relative to urban counties. Yet, the mechanism through which the youth poverty/rurality-earnings correlation arises is unclear; the authors argue that it is a matter of opportunity, but the same correlation could also arise from differences in service quality, peer effects, or from other household level unobservable forces.

Bosquet and Overman (2016) estimate adult wage elasticities with regard to the population size of individuals' birthplaces. They distinguish between three different mechanisms through which such an elasticity could emerge: *sorting*, whereby types of parents who choose to live in certain places produce a correlation; *learning*, whereby population size affects human capital accumulation; and *geography*, whereby birthplace affects migration decisions later in life, which contribute to location decisions, and thus the labor market the individual faces. They find a raw wage elasticity of birthplace size of 6.8 percent, and argue that this is driven primarily by sorting, because parents with professional occupations are substantially more likely to live in large cities. Since controlling for parental status removes the association between size and education, the authors argue that the elasticity does not operate through learning. Finally, the evidence on the geography hypothesis is inconclusive, although Bosquet and Overman (2016) do observe differences between movers and stayers. This outcome affirms the concerns continuously expressed throughout the neighborhood effects literature that apparent neighborhood effects can arise from sorting.

This segment of the literature remains small, but it has drawn some conclusions that help to reconcile conflicting findings from the neighborhood effects and mobility literatures. These papers suggest that places do play a substantial role in mobility,

but that a large part of this story is heterogeneity between places, which may not be apparent in the earlier studies that suggested small to null neighborhood effects. Like the experimental papers, they estimate long-term outcomes rather than mobility parameters, and while this departure from mobility models provides valuable flexibility, it means that they answer questions of mobility only indirectly. Taken together, however, this body of work lays a foundation for further investigation into the sources of mobility, as opposed to its level, particularly with regard to the role of community inputs in determining individual mobility.

4.3 Some Open Questions

The work on relocation experiments has established that childhood exposure to certain neighborhood characteristics has long-term effects on individual socioeconomic outcomes, establishing a causal link between exposure to poor neighborhoods and economically important outcomes such as wage, education, and employment. Recent extensions of the traditional mobility literature – relying on descriptive statistics about mobility itself, rather than causal effects of childhood experiences – have also answered important questions, most notably by establishing that there are substantial spatial differences in economic mobility, along with provisional evidence about the sources of these differences. The shrinking gap between studies that estimate intergenerational elasticity parameters and those that focus on causal effects raises important conceptual and empirical questions. Research has established a relationship between place and mobility, but additional work is needed to answer questions about why mobility is higher in San Jose than in Baltimore or the Mississippi Delta as Chetty et al. (2014) and Chetty and Hendren (2015) suggest. As we have discussed, it is difficult to answer such questions within the traditional mobility framework because the intergenerational elasticity parameters are descriptive statistics and not causal, while at the same time, the field experiment models have so far not been able to disentangle particular mechanisms.

5 Lessons for Research and Policy

So far in this review we have touched on three strands of research related to intergenerational mobility: studies that estimate individual level intergenerational mobility parameters, studies that explore the impact of neighborhood characteristics on economic outcomes, and studies that investigate mechanisms driving rates of mobility. The evidence generally indicates that there are significant individual and neighborhood factors that influence long term economic outcomes, although only a few studies can conclusively identify the mechanisms through which these factors affect outcomes. In this section, we focus on the road ahead, asking two questions: "What is next along the research frontier?"

and "What policy lessons can we draw from this vast body of research?"

5.1 Insights from Theoretical Models of Poverty Traps

In addressing these two questions, we believe it is useful to consider the theoretical foundations from the of poverty trap literature. Thinking about mechanisms through which poverty traps may influence the process of intergenerational mobility is one way to gain some clarity as to the different types of mechanisms and policies that are related to intergenerational mobility. More importantly, whether or not economic outcomes are subject to true poverty traps – defined in Azariadis and Stachurski (2005) as "self-reinforcing mechanisms that cause poverty to persist" – bears important implications for the types of policies that might improve economic outcomes. This point deserves attention because it has serious implications for our understanding of the extent to which history influences long-run steady-state outcomes.

An overarching conclusion from simple models of poverty traps is that multiple frictions need to exist simultaneously in order to generate a poverty trap (i.e., a stable steady state at which individuals remain in poverty; Azariadis, 2006; Ghatak, 2015). While this conclusion may seem counterintuitive, it is important to understand that frictions such as capital market imperfections or nonconvexities in returns to labor do not by themselves prevent two individuals from converging to the same long run steady state (Ghatak, 2015); in other words, these factors need not lead to a poverty trap. This distinction is important and separates the idea of poverty persistence from a poverty trap: a person, place, or even country could be consistently poor over a long period of time, but not necessarily be afflicted by a true poverty trap. In such a case, a relatively simple shock such as a cash transfer, an increase in local employment, or improved technology, may be sufficient to put the individual back on the path toward the long-run steady state (and away from poverty).

