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# Introduction: Inequality of Economic Opportunity



KATHARINE BRADBURY AND ROBERT K. TRIEST

In the United States, inequality in the distribution of economic rewards, such as income and wealth, has widened greatly in recent decades. This has led to a spirited debate regarding the causes and consequences of increased economic inequality. A fundamental area of contention is whether the increase is evidence of underlying economic problems that need correction. Increased inequality may result from increased risk taking and entrepreneurship in an environment of rapid technological change, with some entrepreneurs producing better, or just luckier, innovations than others, and reaping greater rewards. It may also result from increased disparities in work effort, with more industrious individuals earning higher incomes as a result of their greater effort. In both these cases, one could argue convincingly that the increase in inequality is justified and that no remedial changes in public policy are needed. On the other hand, if the increase in inequality results mostly from factors largely beyond the ability of individuals to control or counteract, then a strong case can be made for a public policy response.

In other words, the extent to which economic inequality is viewed as an appropriate matter for public policy concern depends, in

part, on the underlying causal mechanisms. *Inequality of economic opportunity*, a contributing factor to overall economic inequality, reflects inequality in an individual's innate characteristics and the circumstances of birth and early environment. It is generally regarded much more negatively than inequality of economic outcomes, because it is associated with characteristics and circumstances that are beyond an individual's ability to control. Although a degree of inequality in economic outcomes can have the positive effect of providing incentives for entrepreneurship and work effort, inequality of economic opportunity cannot be defended on these grounds. And few, if any, would claim that inequality of opportunity is desirable on moral grounds.

The articles in this issue examine the causes of inequality of economic opportunity and analyze the potential for public policy to reduce it. This essay provides an overview of the topic and aims to integrate the analyses provided in the other articles. Several major themes emerge from our reading of the research on inequality of opportunity:

- Inequality of economic outcomes is both a consequence and a cause of inequality of

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The views expressed in this article are those of the authors and do not necessarily represent the positions of the Federal Reserve Bank of Boston or the Federal Reserve System. The authors thank Suzanne Lorent and two anonymous reviewers for very helpful comments and Stephanie Bonds and Sam Richardson for expert research assistance. Direct correspondence to: Katharine Bradbury at [katharine.bradbury@bos.frb.org](mailto:katharine.bradbury@bos.frb.org), Research Department, Federal Reserve Bank of Boston, 600 Atlantic Ave., Boston, MA 02210; and Robert K. Triest at [robert.triest@bos.frb.org](mailto:robert.triest@bos.frb.org), Research Department, Federal Reserve Bank of Boston, 600 Atlantic Ave., Boston, MA 02210.

opportunity. Children growing up in low-income families lack many of the developmental and educational advantages enjoyed by children growing up in more affluent families. The barriers to opportunity that disadvantaged children face are often amplified by the effects of other barriers to schooling and labor market success later in life, leading to a perpetuation of inequality of economic outcomes across generations.

- Intergenerational economic mobility, the ability of children to enjoy higher economic status than that of their parents, is closely linked to equality of opportunity. Intergenerational mobility appears to be relatively low in the United States and shows no sign of improvement in recent history. Empirical studies point to a substantial risk of continued stagnation of intergenerational mobility unless public policy changes in ways that break down barriers to economic opportunity. Rates of intergenerational mobility vary substantially by the geographic location where one grows up, suggesting that policies that change the economic and social environment may be effective in promoting economic opportunity and mobility.
- Barriers to economic opportunity occur throughout life, but many of the most damaging obstacles to opportunity appear at very young ages. Some children are born into environments of economic deprivation and risk falling behind before they even enter preschool or kindergarten.
- Additional barriers appear as children age, often amplifying the effects of disadvantages first encountered at very young ages. Disadvantaged children tend to live in areas with relatively low-quality public schools and face obstacles to attaining postsecondary degrees. Barriers to opportunity in the labor market further amplify the effects of unequal access to opportunity during childhood and adolescence.
- Public policy has the potential to reduce substantially the effects of barriers to opportunity. Some policies, such as targeted, high-quality preschool, can compensate at

least partly for early-life disadvantages. Other policies may improve the quality of schools and neighborhood environments encountered by disadvantaged children, limiting the extent to which their environment hinders their educational attainment and early labor market outcomes. Labor market policies that offer opportunities for skill development and career development for workers with relatively modest formal credentials may also attenuate the negative effects of earlier disadvantages.

- Reducing inequality of opportunity need not come at the expense of economic growth or efficiency. Barriers to economic opportunity generally interfere with the efficient operation of the economy and result in suboptimal development of human talent and resources. Empirical evidence shows a positive association between equality of opportunity and aggregate economic growth.

#### CONCEPTS AND MEASURES OF INEQUALITY OF ECONOMIC OPPORTUNITY

Although the term *inequality of economic opportunity* is broadly understood to refer to inequality associated with an individual's circumstances at birth and during childhood, the way the term is operationalized varies across researchers and commentators, and a wide range of measures are used to quantify its magnitude.

To measure inequality of opportunity, and to develop policies to promote it, a common understanding of the term, at least conceptually, is critical. A key difficulty in arriving at a workable definition lies in specifying the circumstances and outcomes for which individuals are not considered responsible. Equality of opportunity intuitively requires that circumstances beyond one's control, such as parents' education, should not affect one's economic outcomes, but allows other factors that are under one's control, such as one's own educational attainment, to affect one's economic outcomes. But parents' educational attainment has been found to influence, although not completely determine, the educational attainment of their children. So how can we sep-

arate the effects of circumstances beyond one's control from those that are influenced by these circumstances but still at least partly under one's control?

### Circumstances and "Effort"

John Roemer (1993, 1998) has been especially influential among economic researchers and has spawned a growing research literature on the measurement of inequality of opportunity (for a clear exposition, see also Roemer and Trannoy, forthcoming). Roemer's approach separates the population of interest into types defined by circumstances beyond one's control, such as parental education, parental economic status, race, ethnicity, gender, the neighborhood or labor market where one grew up, and one's family structure while growing up. Within the group of people who experience a specific set of circumstances, there will be a distribution of an outcome variable of interest, such as income in adulthood. The distribution of the outcome for a given circumstance type is assumed to depend on responsible actions (such as the effort exerted in the labor market) taken by individuals of that type. For example, suppose that the only circumstance variable we choose to treat as not under one's control is parental education. There will be some distribution of income among people whose parents did not graduate from high school as well as other distributions for other circumstance types, such as those whose parents both received four-year college degrees. The distribution of income within a circumstance type is taken to be driven by differences in the responsible actions (which we often refer to as effort) taken by people of that type, whereas differences in the distribution of income between types are taken to be the result of differences in opportunities available to people of different types.

In Roemer's approach, complete equality of opportunity requires equality of outcomes for people of a given percentile rank in the effort distributions of each type. In other words, equality of opportunity is attained when the chance of achieving a given outcome depends

not on one's circumstances but instead on position in the distribution of effort. This captures the notion that effort is influenced by circumstances, but still under individuals' control. In our example, when parental education is the only circumstance and income is the outcome of interest, the income of someone at the 75th percentile of the effort distribution among people whose parents did not graduate from high school would equal that of someone at the 75th percentile of the effort distribution among people whose parents both graduated from four-year colleges.<sup>1</sup> The responsible actions taken by someone at the 75th percentile of the effort distribution of these two types would generally differ. Consider one specific type of responsible action, investing in one's schooling. Educational attainment of people whose parents did not graduate from high school tends to be lower than educational attainment of people whose parents graduated from college. This difference in the effort distribution across circumstance types is taken to be due to the influence of circumstances on effort, and full equality of opportunity in Roemer's approach requires eliminating (or compensating for) differences in outcomes associated with differences in the distribution of effort across circumstance types.

Marc Fleurbaey and Vito Peragine (2013) distinguish this approach, which they call the *ex post* perspective, from a somewhat different approach to defining and measuring equality of opportunity, which they call the *ex ante* perspective. In the *ex ante* perspective, equality of outcomes is not needed between people of different circumstance types at the same point in the effort distribution; instead, it requires only that the average outcomes of people of different circumstance types be equated. In our example, equality of opportunity would require that the average income of people whose parents did not complete high school would be equal to the average income of people whose parents both graduated from four-year colleges. This is an *ex ante* perspective on equality of opportunity in the sense that it is based on information available before we know where

1. This would hold true for any given percentile of the income distribution comparing any two circumstance types.

people stand in the effort distribution for their circumstance type. In contrast, Roemer's approach is an *ex post* perspective in the sense that equality of opportunity requires that outcomes for people of different circumstance types be equated for people with the same rank in their effort distributions, which means that we need to know where people stand in the effort distribution.

Whether one adopts the *ex ante* or the *ex post* approach to defining and measuring inequality of opportunity, specifying what range of factors are to be included in the set of circumstances over which one has no control is critical. Parental income is an obvious candidate and is often used in empirical applications. This variable is a proxy for the differing opportunities available to children growing up in high-income families compared with the opportunities of children growing up in low-income families. Parental education is another relevant circumstance. It is closely related to parental income, but it also captures how more educated parents may promote educational attainment and economic success in their offspring. Other family characteristics, such as the number of parents living with the child, also play an important role in children's development and the economic opportunities open to them later in life. The possible effect of discrimination on opportunities suggests that race, ethnicity, and gender should be included in defining the set of circumstance types. Childhood geographic location is another important circumstance that affects economic opportunity in several ways. City and state play a large role in determining the availability and quality of preschool programs open to low-income families and determine the quality of public K–12 education; the local labor market also plays an important role in creating economic opportunities and providing incentives for investment in education and training. At a finer-grained level of geographic demarcation, one's neighborhood while growing up affects factors such as exposure to crime and drugs, peer and role models, and often the specific schools that one attends.

Xavier Ramos and Dirk Van de Gaer (2012)

and Paolo Brunori, Francisco Ferreira, and Vito Peragine (2013) review empirical applications of the approaches outlined, as well as some other methods. Because of data limitations, the set of circumstance variables specified in empirical studies is much more limited than the complete set discussed previously (and one could argue convincingly that even that set is incomplete). In practice, only a small subset of the full range of potential circumstance variables is observed and specified in defining circumstance types. As a result, the portion of overall inequality of outcomes attributed to inequality of opportunity is undoubtedly an underestimate of what a more complete set of circumstance variables would yield. Of the Brunori, Ferreira, and Peragine country estimates, the share of total income inequality attributed to inequality of opportunity ranges from 2 percent to 34 percent.

### **Intergenerational Mobility and Equality of Opportunity**

Much of the empirical research related to inequality of opportunity focuses on measures of intergenerational mobility rather than using the approaches described. Intergenerational income mobility is closely related to measures of inequality of opportunity in which parental income is the only variable used to classify people into circumstance types and income is the outcome variable of interest. High intergenerational income mobility implies that one's childhood family income plays only a modest role in determining one's income as an adult. One would intuitively expect an increase in intergenerational income mobility to be associated with a decrease in inequality of opportunity. However, although intergenerational income mobility is closely related to inequality of opportunity, the two concepts differ in important respects.

One distinction is that measures of intergenerational income mobility typically do not capture the relationship between inequality in parental income and the extent of inequality in adult children's income. However, this relationship is central to the concept of inequality of opportunity. If variance in parental income is minimal, then income inequality associated

with parental income types (inequality of opportunity) will also be minimal, even when intergenerational income mobility is low. Conversely, a high degree of parental income inequality may be a source of a substantial inequality of opportunity even if intergenerational income mobility is reasonably high.

A second potential distinction between intergenerational income mobility and equality of opportunity revolves around whether we are considering absolute or relative income mobility. Absolute income mobility refers to the relationship between the amount of income received by someone as an adult and the inflation-adjusted income received by his or her parents a generation earlier. In contrast, relative income mobility refers to the relationship between a person's position in the income distribution and the position of his or her parents in the income distribution a generation earlier. It is possible for a high degree of absolute income mobility to be present even when income rankings change little across generations. Consider an extreme hypothetical case in which every adult's income is exactly double that of his or her parents. In this example, absolute mobility is high, but everyone occupies the same position in the income distribution as their parents a generation earlier. If we take parental income as an exogenous circumstance, then all of the income inequality of the children's generation represents inequality of opportunity, because it is fully determined by parental income. In general, no consistent theoretical relationship exists between absolute income mobility and equality of opportunity.

In contrast, an increase in relative income mobility will generally be associated with an increase in equality of opportunity. As relative income mobility increases, parental income becomes a less important determinant of one's position in the income distribution. Suppose that members of the children's generation are classified into types according to their parents' income (treating parental income as the sole circumstance variable). As relative income mobility increases, more of the income inequality in the children's generation income will be within circumstance types rather than be-

tween types, so measured inequality of opportunity will decrease.

Another potential distinction between intergenerational income mobility and equality of opportunity concerns whether parental income is a comprehensive summary measure of circumstances, and also whether income is the outcome measure of greatest interest. Income certainly may be used to convey advantages to one's children, but some parents choose to forgo earnings opportunities and instead use more of their time for parenting activities. Such choices are facilitated by the availability of financial wealth or the presence of a second parent. Thus, a case can be made that parental income must be supplemented by other variables, including parental education and family structure, to capture adequately the circumstances that determine the opportunities open to children. One can make a somewhat similar case for why income is not the only outcome variable of interest, and for the analysis of broader measures of well-being.

Isabel Sawhill and Richard Reeves (in this issue) discuss the distinction between relative and absolute income mobility, and reach the same conclusion: relative intergenerational mobility is more closely related to equality of opportunity than absolute intergenerational mobility is. They also discuss the question of "mobility of what?" and note that it is instructive to examine mobility across a broad range of outcomes beyond just income, including education, well-being, and educational status. However, they also note that income is a powerful indicator of other outcomes and of special interest.

In recent research, Brunori and his colleagues (2013) compute an *ex ante* measure of inequality of opportunity and a measure of intergenerational earnings mobility (the intergenerational earnings elasticity) for a large number of countries and find a robust cross-country negative correlation between intergenerational earnings mobility and the share of overall income inequality that is attributed to inequality of opportunity. Thus, despite important conceptual differences between the two concepts, intergenerational mobility has a



strong empirical association with equality of opportunity.

### KEY FACTS: INTERGENERATIONAL MOBILITY IN THE UNITED STATES

Sawhill and Reeves provide in this issue an overview of current patterns of relative intergenerational income mobility, and Timothy Smeeding, also in this issue, examines which subgroups of the population appear to face particularly severe obstacles to economic advancement. (For comprehensive reviews of the research literature on intergenerational mobility, see Solon 1999; Black and Devereux 2011; and Jäntti and Jenkins 2015.)

Drawing on both their research and that of others, Sawhill and Reeves document that in the United States the position of one's parents in the income distribution strongly predicts one's own place in the income distribution in adulthood. This is especially true for those born to families at the top and bottom of the income distribution: one set of estimates suggests that 60 percent of those born into a bottom-quintile family will themselves be in the bottom two quintiles of the income distribution at age forty, and that 56 percent of those born into a top-quintile family will be in the top two quintiles of the distribution at age forty. Other researchers have estimated qualitatively similar relationships. For example, using a different data source, Susan Urahn and her colleagues (2012) find that 70 percent of those growing up in families in the bottom two quintiles of the income distribution will also be in the bottom two quintiles as adults.

Contrary to popular impression, measured intergenerational income mobility in the United States tends to be less than that in many other advanced economies. Jo Blanden (2013) provides a recent compilation of estimates of intergenerational mobility across countries. Although sampling variance makes it difficult to draw definitive conclusions, point estimates of the intergenerational income elasticity (one measure of intergenerational income persistence) are greater for the United States than for Australia and several countries in western Europe. Of the twelve countries for which Blanden is able to identify comparable estimates, only Brazil has greater intergenera-

tional income persistence (and so less intergenerational income mobility) than the United States.

### U.S. Trends

The trend in intergenerational income mobility in the United States over recent decades and especially its implications for changes in equality of opportunity are somewhat controversial. The data requirements for analyzing changes over time in intergenerational mobility are daunting, resulting in a paucity of studies on this topic. Using census data on adults matched to synthetic parents in the previous generation, Daniel Aaronson and Bhashkar Mazumder (2008) find evidence that intergenerational income mobility decreased in the late twentieth century. Deirdre Bloome and Bruce Western (2011) document a similar decline in mobility based on data from two cohorts in the National Longitudinal Survey, and David Levine and Mazumder (2007) use data on brothers to come to a similar conclusion. In contrast, both Chul-In Lee and Gary Solon (2009) and Raj Chetty, Nathaniel Hendren, Patrick Kline, Emmanuel Saez, and Nicholas Turner (2014), using two different sources of intergenerational longitudinal data, find little evidence of changes over time in intergenerational income mobility, at least for recent adult cohorts.

As discussed earlier, changes in intergenerational mobility may be only loosely connected to changes in inequality of opportunity. If we consider parental income a circumstance variable, then any measure of inequality of opportunity would increase as inequality of parents' income increases. Increasing income inequality and largely unchanged intergenerational income mobility would combine to produce a trend of increasing inequality of opportunity. This appears to have been the pattern in late twentieth-century America.

### Population Subgroups

Particular subgroups of the population appear to be especially vulnerable to lack of mobility. Examination of differences in mobility across subgroups is of interest in its own right and can also give us insight into the mechanisms that may underlie barriers to opportunity.

Smeeding reports in this issue that among people born into bottom-quintile families, blacks, children of never-married mothers, and children of parents lacking a high school diploma are especially likely to be in the bottom quintile of the income distribution in adulthood. Mazumder (2011) cites earlier studies and offers as well new evidence that blacks experience both lower rates of upward mobility and higher rates of downward mobility than whites do. Chetty, Hendren, Kline, and Saez (2014a) present estimates showing that intergenerational mobility varies greatly across geographic areas of the United States. The variability in rates of intergenerational mobility raises the question of what underlies differences in mobility. To what extent are characteristics such as race and geographic location causal factors affecting mobility, and to what extent are they instead proxies for other less easily measured characteristics, such as limited access to quality schooling, that are the more direct causal factors? We return to this question in our discussion of mechanisms.

Membership in the subgroups discussed can be considered beyond one's control. In the context of the measures of inequality of opportunity discussed earlier in this essay, it is not differences in intergenerational mobility across circumstance types that are most relevant, but instead the extent to which inequality of outcomes is explained by circumstance types. Inequality between circumstance types defined by factors beyond an individual's control, such as race, parents' education, family structure, or place where one lives while growing up, forms the basis of the *ex ante* measures of inequality of opportunity. That intergenerational mobility is especially low among specific subgroups that are already overrepresented in the bottom quintile of the income distribution suggests that barriers to economic opportunity are especially severe for these groups.

### **DYNAMICS: INEQUALITY OF OUTCOMES AND INEQUALITY OF OPPORTUNITY**

The close connection between intergenerational mobility and equality of opportunity

raises the question of the impact inequality of outcomes has on inequality of opportunity. In simple terms, the outcomes-affect-opportunity hypothesis is that as the overall distribution of outcomes becomes more unequal it reduces low-income children's access to education and to other opportunities to accumulate human capital and move up the income ladder, and it increases high-income children's access to enrichment beyond schooling, in turn enhancing the ability of advantaged children to stay at the top. Both these changes tie individuals' economic prospects more tightly to their parents' economic success.

Several research papers explore this question, focusing on how unequal outcomes lead to unequal opportunity or how unequal outcomes reduce mobility, which is interpreted as indicating unequal opportunity. Miles Corak explores a variety of mechanisms that link income inequality, equality of opportunity, and intergenerational mobility.<sup>2</sup> Introducing his analysis, he notes that "an emerging body of evidence suggests that more inequality of incomes in the present is likely to make family background play a stronger role in the adult outcomes of young people, with their own hard work playing a commensurately weaker role" (2013a, 79). Corak first establishes the empirical regularity—labeled the Great Gatsby curve by Alan Krueger—that countries with greater inequality of incomes at a point in time also "tend to be countries in which a greater fraction of economic advantage and disadvantage is passed on between parents and their children" (80).