Yet, many types of frictions might lead to a poverty trap, and Ghatak (2015) classifies these mechanisms into external and preference-based frictions.[8] From this perspective, understanding interactions between individuals, families, and communities is key because in the case of a 'social' poverty trap the equilibrium depends on the relative strength of social and individual behavioral incentives. The predictions of these abstract models appear to be consistent with the empirical literature on individual mobility and neighborhood effects: scholars have found a wide variety of neighborhood associations that correspond to both external and preference-based explanations. In addition, the presence of imperfect markets for noncapital goods (such as human capital) or limitations on intergenerational transfers, the perfect capital markets assumed in the standard

[8] Specifically, the ideas that the poor are rational but subjected to adverse constraints (external) vs. the notion that the poor make different choices because they are poor (preference-based).

Becker and Tomes (1979) model will not guarantee income convergence. A main implication is that preference or scarcity-based frictions can generate poverty traps even in the absence of external frictions, just as other market imperfections make poverty traps possible in the presence of perfect capital markets.

What do these models tell us about how to think about mobility, neighborhoods, and future empirical research? One answer is that we need a better understanding of *how* both families and neighborhoods affect human capital accumulation, combined with an understanding of how nonconvexities in returns to human capital affect permanent income. The findings in Chetty et al. (2016) are illustrative, as a large moving effect for children is consistent with the poverty trap hypothesis, because this treatment changes many factors at the same time. The paper shows that MTO had a substantial effect on educational attainment and income of relocated children, but whether this effect arises from differences in the allocation of educational quality, differences in one of a variety of possible peer effects, or from another unobservable factor (such as parental valuation of education that may influence both participation in MTO and these outcomes) remains unclear. This ambiguity emerges precisely because treatment changed many factors simultaneously, and so an effect driven by a change in a single factor and an effect driven by breaking a multifaceted poverty trap are observationally equivalent.

The poverty trap perspective also suggests that poverty traps may be a source of heterogeneity in intergenerational mobility parameter estimates, which further implies that the classic homogeneous parameter models do not adequately measure mobility (e.g., the models from Becker and Tomes, 1979; Solon, 2002). In a simple model with two steady states – a low income steady state that corresponds to a poverty trap, and a higher income steady state that corresponds to improved economic outcomes – it is clear that there will be a high degree of intergenerational income persistence for individuals in the poverty trap, and a lower degree of intergenerational persistence for individuals outside the trap as these individuals are moving towards the steady state.[9] Yet, these dynamics are not consistent with the assumption of a single intergenerational mobility parameter for all individuals. In other words the poverty trap perspective contradicts the implicit assumption of (at least conditional) convergence to a single steady state level of economic well-being. Allowing for heterogeneity in the estimates of intergenerational parameters, perhaps across the income distribution and across different groups (e.g., ethnic groups, those living in urban vs. rural areas), might provide a first step in assessing the extent to which the magnitude of the mobility estimates are impacted by these sources of heterogeneity. One way to capture this type of heterogeneity is to use a hierarchical model, as in Sampson and Morenoff (2006). Similarly, Hertz (2005) shows that black

[9]Implicit in this argument is the belief that the economy is not already in a steady state, and so individuals in the poverty trap remain fixed with low mobility and individuals who are not in the trap are free to travel towards the steady state. For our discussion, we maintain this implicit assumption.

Americans experience lower mobility overall, and substantially higher rates of downward mobility, compared to white Americans; this evidence is consistent with the membership-based poverty trap theory. Another alternative is to think about how neighborhood effects might have heterogeneous impacts on individual mobility across different age cohorts of individuals (Wodtke et al., 2016), or that IGE-like parameters can be decomposed across different groups or factors (Sacerdote, 2007; Lefgren et al., 2012).[10]

5.2 How Might We Think About Policy?

The insights from the theory of poverty traps is also important for understanding continued policy development. If, on the one hand, empirical evidence shows that economic outcomes are not subjected to the forces of a poverty trap (though poverty may be persistent), then history does not matter and certain straightforward (e.g., lump sum) policies can aid individuals in upward economic mobility (though these investments may need to be large; Azariadis, 2006). On the other hand, if empirical evidence indicates a poverty trap, then policymakers must proceed in a fashion that simultaneously targets multiple frictions.