To understand the causal links, Corak then investigates the various channels through which parents' income can influence their children's accumulation of human capital and their adult outcomes, influences that he notes are mediated by the different balance struck between family, labor market, and public policy in determining outcomes across countries. For example, high returns to education not only make the income distribution more unequal and thereby provide rich families with relatively more resources to invest in their children, but also increase the incentive for the

2. In his *Journal of Economic Perspectives* article of that title.



rich to make such investments. Corak argues that parents with high incomes create advantages for their children both through monetary investments (better schools, enrichment experiences) and by passing along nonmonetary advantages—behavior, motivation, aspirations, and connections. One example of nonmonetary advantage is the guidance and culture supportive of college attendance.

Corak also discusses public policies that can either exacerbate or blunt inequality of outcomes, such as public provision of early childhood education: he notes that public policies outside of education, such as in health care and fiscal (tax and transfer) policy, can also intervene or not between parental income and children's outcomes. He argues that public policies in the United States, including even public K–12 schooling, are particularly tilted toward the advantaged. He also notes that public provision of health care, as in most other developed nations, helps level the playing field, leading to more preventive care for those with low incomes and hence to fewer negative health shocks that could have longer-term consequences" (2013a, 97).

Corak concludes by pointing out that "inequality lowers mobility because it shapes opportunity. It heightens the income consequences of innate differences between individuals; it also changes opportunities, incentives, and institutions that form, develop, and transmit characteristics and skills valued in the labor market; and it shifts the balance of power so that some groups are in a position to structure policies or otherwise support their children's achievement independent of talent" (2013a, 98). Regarding policies to address inequality of opportunity, he reminds us of Roemer's argument that policy should offset only those aspects of differential success that relate to circumstances, and argues that different nations may well make different judgment calls regarding which circumstances are appropriate to offset.

In a sense, Brunori, Ferreira, and Peragine (2013) begin their analysis here, citing behavioral economics experiments indicating that people do distinguish between factors over which individuals have control and those they do not, when evaluating the fairness of the dis-

tribution of outcomes. They use these findings to argue that inequality should be evaluated not only from the point of view of its direct impact on growth or other aspects of the economy but also in terms of fairness. They note that inequality reflecting circumstances beyond the individual's control is widely viewed as unfair. Their paper focuses on an *ex ante* measure of inequality of opportunity used by others in the literature (including Ferreira et al. 2014; Marrero and Rodriguez 2013), which quantifies the extent of inequality between groups of people defined in terms of circumstances beyond their control (see Bradbury and Triest later in this issue).

Brunori and his colleagues (2013) examine the cross-sectional correlations between the inequality of opportunity measure and other country characteristics, including per capita output, inequality of outcomes, and intergenerational mobility. Like Corak, they find a positive relationship between inequality of opportunity and income inequality. They also note a positive correlation between this between-group inequality of opportunity measure and the standard intergenerational mobility measure (the intergenerational elasticity of income) as well as the intergenerational correlation of education, even when the measures come from different papers and are based on different data sources. They conclude by saying

inequality of opportunity is the missing link between the concepts of income inequality and social mobility. If higher inequality makes intergenerational mobility more difficult, it is likely because opportunities for economic advancement are more unequally distributed among children. Conversely, the way lower mobility may contribute to the persistence of income inequality is through making opportunity sets very different among the children of the rich and the children of the poor. (2013, 17)

Pablo Mitnik, Erin Cumberworth, and David Grusky "eke out as much evidence on [whether opportunities to get ahead are growing more unequal] as the available data will allow" (2013, 1). They focus on measuring the

trend in intergenerational *social-class* mobility and find evidence of recent rigidification in the U.S. class structure.<sup>3</sup> The negative trend in class mobility is especially pronounced among younger cohorts, for whom the rise in inequality would have had maximum influence during childhood, and is focused on professional and managerial parents, who have increasingly been successful in passing along status to their children.

Along similar lines, Smeeding (2013) argues that existing empirical work on U.S. intergenerational mobility cannot tell us much about the impact of rising inequality of outcomes on mobility because the recent and current young adults whose mobility can be examined were born and mostly grew up before inequality widened considerably beginning in the 1980s. We should look for evidence of growing divergence in success at early life stages between children raised in rich and poor families, Smeeding maintains. He notes that most developed nations show differences in school readiness associated with parental socioeconomic status (SES) and that some nations' education institutions succeed in reducing these differences somewhat, but most do not. Lane Kenworthy (2012) points to specific early-life indicators that have worsened, citing Sean Reardon's (2011) work on growing school performance gaps between high- and low-SES children and Martha Bailey and Susan Dynarski's (2011) research showing rising SES gaps in college completion.

Bloome (2015) provides a comprehensive and careful recent addition to this literature by

examining how intergenerational mobility varies with inequality of outcomes in the geographic area where people grew up. Using individual data from two longitudinal surveys, she regresses children's adult incomes on their parents' incomes interacted with inequality observed in their state of residence when the children were growing up.<sup>4</sup> She finds that "the best available data cannot confirm the hypothesis that inequality and mobility are systematically linked in the United States" (22). Given that she has improved considerably on the precision of earlier estimates, if a relationship exists, she argues that it must be quite small. She also notes that the estimated relationship may reflect countervailing trends; for example (much as Corak noted), inequality-associated higher barriers to college completion among the poor may be partly offset by the increased incentives for those at the bottom of the income or wealth distribution to attempt a college degree.

We next present new empirical evidence in favor of the Great Gatsby curve, and show that this relationship holds up, though in somewhat attenuated fashion, when other factors are controlled for. Our analysis begins where Corak's does, by establishing the empirical relationship, in our case within the United States. Figures 1 and 2 plot inequality of income and intergenerational income mobility across commuting zone (CZ) areas.<sup>5</sup> The vertical axes are transformed versions of Chetty, Hendren, Kline, and Saez relative mobility and absolute mobility measures (2014b).<sup>6</sup> The horizontal axes are a measure of inequality of income in

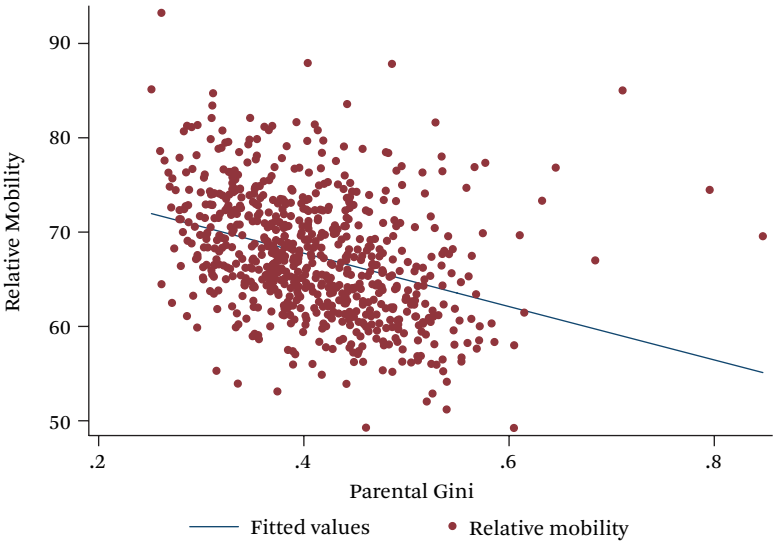
**3.** They define social class mobility in occupational terms, professionals/managers at the top and unskilled workers at the bottom.

**4.** In addition to simple interaction terms, she allows the intergenerational coefficient to vary with inequality through the use of state fixed effects and random coefficients estimates. She examines inequality when the children were teens and, alternatively, when they were around age four.

**5.** Commuting zones generally coincide with metropolitan areas in urban locations, but also include combinations of counties in rural areas, so as to exhaust the territory of the United States.

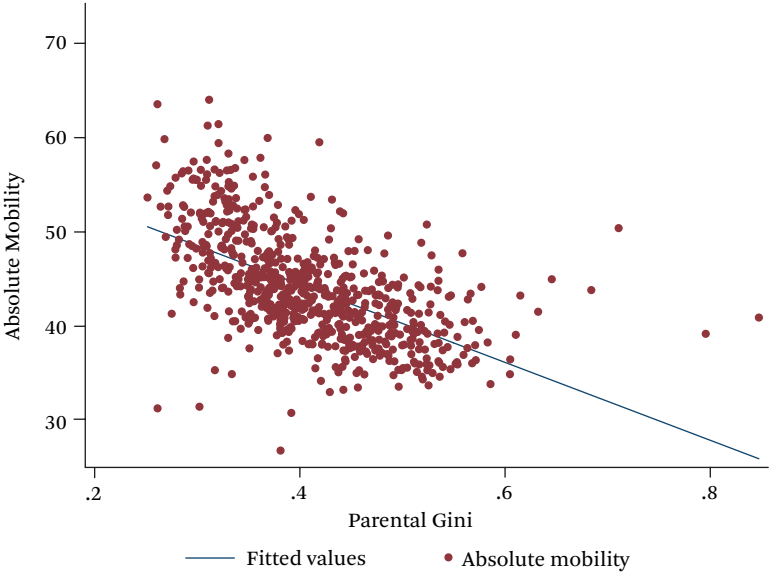
**6.** Chetty et al.'s measure of relative (im)mobility is the elasticity of child income rank at age thirty to thirty-one with respect to parent rank when the child was in his or her teens. We have inverted that measure (by subtracting from one, and also multiplied the result by 100) so that it is larger—more positive—where intergenerational mobility is higher; we refer to the result as "adjusted relative mobility" to call attention to this transformation. Chetty et al.'s absolute mobility measure indicates the expected adult rank of a child whose parents were at the 25th income percentile when the child was growing up.

**Figure 1.** Relative Mobility and Inequality of Parental Income



Source: Authors’ calculations based on Chetty, Hendren, Kline, and Saez 2014b.  
RM = 79.07\*\*\* -28.28\*\*\*Gini (\*\*\* $p < 0.001$ )  $R^2 = 0.12$

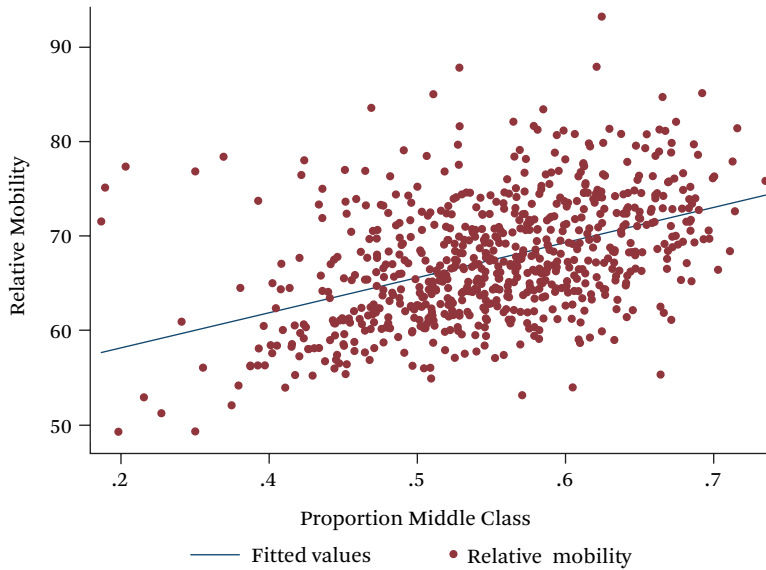
**Figure 2.** Absolute Mobility and Inequality of Parental Income



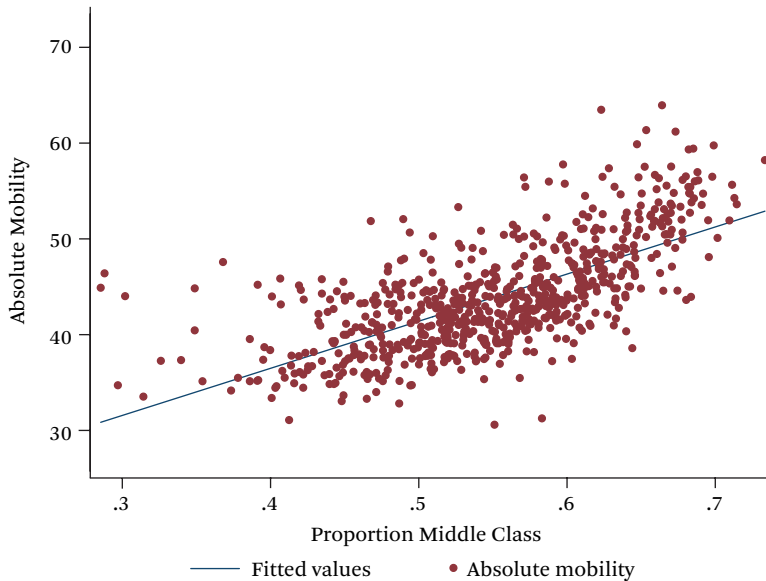
Source: Authors’ calculations based on Chetty, Hendren, Kline, and Saez 2014b.  
AM = 60.93\*\*\* -41.56\*\*\*Gini (\*\*\* $p < 0.001$ )  $R^2 = 0.33$

the parental generation, the Gini coefficient.<sup>7</sup> that places with greater inequality of income  
As in Corak’s depiction, both figures indicate also display less mobility, both relative and ab-

**7.** The Gini coefficient may take on values ranging from 0, indicating that all incomes are equal, to 1, indicating maximal inequality.

**Figure 3.** Relative Mobility and Size of the Middle Class While Growing Up

Source: Authors' calculations based on Chetty, Hendren, Kline, and Saez 2014b.  
 $AM = 16.95^{***} + 49.08^{***} \text{middle class}$  ( $***p < 0.001$ )  $R^2 = 0.20$

**Figure 4.** Absolute Mobility and Size of the Middle Class While Growing Up

Source: Authors' calculations based on Chetty, Hendren, Kline, and Saez 2014b.  
 $AM = 16.95^{***} + 49.08^{***} \text{middle class}$  ( $***p < 0.001$ )  $R^2 = 0.46$

solite. Figures 3 and 4 use the size of the middle class (proportion of CZ parents whose incomes are between the 25th and 75th percentiles of the national income distribution) as the indicator of inequality. The size of the middle

class is inversely related to inequality and fairly strongly related to mobility—places with a larger middle class display more mobility.

One of the issues raised by those who have challenged the import of Corak's empirical re-

lationship relates to timing: critics argue that the inequality measure should refer to the period when the children whose mobility is measured were growing up. This is exactly what these scatter plots refer to—the inequality of parental income, by location, when individuals whose outcomes as thirty-year-olds are measured were in their mid-teens, living with their parents. Nonetheless, scatter plots are simple correlations and not evidence of causation.<sup>8</sup>

An additional consideration is whether the relationship between inequality of family circumstances while growing up and intergenerational mobility holds up when potentially confounding factors are controlled for. For example, it might be that areas with a high proportion of single-parent households have a high degree of inequality of outcomes and also generate a lower rate of upward mobility. If this is true, and if we do not statistically control for single-parent households, then we might mistakenly attribute low upward mobility to general inequality, rather than to the prevalence of single-parent households. Using multiple regression analysis, we control for a variety of potentially confounding factors, including a measure of past immigration (percentage of foreign-born residents), the mix of educational attainment among adults age twenty-five and older, the proportion of households with children headed by a single mother, the proportion of workers with average commuting times of less than fifteen minutes, labor force participation rates of men and women, and economic variables including per capita income, growth in per capita income in the prior decade, and population size. Details and complete regression results are presented in the appendix.

The simple correlation represented by the Great Gatsby curve persists even in the presence of demographic controls and the use of a parental inequality measure that predates the period during which the adult children's mobility is measured. The estimated association between inequality of circumstances while growing up and economic mobility is considerably smaller when controlling for potentially

confounding factors, although it is mostly statistically significantly different from zero. We find that demographic characteristics have the expected relationships with mobility: past immigration, more highly educated residents, and fewer children living in single-parent families are positively associated with mobility. Lower commuting times are associated with higher absolute (but not relative) mobility, consistent with the hypothesis that spatial segregation (proxied here, as in Chetty, Hendren, Kline, and Saez by commuting times) makes upward mobility more difficult for low-income residents.

The reduction in the magnitude of the Great Gatsby curve relationship when other factors are controlled for should not be surprising, because some of the demographic controls can be seen as reflecting the mechanisms through which inequality among parents is likely to be passed along to their children. These mechanisms include support (financial as well as via encouragement and expectations) by more-educated parents for their children to persist in school, the inherent time constraints that reduce the parental attention available to children of single parents compared with their two-parent counterparts, and the neighborhood segregation mechanisms discussed later.

Even as increased inequality of outcomes among parents appears to be associated with a reduction in their children's income mobility, a likely further impact of increased parental inequality is to increase inequality of opportunity given any level of mobility. The reason for this is simply that the parent generation's outcomes essentially constitute the circumstances (in the Roemer sense) of the children's generation while growing up. Inequality of opportunity will increase with a widening of the distribution of circumstances even if the relationship between circumstances and outcomes (intergenerational mobility) does not change. As Bloome notes, although rising inequality of (parental) outcomes may not *cause* a reduction in mobility, "the economic consequences of growing up rich or

8. Chetty, Hendren, Kline, and Saez (2014a) report the same look at the Great Gatsby curve across the 709 CZs, except via regression coefficients (their table V) rather than scatter plots.

poor have risen, simply because the distance between the rich and poor has increased” (2015, 29).<sup>9</sup> Furthermore, the ongoing rise in inequality of outcomes in the United States (and other nations) heightens the need for further research to understand the mechanisms that underlie the observed relationships.

## MECHANISMS

Factors that enhance or diminish opportunities for economic advancement are present throughout the life cycle. Circumstances beyond the control of children affect their social and cognitive development and their opportunities for education and training from conception through early adulthood. Institutions and policies interact with circumstances and individual behavior in ways that may either hinder or promote opportunities for education and advancement and also affect other outcomes, such as conviction for criminal activity. In adulthood, exogenous circumstances continue to impinge on opportunities, both directly and through their effect on investments and outcomes earlier in life.

The Social Genome Model (SGM) developed by the Brookings Institution (Sawhill and Reeves in this issue; Winship and Owen 2013) models the mechanisms through which opportunities for economic mobility cascade over the life cycle and is used by researchers to study the factors affecting intergenerational mobility. The model simulates the progression of individuals through the stages of life, starting by specifying circumstances at birth. Initial circumstances—such as family structure, maternal education, and birth weight—directly affect the probability of successful outcomes throughout childhood and adolescence and, through these early stage outcomes, have indirect effects on outcomes later in life. Income in adulthood is influenced by the cumulative effects of outcomes at earlier ages. For example, circumstances at birth affect school readiness, which in turn affects academic and social development in middle childhood, which

then affects final educational attainment, which affects income in adulthood.

Circumstances, behavior, institutions, and policies may interact in complex ways to create or hinder economic opportunity. Joseph Fishkin (2014, 2016) notes that opportunities for economic mobility may be limited by bottlenecks one must pass through to reach the next stage in the pursuit of a goal. Analyzing inequality of opportunity as due to a set of bottlenecks that are difficult to negotiate or circumvent is useful in thinking about the obstacles to economic opportunity at different stages of the life cycle and in thinking about the effects of institutions and policies on economic opportunity. In the sections that follow, we survey the main findings of the research literature on the effects of bottlenecks and barriers to opportunity facing individuals as they progress through life.