One implication is that given nonconvexities in labor markets and preference-based traps, many antipoverty policies – e.g., Empowerment Zones, expanded early childhood education, training aimed at the development of character skills, education reform in impoverished areas – are unlikely to substantially increase mobility. An optimistic way to view this insight is to suggest a rehabilitation of policies that may have already been deemed ineffective, if they could be combined with other types of interventions aimed at other frictions. Policy aimed at breaking poverty traps likely needs to target both people and places, accounting for both structural (e.g., economic and institutional) and preference-based frictions. To combat social effects, Durlauf (2006) suggests policies of associational redistribution – that is, a redistribution of access to certain services and opportunities, such as in the case of school desegregation during the 1950's and 1960's. These policies aim to alter group composition, such as busing children to different schools, or affirmative action. In cases in which associational redistribution policies may not be politically feasible, Durlauf (2006) suggests considering supply-side associational redistribution policies, to increase the ability of individuals of disadvantaged groups so that they can compete under meritocracy and benefit from existing economic structures.

[10] Wodtke et al. (2016) focus on heterogeneity in high-school graduation induced by variation in both age cohorts and neighborhood effects, and not specifically on income or earnings.

6 Conclusion

The literature on intergenerational mobility is vast, and exciting. In this article, we weave together several strands of the literature, touching on key themes at the core of intergenerational economic mobility. The integration of individual and neighborhood effects in efforts to understand mobility and inform policy represents the forefront of this literature, and while the literature we summarize provides a solid foundation, there is still much to learn. Recent work that uses relocation experiments for identification has made substantial progress towards understanding the role of neighborhood context in economic mobility, as research has convincingly established a strong and persistent relationship between the two. Yet, as we have discussed, much remains to be learned about how this relationship works. It is, however, our hope that the relevant insights in the older literature will be retained and used to ask and answer deeper questions. The primary goal must be to understand the microeconomics underlying the most credible results, solidifying strong links between theory and empirics, to support stronger policy development.

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Table 1: Summary of the scope of the intergenerational mobility literature and a list of key citations

Model	Origin	Key citations
Cross-sectional	Sewell and Hauser (1975)	Becker and Tomes (1986), Solon (1992), Zimmerman (1992), Mazumder (2005), Mitnik et al. (2015)
Cross-sectional IV	Behrman and Taubman (1985)	Solon (1992), Shea (2000), Zimmerman (1992), Björklund and Jäntti (1997)
Panel	Levine and Mazumder (2002)	Lee and Solon (2009), Hertz (2007), Aaronson and Mazumder (2008)
Sibling correlations	Gorseline (1932), Chamberlain and Griliches (1975)	Solon et al. (1991), Björklund et al. (2006), Björklund et al. (2009), Levine and Mazumder (2007), Mazumder (2008)
Neighborhood effects	Loury (1977), Wilson (1987)	Case and Katz (1991), Massey and Denton (1993), Page and Solon (2003), Chetty and Hendren (2015)
Experimental studies	Popkin et al. (1993)	Oreopoulos (2003), Ludwig et al. (2013), Jacob et al. (2015), Chetty et al. (2016)
Quasi-experimental place studies	Chetty and Hendren (2015)	Chetty and Hendren (2015), Bosquet and Overman (2016)

Table 2: Summary of intergenerational correlation/elasticity literature that focuses on the individual-parent model

Citation	Time frame	Model	Methodological Summary	Intergenerational elasticity
Sewell and Hauser (1975)	1957-1967	Cross-sectional	Average parental income over four year period	0.18
Solon et al. (1991)	1968-1982	Cross-sectional sibling	Corrects for variance components; measures correlation in family (sibling) component rather than transitory individual shocks	0.45
Zimmerman (1992)	1966-1981	Cross-sectional	Instruments parental earnings with Duncan index	At least 0.4
Solon (1992)	1968-1984	Cross-sectional	Correct for transitory bias; selection of homogeneous sample	0.413
Shea (2000)	1968-1989	Cross-sectional	Uses instrumented 'luck income' to evaluate direct effect of money, as opposed to household characteristics associated with income	Insignificant
Levine and Mazumder (2002)	1968-1994	Panel	Decompose intergenerational elasticity into direct income effect, and indirect education/human capital effect	0.41 (NLS), 0.29 (PSID)
Mazumder (2005)	1968-1998	Panel	Averages many years; use of multiple data sets (NLSY, SIPP, Social Security Earnings data); corrects for autocorrelated transitory shocks and life-cycle biases	0.6
Aaronson and Mazumder (2008)	1950-2000	Cross-sectional sibling	Relies on synthetic parental generation means to produce sufficient data, but finds significant upward trend in correlation between individual incomes and this average	0.40 (1950), 0.58 (2000)
Lee and Solon (2009)	1977-2000	Panel	Controls for parental age; observes individuals in multiple years; uses robust covariance estimator	0.44
Mitnik et al. (2015)	1972-2010	Nonparametric cross-sectional	Modifies functional form to relax standard intergenerational elasticity model; applies corrections following Mazumder (2005)	0.52 (men), 0.47 (women)

Table 3: Summary of international intergenerational elasticity estimates for selected OECD countries

Country	Estimate	Years Averaged	Outcome Year	Source
Sweden	0.28	10	1991	Björklund and Jäntti (1997)
United States	0.47	5	1993	Grawe (2004)
Canada	0.19	5	1996	Grawe (2004)
United Kingdom	0.50	-	1991	Grawe (2004)
Norway	0.17	3	1992	Corak (2006)
Finland	0.18	-	1990	Corak (2006)
Germany	0.32	-	1997	Corak (2006)

These estimates from Corak (2006) are averages of multiple intergenerational elasticities estimated for those countries. For the Finland study, heterogeneous age ranges are used: at measurement, the son's age was 39.7 on average, and the father's age was 45.7 on average.

Table 4: Summary of key papers from the economic history literature

Citation	Topic	Main Finding
Long and Ferrie (2015)	Occupational mobility in U.S. and Britain, 1850-2000	U.S. mobility is high from 1850-1880, driven by returns to migration; as returns dropped, these countries became more similar
Ferrie et al. (2016)	Role of grandparents in mobility	Grandparents are important for the long-term outcomes of individuals
Feigenbaum (2015b)	Examining mobility among early 20th century cohorts, 1915-1940	Compares traditional IGE with occupational imputations and finds similar results; the IGE is lower for this period than later in the century
Feigenbaum (2015a)	How did the Great Depression affect mobility?	The Great Depression reduced mobility via selective migration by richer sons
Collins and Wanamaker (2017)	Long run estimates of racial mobility differences	Black mobility depressed from the late 19th century to present because of persistent intergroup human capital differences relative to whites
Hilger (2017a)	Examines sources of 20th century mobility trends	Limited effects, though there are increases in persistent growth and access to higher education
Hilger (2017b)	Long-run Asian-American mobility – high earnings despite discrimination	Interaction between positive selection of Asian immigrants and rapid change in anti-Asian discrimination in the postwar period led to high mobility, rather than higher educational attainment
Modalsli (2016)	Measuring grandparents' role in Norwegian mobility	Temporally varied grandparent effects that are sometimes large; the individual-parent model is inadequate
Modalsli (2017)	Long-run trends in Norwegian mobility	In the 19th century, Norwegian mobility was relatively low, but rose through educational access and movement away from agriculture
Clark and Cummins (2015)	Wealth mobility in England using surnames	Persistence of wealth among surname groups is consistent with an intergenerational wealth elasticity of 0.7-0.75
Olivetti and Paserman (2015)	Use surname approach to study U.S. mobility from 1850-1940	Consistent mobility in the 1800's with a decrease in the early 20th century; an overall decrease in mobility; trends are a function of expanded educational access and migration
Olivetti et al. (2016)	Grandparents' role in mobility in the U.S. from 1850-1940	Relatively large, robust, and gender specific grandparent effects that are explained using a model of trait matching

Table 5: Summary of the empirical literature investigating the effect of neighborhoods on economic outcomes

Citation	Mechanism	Outcomes	Result
Case and Katz (1991)	Social externalities via neighborhood-level spatial dependence	Crime, drug and alcohol use, single parenthood, labor market 'idleness'	Strong association between neighborhood poverty and the outcomes; positive and significant Moran's I statistics
Massey et al. (1991)	Racial segregation via black-white dissimilarity index	Single motherhood, labor market nonparticipation	Individuals in a high poverty neighborhood have a higher probability of being a single mother or not working
Borjas (1992)	Ethnic capital via neighborhood-level educational attainment and occupation prestige of individual's ethnic group in father's generation	Individual incomes, occupational prestige, educational attainment	Ethnic capital intergenerational elasticities are comparable to family intergenerational elasticities; approx. 0.23
Brooks-Gunn et al. (1993)	Social externalities via neighborhood means of socioeconomic and behavioral variables	IQ, behavioral problems, out of wedlock birth, dropping out of high school	Significant association between these outcomes and neighborhood poverty rates; authors argue this arises from lack of high-income peers rather than "contagion" among low-income peers.
Borjas (1995)	Ethnic capital via neighborhood-level educational attainment and occupation prestige of individual's ethnic group in father's generation	Income, education	Insignificant ethnic capital intergenerational elasticity after adding fixed effects and adjusting wages for education
Cutler and Glaeser (1997)	Racial segregation via black-white dissimilarity index	Employment, income, single parenthood	Segregation is associated with a decrease in income and probability of employment; a 10% increase in the dissimilarity index is associated with a 1.83% reduction in the probability of graduating high school and a 2.1% increase in probability of being unemployed
Solon et al. (2000)	Investigates neighborhood and sibling correlations	Educational attainment	Significant neighborhood-level correlations between .08 and .12, but smaller than family correlations of about 0.4
Page and Solon (2003)	Investigates the relative sizes of family vs. neighborhood correlations	Adulthood earnings for men	Neighbor correlations of about 0.15 are smaller than brother correlations of about 0.3; suggests limited long-term neighborhood effects on earnings
Ananat (2011)	Racial segregation via instrumented black-white dissimilarity index	Poverty, black-white inequality	Segregation increases poverty and inequality for blacks; a 10% increase in the dissimilarity index causes a 2.58% increase in the black poverty rate