## EARLY CHILDHOOD INFLUENCES ON MOBILITY AND ECONOMIC OPPORTUNITY

A large and growing research literature documents the important role of early childhood development, when many of the barriers to economic mobility first arise, in shaping opportunities and outcomes later in life. Comprehensive reviews of this literature are provided in Douglas Almond and Janet Currie (2011a) and Currie and Maya Rossin-Slater (2015). Here, citing only a sampling of the most relevant studies, we provide a more limited review of the main themes and findings emerging from this research. This topic is especially pertinent to understanding the mechanisms through which inequality of opportunity arises. Factors associated with early childhood development are circumstances beyond the ability of young children to control, and so clearly represent inequality of opportunity.

Moreover, early childhood factors may have an especially important influence on the opportunities open to children in adolescence and adulthood. In a series of papers, Flavio

9. Chetty, Hendren, Kline, Saez, and Turner (2014) make a similar comment: “children entering the labor market today have the same chances of moving up in the income distribution (relative to their parents) as children born in the 1970s. However, because inequality has risen, the consequences of the ‘birth lottery’—the parents to whom a child is born—are larger today than in the past” (2014, online abstract [emphasis added]).



Cunha and James Heckman (2007, 2008) and later with Susanne Schennach (2010) develop a model of human capital development and provide empirical evidence showing that early childhood development increases an individual's capacity to benefit from investment at later stages of the life cycle. In another study, Cunha and his colleagues (2006) survey earlier research on skill development over the life cycle. A key feature of human capital investment that underlies the importance of early childhood investments is the tendency for skills acquired at one stage of life to augment the skills acquired later in life, which some refer to as *dynamic complementarity* (see Cunha and Heckman 2007). Early-life skills not only persist, but also increase children's capacity to develop further. For example, basic language acquisition in infancy allows a young child to progress in further cognitive development. A closely related phenomenon is the ability of investments at one stage of life to increase the productivity of investments at later stages, or *self-productivity* (see Cunha and Heckman 2007). For example, the efficacy of investment in elementary and secondary school education programs may be greater for a child who has attended a high-quality preschool than for the same child had she or he not attended preschool. In the words of Cunha and Heckman, these two features of human capital investment "produce multiplier effects which are the mechanisms through which skills beget skills and abilities beget abilities" (2007, 6).

Investments made early in childhood will generally have larger multiplier effects than those made later in life for the simple reason that early childhood investment can affect more stages of subsequent development. Conversely, bottlenecks interfering with development and opportunity early in life are likely to be especially damaging to children's future opportunities and outcomes.

### **Prenatal and Neonatal Factors**

The earliest bottlenecks interfering with economic opportunity and mobility occur *in utero*. Currie (2011) and Almond and Currie (2011a, 2011b) synthesize the evidence on the role of prenatal health factors in health and economic outcomes later in life. Evidence is substantial

that prenatal and neonatal health is affected by environmental factors such as maternal nutrition, maternal health, and exposure to pollution. Neonatal health, in turn, affects child development and outcomes later in life. Some of the environmental factors associated with poor neonatal health are borne disproportionately by relatively low-income women, and therefore this is a mechanism by which inequality of outcomes in the parents' generation leads to inequality of opportunity among children.

A surprisingly robust relationship exists between indicators of prenatal health and outcomes later in life. Birth weight is an indicator of prenatal health that has received much attention, in part because it is very widely measured. It is well documented that low birth weight is associated with reduced wages in adulthood (see, among others, Currie 2011). Research supports the hypothesis that this relationship is causal, rather than being due simply to the correlation between birth weight and other unobserved factors affecting outcomes. For example, Sandra Black, Paul Devereux, and Kjell Salvanes (2007) examine a sample of twins to control for other factors related to a child's circumstances and find that the estimated long-term effects of low birth weight hold up to the controls for these factors. Much of the effect of birth weight on economic outcomes appears to operate through its effect on cognitive development. David Figlio and his colleagues (2014) estimate a positive relationship between birth weight and standardized test scores in a sample of twins (to control for unobserved factors). Interestingly, they also find that family background is more strongly associated with test performance than neonatal health is; low-birth-weight children with highly educated parents outscore high-birth-weight children with relatively poorly educated parents. This suggests that, in principle, the disadvantages associated with low birth weight can be offset by other factors. However, in practice, low birth weight and poor health in childhood tend to be associated with being born to low-income parents (Case, Lubotsky, and Paxson 2002; Currie and Moretti 2007). Thus, in the absence of public intervention, compensatory measures may not be available to low-

income families and this mechanism may contribute to low rates of intergenerational income mobility.

The inequality of outcomes associated with prenatal health represents inequality of opportunity whether or not a causal relationship runs from prenatal health to outcomes. An alternative possibility is that prenatal health serves as a proxy for unobserved early life circumstances. Nevertheless, to design effective programs and policies to reduce inequality of opportunity associated with early life circumstances, the causal relationships between early life circumstances and outcomes need to be understood.

Researchers have used natural experiments to identify causal links from prenatal health to outcomes later in life. For example, Almond and his colleagues (2010) examine the long-term effects of being subjected in utero to the 1959 to 1961 Chinese famine and find substantial reductions in literacy and employment for this birth cohort in the 2000 Chinese census. Similarly, in other research, Almond (2006) examines long-term effects of prenatal exposure to the 1918 influenza pandemic and finds the effects to be increased risk of adult disability and reduced educational attainment and earnings. Adam Isen, Maya Rossin-Slater, and Reed Walker (2014) use geographic variation in changes in air pollution concentration following implementation of the Clean Air Act of 1970 to identify the effect of exposure to air pollution in the year of birth. They find that greater exposure to pollution leads to lower earnings in adulthood, driven mostly by decreased labor force participation.

Overall, it is now well established that health in early childhood affects outcomes later in life. Although health risks are correlated with other factors such as low family income that may also be associated with barriers to development and opportunity, the role of early child health in affecting outcomes is a mechanism distinct from the more general contribution of other associated factors.

### Compensatory Programs and Policies

Programs that improve maternal and early life health and nutrition have the potential to improve child health outcomes, with concomi-

tant gains in later life outcomes. In the United States, the Special Supplemental Program for Women, Infants, and Children (WIC) is the public program most directly targeted at improving maternal and early childhood nutrition. Currie and Rossin-Slater survey research on the effects of WIC, and conclude that although identifying effects of the program on child health outcomes is difficult, “recent work that carefully attempts to identify the causal effects of WIC nevertheless points to positive and relatively large effects of the program” (Currie and Rossin-Slater 2015, 222).

The Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program (FSP), provides means-tested payments to households to be used for food expenditures, although many analysts have concluded that SNAP/FSP is effectively an income support program. Almond, Hilary Hoynes, and Diane Schanzenbach (2011) use geographic variation in the initial rollout of the FSP to identify causal effects of potential prenatal participation in the FSP on birth weight and find that the program increased birth weights, especially at the low end of the birth-weight distribution.

Given the success of the FSP in improving birth weight, one would expect other policies that boost family income to also result in improved neonatal health outcomes and eventual improvements in adult economic outcomes. The Earned Income Tax Credit (EITC) has become a significant source of income for families with low earnings. Hoynes, Douglas Miller, and David Simon (2012) use variation in EITC generosity due to tax reforms to identify the causal effect of EITC payments on birth outcomes and find that an increase in EITC income is associated with a reduction in the incidence of low birth weight and an increase in average birth weight. Using a similar identification strategy, Gordon Dahl and Lance Lochner (2012) estimate that an increase in EITC income causes a substantial increase in children’s standardized test scores.

### Early Childhood Education

The policy instrument with arguably the greatest potential to increase equality of opportunity in early childhood is the provision of high-

quality early childhood education (ECE). Katherine Magnuson and Greg Duncan provide in this issue an overview of the evidence on the overall effectiveness of ECE and an analysis of the extent to which expanded ECE can promote equality of opportunity.

The way in which ECE combines with children's classroom readiness to promote learning and development, and its implications for how ECE might be most effectively targeted, has provoked some controversy. Magnuson and Duncan note that developmentalists tend to hold a view of the role of ECE that differs from the "skills-beget-skills" model of human capital investment described earlier. That model predicts that the productivity of ECE will be greatest for children who start preschool equipped with the cognitive and socio-emotional skills needed to take full advantage of preschool learning opportunities. Developmentalists instead view the productivity as driven by how well an ECE program matches the developmental needs of the child in question. Children who enter preschool with relatively low skill levels due to factors associated with economic disadvantage may especially benefit from high-quality preschool programs designed to compensate for their economic disadvantage. In this example, the ECE program would substitute for skill development outside school rather than largely complement skills developed before entering the program. Of course, it is possible that the skills-beget-skills model might hold over broader phases of the life cycle even if the developmentalists' view is more accurate with regard to early childhood education. Furthermore, compensatory programs at young ages, such as with preschool programs, would be especially important if the skills-beget-skills phenomenon holds for human capital investments at later ages.

Magnuson and Duncan document in this issue that measures of children's prekindergarten skills differ greatly by socioeconomic status. These differences are especially pronounced for math and reading skills, and smaller for attention skills. The large differences in pre-kindergarten skills across socioeconomic strata point to the possibility of reducing inequality of opportunity by expanding

high-quality compensatory preschool education targeted to economically disadvantaged children. The evidence on the efficacy of ECE in improving school readiness is generally favorable, Magnuson and Duncan write, though variation is considerable in the magnitude of the effects across programs and test score gains associated with preschool attendance fade as students age.

Of perhaps greater relevance to the topic of inequality of opportunity, several research studies have found favorable long-term impacts of preschool attendance. One of the most studied preschool programs is Head Start, a large federally funded U.S. program targeted at economically disadvantaged children. Using comparisons with siblings who did not attend Head Start to control for confounding factors, Eliana Garces, Duncan Thomas, and Currie (2002) find that Head Start attendance results in increased earnings and educational attainment among whites and decreased probability of being booked or charged with a crime among blacks. David Deming (2009) also uses siblings who did not attend Head Start as controls and finds that Head Start attendance results in a substantial increase in a summary index of young adult outcomes, including high school graduation, college attendance, and reductions in crime and teen parenthood. Strikingly, Head Start participation closes one-third of the gap in this index between children with median and bottom-quartile family income. Two high-quality preschool programs targeted at disadvantaged children, the Perry Preschool and the Abecedarian Project, randomly assigned potential participants into enrollment and control groups and have been extensively studied. Research has documented substantial positive effects on a variety of long-term outcomes for both programs.

Magnuson and Duncan document in their article in this issue that participation in ECE programs is higher among children in top-income-quintile families than among their counterparts from lower in the income distribution. This suggests that expanding preschool enrollment among children from relatively low-income families is likely to be an effective way to reduce inequality of opportunity.

## EDUCATION AND INEQUALITY OF OPPORTUNITY

The widespread American prescription to ameliorate rising inequality is to advance education. However, if the education system reinforces existing differences rather than leveling the playing field, we cannot expect more education to cure inequality. This section reviews evidence on the degree to which the education system in the United States mitigates or amplifies the cumulative effects on children entering school of current and past advantages and disadvantages.

### Primary and Secondary Education: Kindergarten Through Twelfth Grade

As discussed, substantial differences in school readiness exist between children of poor and rich parents, reflecting a wide range of influences, including prenatal health, child care arrangements, and number of books in a child's home. Sawhill and Reeves report in this issue that 66 percent of children born more advantaged begin school with acceptable prereading and math skills and generally school-appropriate behavior, whereas only 46 percent of less advantaged children do.<sup>10</sup> A key question is whether primary schools, once children come under their care, level the playing field and reduce these disparities. Most research findings suggest that they do not, for a variety of reasons.

One part of the answer has to do with the fact that most primary and secondary education is provided as a local government service in the United States; that is, to the extent that rich and poor families live in different communities, their children will go to different schools. And to the extent that K–12 education relies on local financing, those schools' available resources are likely to be correlated with parental income. Even without local financing, if peers influence the quality of education, living in a poorer community may negatively affect the quality of education a child receives. Caroline Hoxby (1998) shows a positive relationship (statistically significantly different

from zero) between per-pupil district spending and district per capita income in the representative states of Massachusetts and Illinois from 1900 through 1980, controlling for per-pupil property valuation and selected demographic variables. Several studies examine school finance reforms and show that as spending becomes more equal across districts, so does student performance (Hoxby 2001; Card and Payne 2002; Chaudhary 2009; Jackson, Johnson, and Persico 2014). These studies provide evidence that when funding depends at least in part on local parental resources, both spending and test scores will be higher (and dropout rates lower) in districts where parents are relatively better off. School finance reforms in many states have reduced dependence on local tax bases, but they have not eliminated the relationship between school spending and local wealth.

Furthermore, even within local school districts, individual schools typically have neighborhood catchment areas, so income segregation among neighborhoods within a community may translate into lower-quality education for poor children either in the presence of peer effects or because within-district school-level per-pupil spending is not adjusted to compensate for differences in the costs of educating children from advantaged versus disadvantaged backgrounds. Kendra Bischoff and Sean Reardon (2014) document significant growth in the last forty years in neighborhood segregation of families by socioeconomic status. Similarly, Joseph Altonji and Richard Mansfield (2011) find that neighborhoods and high schools have become increasingly segregated by socioeconomic status, even as racial segregation has decreased. Annette Lareau and Kimberly Goyette note the prevalence of neighborhood schools, examine the links between choice of residential location and school, and argue that differential access to information (or access to different information sources) and institutional/structural and financial constraints imply that richer families “may be more easily and freely able to enact their ideal

**10.** Sawhill and Reeves distinguish disadvantaged and advantaged not just on the basis of parental income or socioeconomic status. The Social Genome Model they use in their analysis defines *advantaged* as being born at normal birth weight to a nonpoor married mother with at least a high school diploma.

preferences,” while poorer families face more trade-offs and operate within a more limited choice set (2014, xiv–xv). Although school choice programs are often seen as a way to reduce socioeconomic or racial segregation of schools, Lareau and Goyette argue that they “may not always reduce inequalities in school quality across families from different social backgrounds, but instead may reproduce or even exacerbate them” (xv).

Another link in the chain is provided by Bruce Sacerdote (2011), who cites studies that find significant effects of peer ability on students’ academic achievement, though some disagree about the magnitude of these effects. William Duncombe, Phuong Nguyen-Hoang, and John Yinger (2015) document substantial additional costs associated with educating disadvantaged students. Bruce Baker (2009) summarizes a number of studies that examine cost differentials related to student characteristics among schools within districts and adds to that literature, emphasizing that equal per-pupil spending does not provide equal educational opportunity when student-body composition, such as poverty incidence, varies across schools.

Even without unequal school districts or unequal schools within districts, children with rich parents benefit from greater enrichment expenditures than children with poor parents do. These benefits include music and art lessons, books and toys, trips, and tutoring (Kaushal, Magnuson, and Waldfogel 2011; Duncan and Murnane, this issue).

Tallying the impact of a full range of factors, Sean Reardon documents a growing school achievement gap between low and high socioeconomic status students over the last fifty years (Reardon 2011).<sup>11</sup> He finds, in addition, that the relationship between parents’ educational attainment and their children’s achievement has been relatively stable even as the relationship with parental income has

strengthened.<sup>12</sup> Reardon reports that the income achievement gap is large when children enter school and does not appear to change appreciably during K–12 school attendance.

To the degree that children benefit from inheriting innate abilities from their parents as well as from exposure to parental attitudes and the advantages that money can buy, these relationships between parental income and school achievement overstate the influence of opportunity. However, even controlling for math achievement, low-SES children disproportionately fail to complete high school: among children with top-quartile eighth grade math scores in 1988, 10.7 percent of low-SES children had not completed high school by 2000, whereas “rounds to 0” percent of high-SES children had dropped out; for those in the middle two quartiles of math scores, 12.4 percent of low-SES children and 0.6 percent of high-SES children had not completed high school twelve years later (Fox, Connolly, and Snyder 2005, table 21).

Duncan and Murnane describe later in this issue the mechanisms by which these growing educational gaps have been developing: some operate through the family and some via schools. They point to differences that arise in early childhood before children begin formal schooling, differential enrichment expenditures, and parental time investments before and throughout the school-age years that amplify the advantages of high-income children, plus increasing segregation by income of U.S. schools and the associated concentration in lower-income districts of children whose behavioral problems negatively affect classmates’ ability to learn. Sawhill and Reeves report, also in this issue, that 66 percent of more-advantaged children graduate high school with a GPA of 2.5 or better and without having been convicted of a crime or having become a parent, but only 37 percent of less-advantaged children do so. The Social Genome Model in-

**11.** Reardon combines results from many previous cross-sectional studies and measures the test-score gap between children with parents at the 90th and at the 10th income percentiles; test score differences are measured in standard deviation units.

**12.** In recent years, Reardon notes, the income achievement gap has approached the size of the parental-education achievement gap, but parental education remains somewhat more important.



volves gross flows in both directions at each transition. However, the success rate for those born advantaged (66 percent) is the same at adolescence and in early childhood (being school-ready when they begin school), whereas the success rate of those born disadvantaged (46 percent in early childhood) deteriorates between these two transitions (37 percent at the end of adolescence), which suggests that the K–12 schooling years do not erase—and may worsen—the disparities that children present when entering school.

Completing high school—or not—and the quality of high school education are critical determinants, together with parental educational attainment and parental income, of the next stage in the lives of youth. Some enter the workforce, some go on to additional training, and others continue their education in more academic settings, beginning two- or four-year college programs. Many of the factors that play a role in high school graduation and performance have independent effects also on college enrollment and completion. Returning to the issue of socioeconomic segregation between districts and between schools, Gregory Palardy, for example, finds that “socioeconomic segregation has a strong association with high school graduation and college enrollment. Controlling for an array of student and school factors, students who attend high socioeconomic composition (SEC) schools are 68 percent more likely to enroll at a four-year college than students who attend low SEC schools. . . . The results indicate the association between SEC and attainment is due more to [socioeconomic-based] peer influences” than to other school effects that reflect resource disparities and practices,

such as rigor of curriculum and disciplinary practices (2013, 714).

### Postsecondary Education

Martha Bailey and Susan Dynarski (2011) help elaborate the issue of postsecondary education gaps and trends; they use panel data to compare higher education enrollment, persistence, and completion for high-income and low-income members of the National Longitudinal Survey of Youth (NLSY) 1979 cohort (born between 1961 and 1964) and the NLSY 1997 cohort (born between 1979 and 1982). They find that college-entry rates were higher for the later cohort, regardless of income, but enrollment of students who grew up in the richest quartile of families rose faster than enrollment of those in the poorest quartile. A 40 percentage-point gap in college enrollment of students born in the early 1960s between poorest-quartile and richest-quartile students expanded to a 51 point gap for the later cohort; similarly, the earlier cohort’s 31 point gap in college completion between rich and poor grew to a 45 point gap for the later cohort.<sup>13</sup> A 2015 paper by Greg Duncan, Kenneth Lee, Ariel Kalil, and Kathleen Ziol-Guest uses similar NLSY data and also includes data from the Panel Study of Income Dynamics (PSID) on same-age cohorts to estimate educational gaps between children growing up in low-income versus high-income families. Like Bailey and Dynarski (2011), they find that educational attainment was measurably higher for later cohorts than for earlier ones at all income levels, but the gap between high- and low-income students between the two cohorts grew larger.<sup>14</sup> Their data, like Bailey and Dynarski’s, show further increases over time (between cohorts) in the fraction of students

**13.** Bailey and Dynarski (2011) find that it is especially among women that the income gap in college entry and college completion increased between the two cohorts; women with high-income parents saw the steepest increases in both college entry and completion between the two cohorts.