Table 6: Summary of the empirical literature investigating the effect of regional characteristics on regional poverty

Citation	Mechanism	Outcome	Result
Crandall and Weber (2004)	Job growth	Census tract poverty	Job growth associated with a reduction in poverty, especially in high poverty tracts and enhanced by increased social capital; spatial autocorrelation in poverty rates
Partridge and Rickman (2005)	Employment growth	County poverty	Employment growth and human capital are strongly associated with a reduction in county-level poverty; evidence in favor of place-based policies
Partridge and Rickman (2007a)	Geographic remoteness	County poverty	Local job growth is strongly associated with a reduction in poverty; evidence against poverty traps
Partridge and Rickman (2007b)	Geographic remoteness	County poverty	Poverty reductions from job growth in the nearest MSA are attenuated by distance from the MSA
Partridge and Rickman (2008b)	Geographic remoteness	County poverty	Association between job growth and poverty reduction differs by MSA size, with county poverty reductions coming from job growth in the central county; evidence of metropolitan spatial mismatch as peripheral counties do not benefit from growth
Partridge and Rickman (2008a)	Geographic remoteness, spatial mismatch	County poverty	Remoteness is correlated with poverty; local job growth strongly associated with poverty reductions in remote counties
Wu and Gopinath (2008)	Geographic remoteness, labor market, natural amenities	County wage rates, employment density, housing prices	Remoteness accounts for the largest proportion of wages and employment density; natural amenities play a substantial role in housing prices which affects aspects of the regional equilibrium
Gebremariam et al. (2011)	Employment, migration	County-level median income	Substantial interdependence between migration, employment, and incomes, as well as spatial dependence between counties; evidence of regional interdependence in outcomes, and argue for an increased role for place-based policy

Table 7: Summary of the empirical literature investigating the impact of relocation experiments on economic well-being

Citation	Intervention	Outcomes	Results
Popkin et al. (1993)	Gautreaux Program	Employment, wages, hours worked	No effect of movement on outcomes
Katz et al. (2001)	Moving to Opportunity	Employment, earnings, welfare recipiency, health, safety, problem behavior incidence	No effect on economic outcomes, but positive effects on safety, behavior, and health
Oreopoulos (2003)	Random subsidized housing selection in Montreal	Adulthood (age 30+) earnings, employment, and welfare recipiency for treated children	No effect on these outcomes, and neighborhood variation in unobservables does very little to explain variation in outcomes; family variation makes a large difference
Kling et al. (2007)	Moving to Opportunity	Adult economic status, physical health, mental health 4-7 years after treatment	No long-term effect on economic status or physical health, substantial positive effects on mental health
Ludwig et al. (2013)	Moving to Opportunity	Long-term (10-15 years after treatment) effects on adult economic status, mental and physical health, and children's educational attainment and achievement	Improvement in adults' mental and physical health, no effect on economic status or children's education
Jacob et al. (2015)	Housing lottery in Chicago	Long-term (14 years after treatment) effects on treated children's test scores, health, high school graduation, arrests, earnings, and welfare recipiency	Small to null effects on all outcomes
Chetty et al. (2016)	Moving to Opportunity	Long-term effects (15+ years after treatment) on college attendance, earnings, problem behavior, single parenthood, and health for treated children	Substantial increases in earnings and college attendance, reduction in single parenthood probability
Chyn (2016)	Randomized moves due to housing project demolition	Earnings, employment, education, criminal behavior	Long-term positive effects on earnings, employment, and educational attainment, and decrease in arrests for violent crimes