**14.** Duncan and colleagues’ data show that students who grew up in the poorest income quintile in the late 1970s completed 11.7 to 12.0 years of school, on average, compared with 13.9 to 14.0 years for richest-quintile students in the early cohort; later-cohort students from low-income families completed from 12.1 to 12.3 years versus the 15.0 years for the richest-quintile students, implying that the gap between rich and poor expanded from between 2.0 and 2.3 years to between 2.7 and 2.9 years. The year ranges reported in this sentence represent data from the NLSY79 and NLSY97 compared with corresponding cohorts in the PSID (fourteen- to sixteen-years-old in the late 1970s and fourteen- to sixteen-year-olds in the late 1990s); it is remarkable how close these educational attainment estimates from the two data sources are.



of all income levels who complete college, and expanding gaps between those who grew up in richest-quintile and poorest-quintile families.<sup>15</sup>

Although these average attainment data reflect all the influences on and behaviors of low-income versus high-income students and hence overstate the opportunity disparities, data including eighth grade math test scores on a cross-sectional snapshot of students halfway between the late 1970s and late 1990s cohorts indicate that a substantial part of the completion gap reflects inequality of opportunity. Mary Anne Fox, Brooke Connolly, and Thomas Snyder (2005) report that among low-income students with top-quartile eighth-grade mathematics scores in 1988, 74 percent continued their education beyond high school and 29 percent completed a bachelor's degree or higher by 2000.<sup>16</sup> By contrast, virtually all high-SES high-scorers continued in school beyond high school graduation and 74 percent obtained a bachelor's degree or higher by 2000. High-SES students with low eighth-grade test scores (scores in the bottom quartile) continued beyond high school and graduated from college at higher rates (83 percent and 30 percent, respectively) than low-SES children with the *highest* test scores did. Thus, even attaining top-quartile 8th grade math test scores did not earn low-income children as much access to higher education as their rich classmates with the poorest test scores enjoyed. Philippe Belley and Lochner (2007) report higher gaps in college attendance between students with low and high family income for a cohort born in 1979–1982 (NLSY97) than for a cohort born in 1961–1964 (NLSY 79).<sup>17</sup> In their regression anal-

ysis, Belley and Lochner conclude that although “ability is equally important for both cohorts, family income plays a substantially more important role in determining college attendance for the NLSY97 youth” than for the earlier cohort (14).

### Obstacles to Postsecondary Education

Considerable research has examined the nature of the obstacles facing low-income students in pursuing higher education. Some concern the attitudes, expectations, and aspirations regarding postsecondary education that surround rich versus poor children among parents, peers, and teachers during their earlier years of schooling; some reflect the quality of the education (or the quality of the credential) that students receive in high school. Because many low-income parents did not go beyond high school and some high schools serving concentrated-poverty populations do not have college-focused guidance departments, lack of information about the benefits of degree attainment or the process of applying to postsecondary schools can hinder low-income students. Furthermore, high and rising college costs can create substantial perceived and actual financial barriers, even in the presence of need-responsive financial aid programs.

Brian Jacob and Tamara Linkow (2011) present data showing a strong link between tenth graders' expectations about attending college and their parents' educational attainment or income level.<sup>18</sup> Although SES-associated gaps in expectations decreased between the early 1970s and mid-2000s, tenth graders in the mid-

**15.** Only 2 to 6 percent of students who grew up in the poorest income quintile in the late 1970s completed college, on average, versus 36 to 38 percent for richest-quintile students in the early cohort; 8 to 9 percent of low-income later-cohort children completed college versus 54 to 59 percent for the richest quintile. Thus, the college-completion gap between rich and poor students increased from 32 to 34 percentage points for the late 1970s cohort to 45 to 51 points for the later cohort: (Duncan et al. 2015, table 1).

**16.** Continuing beyond high school graduation includes some college, received certificate or license, received associate's degree, and received bachelor's degree or higher.

**17.** They use the Armed Forces Qualifying Test as the measure of ability and group students into quartiles; they also group family incomes into quartiles. College attendance by the age of twenty-one is measured because of the youth of the NLSY97 sample.

**18.** The intergenerational transmission of educational attainment is a widely researched topic (for a review of recent literature, see Black and Devereux 2011).

2000s with college-educated parents were still roughly 10 percentage points (girls) to 16 percentage points (boys) more likely than tenth graders whose parents did not complete college to expect to obtain a bachelor's themselves. The college-expectations gap between tenth graders with parents in the richest and poorest quintiles of family income remained high in the early 2000s at 40 percentage points (girls) to 48 percentage points (boys). These authors also show that expectations "have an important influence on college enrollment and persistence" (159). Data for high school seniors similarly show that students whose parents were more highly educated or had higher SES expected to obtain more education themselves (Aud, KewalRamani, and Frohlich 2011, table 52; Aud et al. 2012, table A-35-1). Joshua Goodman (2008) looks at college-going intentions of Massachusetts 2003 and 2004 public high school graduates and similarly finds substantial differences between low- and high-income students; these differences shrink but do not disappear when he controls for skills (test scores). He finds specifically that "low income students in the middle and upper parts of the skill distribution appear the most constrained, particularly with respect to four-year public colleges" (Goodman 2008, 5).

One issue in college-going for low-income students is the academic preparation they receive in high school. Course offerings sometimes differ between low- and high-income schools and districts, and a student's course

taking can differ depending on college-attendance intentions, which are partly a function of income even controlling for ability, as noted in the previous paragraph. Students in high-poverty schools take fewer high-level math and science courses than students in low-poverty schools: National Center for Education Statistics data show that 80 percent of 2009 high school graduates from low-poverty schools completed algebra II–trigonometry and 23 percent took calculus, while only 71 percent and 7 percent, respectively, of graduates from high-poverty schools did.<sup>19</sup> Similarly, 40 percent of graduates from low-poverty high schools completed biology, chemistry, and physics, compared to only 23 percent of graduates from high-poverty schools.

Advanced placement (AP) course taking also differs between schools. Brett Lane and Phomdaen Souvanna (2013) report much lower AP participation rates and lower overall success rates in high-need schools than in low-need schools in the absence of the Mass Math + Science Initiative, a program implemented in some schools in Massachusetts to increase low-income students' participation and success in AP courses.<sup>20</sup> Schools that participated in the program saw immediate and dramatic increases in AP participation and success rates and have sustained those gains over the four-plus years that the program has run.<sup>21</sup> The success of this program implies that barriers unrelated to their abilities prevent students at low-income schools from getting ahead in this

**19.** Low-poverty schools are those in which 0 to 25 percent of students qualify for free or reduced-price lunches, while 76 to 100 percent of students receive free or reduced-price lunches in high-poverty schools. See Aud et al. 2012, Appendix A, table A-31-1, pp. 234–35.

**20.** Their data show participation rates (the number of AP exams taken divided by the number of juniors and seniors in the school) of 21 percent for the 2011–2012 school year at low-need schools not participating in the program as compared with 13 percent in high-need non-participating schools; low need means fewer than 35 percent of students qualify for free or reduced-price lunch while high need indicates the school has more than 50 percent of its students eligible for free or reduced-price lunch or has been classified as level 3 or 4 in terms of school accountability status. The overall success rate (number of exams scoring 3 or better divided by the number of juniors and seniors) was 14 percent for low-need schools and less than 6 percent in high-need non-participating schools. Authors' calculations based on Lane and Souvanna 2013, table 3, p. 11.

**21.** Students in participating schools were more than 2.5 times as likely to take an AP course as students in otherwise similar comparison group schools, and overall success rates were also about twice as high as those in comparison schools. The simple success rate—test scores of 3 or better per test—is lower for participating schools, as would be expected when broadening the pool of test-takers.

way. Taking AP courses and completing them successfully is said to increase college applications, enrollment, and persistence.

The availability of college counselors varies considerably between high- and low-income high schools, reducing the chances that low-income children receive useful advice about college-going. Christopher Avery, Jessica Howell, and Lindsay Page document less availability of college counseling for low-income high school students, which they attribute largely to “inadequate school finances, insufficient counselor training programs, and a lack of clarity about how school counselors should allocate their time” (2014, 1). They conclude, “Armed with less information about colleges than their higher-income peers, students from modest backgrounds may be at greater risk of selecting a postsecondary alternative that is not a good fit” (2). Hoxby and Avery document that many low-income, high-achieving high school students fail to apply to high-quality selective colleges that would be a better academic fit than the much less selective colleges they typically attend. They note that these students lack access to appropriate college counseling because they “come from districts too small to support selective public high schools, are not in a critical mass of fellow high achievers, and are unlikely to encounter a teacher who attended a selective college” (2013, 1).

Recent studies and experiments have shed light on additional information problems that impede low-income students in the college-going process. Carrell and Sacerdote report on an inexpensive intervention involving cash bonuses and coaching for high school seniors identified by guidance counselors and find large effects on college enrollment and persistence for young women but no effect for men; in addition, “offering cash bonuses alone without mentoring has no effect” (2013, 1). Eric Bettinger and his colleagues (2012) offered low-income adults who received tax-preparation help simultaneous assistance filling out the lengthy Free Application for Federal Student

Aid (FAFSA) along with estimates of aid (and tuition) at nearby colleges. They find the combined treatment increased significantly the proportion of students who had completed two years of college three years after receiving services, but find no effect of aid and tuition information without filling out the FAFSA.

Some low-income individuals, however, lack both the necessary information and the financial resources to pay for college. Although net tuition at public and private nonprofit four-year institutions is typically lower for low-income students than for their high-income counterparts because grants and scholarships are higher, net tuition still represents a considerably higher proportion of income for low-income students or their parents.<sup>22</sup> As a result, many students and families borrow to meet college costs. Belley and Lochner, as noted earlier, document a substantial increase in the effects of family income on college attendance between the NLSY79 and NLSY97 cohorts. They develop a model that includes credit constraints and conclude, “Overall, it is likely that borrowing constraints have become more stringent over the past few decades and that this is at least partially responsible for the increase in college attendance gaps by family income” (2007, 32). Janet Yellen shows in this issue much higher student loan debt burdens for families in the lower half of the wealth distribution than for richer families and reports that these disparities increased between 1995 and 2013.

All in, children of affluent parents graduate from college at substantially higher rates than children of low-income parents, and the gap persists even when controlling for ability in the form of test scores. A variety of mechanisms serve to prepare poor children less well for college in addition to making it more difficult for them to attend and persist through graduation even with equal preparation. The consequences of these parental-income gaps in schooling are enormous, as educational attainment is a key determinant of labor market suc-

**22.** For 2011–2012 data on average net price of tuition at public and private nonprofit four-year institutions by income group (net price nets out all grants and scholarships but does not take account of loan aid), see the 2014 study by Grace Kena and her colleagues (indicator 35, figures 2 and 4).

cess. Four-year college graduates have higher labor force participation rates, lower unemployment rates (that is, higher employment rates given participation), and higher pay for full-time, full-year employment than high school graduates or individuals with some college or AA degrees. As discussed in the next section, Jo Blanden and her colleagues (2014) document a dominant role for educational attainment as a factor contributing to the correlation between an adult's earnings and his parents' family income when he was growing up. Thus, unequal education is both an effect and a cause of unequal opportunity.

### INEQUALITY OF OPPORTUNITY IN THE LABOR MARKET

It seems likely that much of the intergenerational transmission of labor market success is accomplished via educational attainment, both because education is an important determinant of labor earnings and because research shows strong intergenerational correlations in educational attainment. This section investigates the degree to which labor market opportunities may differ among people who grow up in different circumstances beyond disparities in education. That is, to what extent do the children of low-income parents see lower earnings as adults than children of high-income parents, even controlling for educational attainment? Given the disparities in educational attainment documented earlier and elsewhere in this issue, any disparities added on in the labor market will compound the degree of inequality of opportunity and inequality of outcomes.

What mechanisms could cause labor market opportunities to be distributed unequally among young workers with similar education? Children of low-income parents may be less healthy, have different noncognitive skills and attitudes (including, for example, lower expectations of labor market success) and have inferior access to personal networks, connections, and internships that are instrumental in the job search and advancement processes, resulting in access to less prestigious and less remunerative positions. In addition, labor market institutions and processes may widen or reduce the degree of inequality associated

with any educational disparities. Here, we provide an overview of research on the role of barriers to opportunity in the labor market, and the role of the labor market in amplifying the effects of barriers encountered earlier in life.

Some parents can provide their children with especially useful employment information and networks when they seek a job. Research indicates that friends and family are an important source of referrals or information on job openings during job search (Holzer 1988; Ionnides and Loury 2004). Explicit nepotism would amplify the effects of more benign information disparities. Moreover, some parents may be able to pay for (or support their children during) work internships and other forms of work enrichment or work experience beyond education that enhance job prospects, providing support that poorer parents or poorer young labor market entrants cannot afford. In addition, Miles Corak (2013a) and others have written about intergenerational transmission of attitudes, values, preferences, aspirations, and soft skills that can enhance or hurt workers' labor market prospects.

An extensive literature examines intergenerational earnings elasticities or correlations, especially between fathers and sons (for recent reviews, see Solon 1999, 2002; Bjorklund and Jäntti 2009; Black and Devereux 2011; on daughters, see Chadwick and Solon 2002; for intergenerational elasticity estimates on daughters, see Solon 1999, table 6). This literature does not generally control for education because it seeks to quantify the full relationship, including the contribution of education. Nonetheless, some authors do shed light on the net-of-education question. For example, in his *Labor Handbook* article, Solon (1999) lays out a simplified version of the theoretical model posited by Gary Becker and Nigel Tomes (1979), in which a child's earnings in adulthood reflect parental investments in his/her human capital (education) as well as his/her endowment of earnings capacity and market luck (a stochastic element). That endowment, in turn, is determined "by the reputation and 'connections' of their families, the contribution to the ability, race, and other characteristics of children from the genetic constitutions of their families, and the learning, skills, goals, and other 'family

commodities' acquired through belonging to a particular family culture" (Becker and Tomes quoted in Solon 1999, 1764).

Solon (1999) goes on to note several "crucial" aspects of the intergenerational transmission of earnings status implied by the simple model, including that intergenerational transmission occurs through a multitude of processes and that parental income is not the only intergenerational influence on child's earnings. Thus, to go beyond education, as we want to do here, we need to think about children's endowments and about how the various processes determining earnings interact. Regarding that interaction, a child's endowment is correlated with the parental endowment; in addition, some elements of the child's endowment may help determine the degree to which parental investments translate into educational attainment and the degree to which they have a direct impact on earnings, even after controlling for education.

Solon concludes that the intergenerational earnings elasticity, a measure of the relationship between parents' earnings and that of their children in adulthood, for U.S. men is "somewhere around 0.4" (1999, 1795) and notes that this estimate is higher than similar estimates for Canada, Finland, and Sweden; an elasticity of zero would indicate no relationship between the earnings of children and parents, and an elasticity of one would indicate a near-exact correspondence. In a later paper, Solon (2004) also includes the influence of government investments in human capital (public financing of education), which can be redistributive or not. That is, to the degree that publicly funded education is focused on poorer children or public funds are inversely related to parental income, the intergenerational earnings elasticity will be lower. Corak notes that "we can expect the intergenerational elasticity [of earnings] to differ across countries for reasons associated with the costs and returns of investing in a child's human capital, the way

in which the labor market works and how 'good jobs' are obtained, and the income inequalities between parents." (2013b, 114).

Another aspect of interaction among the processes determining outcomes is that the influence of educational attainment on earnings depends on the rate of return to education in the labor market; that rate of return—or educational wage premium—is a labor market characteristic. Nations or eras with greater disparities in pay levels according to educational attainment will, other things equal, have higher intergenerational earnings elasticities (hence, lower mobility) because any level of intergenerational correlation in education translates into greater differences in earnings and, hence, higher correlation of parent and child earnings.

Jo Blanden, Paul Gregg, and Lindsey Macmillan group the key factors or mechanisms in intergenerational earnings persistence—"those variables that are related to family incomes and that have a return in the [labour] market"—into four categories: noncognitive skills, cognitive ability, early labor market experiences, and educational attainment (2007, 1).<sup>23</sup> Although it is impossible to separate these influences (because, for example, cognitive ability helps to determine educational attainment as well as later earnings), it is still instructive to delve into them one by one to learn what we can infer about labor market influences net of education; indeed, Blanden, Gregg, and Macmillan argue that "many of the associations operate in a sequential way" (4).

In their initial examination of intergenerational persistence for a 1970 British cohort, they find the intergenerational elasticity of earnings to be 0.32.<sup>24</sup> They then decompose that elasticity by examining the relationships among the factors and family background / parental income and success-rewards in the labor market. They find that "better off children have better noncognitive traits and perform better in all cognitive tests . . . achieve more at all lev-

**23.** The title of Blanden, Gregg, and Macmillan's paper mentions only three, but in the text they explore early labor market experience as well.

**24.** The intergenerational elasticity is derived from the estimated relationship between child earnings at age thirty and parental family income.



els of education and have greater [labour] market attachment in their teens and 20s" (8). Furthermore, the cognitive variables are generally more strongly associated with parental income than the noncognitive traits. After analyzing how these factors are related to earnings at age thirty, they use both sets of regression results to decompose the estimated earnings elasticity into components explained by each of the factors and an unexplained component, which amounts to 46 percent of the elasticity. In this analysis, they find educational attainment to be the most important factor, accounting for 31 percent of the total estimated elasticity.<sup>25</sup> Early labor market attachment comes in a distant second among the explanatory factors, explaining 9 percent of the elasticity; noncognitive and cognitive factors explain only 6 to 7 percent, largely because their influence appears to work mostly through education. If we attribute the entire earnings elasticity excluding the education component to what goes on in the labor market, we obtain an upper-bound estimate of the importance of variations in labor market opportunity of close to 70 percent. The direct influence of early labor market experience, together with the effects of cognitive and noncognitive skills not operating via education, yields a lower-bound estimate of 23 percent for this British cohort of sons. They undertake a similar decomposition to understand the sources of a drop in mobility observed between 1958 and 1970 cohorts and find that a strengthening relationship between parental income and both educational attainment and early labor market attachment accounts for most of the change.

A 2014 paper by Blanden, Robert Haveman, Smeeding, and Kathryn Wilson compares intergenerational transmission for men in the United States and Great Britain using decompositions that lack the measures of noncognitive traits and cognitive ability (because they are not available in the U.S. Panel Study of Income Dynamics), and add in early marriage, marital status and health at age thirty, and

measures of occupation at ages thirty and thirty-four. This study retains the pathways of education and early labor market attachment. Overall, they find higher mobility in the British sample than in the U.S. sample. They report that "the linkage between parental income and offspring earnings [in the United States] is largely accounted for by the offspring-education pathway, whereas in Great Britain, offspring occupation plays a much stronger role. The difference in the strength of the education pathway is due to relative differences in the returns to education in the two countries rather than to relative differences in the influence of parental income on educational attainments" (Blanden et al. 2014, 442). Note that labor market returns to education reflect the operation of the labor market rather than the heritability of education. Quantifying the contributions, their data indicate that education accounts for 26 percent of the persistence in the United States and 12 percent in Great Britain, even when controlling for occupation. The other pathways between parental income and an offspring's earnings—early marriage, early labor force attachment, and marital status and health at age thirty—account for only 6 percent of persistence in both the United States and Great Britain.<sup>26</sup> Occupational choices account for 24 percent in the United States and 34 percent in Great Britain. Interestingly, a simulation exercise indicates that education's contribution to the overall U.S. elasticity would be roughly cut in half if the returns to education in the United States were at the lower, British level.

Other relevant literature examines the transmission of employers between fathers and sons (see, for example, Bingley, Corak, and Westergaard-Nielsen 2011; Corak and Piraino 2011). The transmission of employers is part of a broader mechanism regarding parental provision of both information and social networks that can enhance the labor market prospects of their offspring; parents may also invest in firm-specific types of human capital. Miles

**25.** They measure educational attainment at and after age sixteen, as number of O-levels at age sixteen, number of A-levels, staying in school after sixteen, earning a degree, and staying in school after eighteen.

**26.** Missing variables "explain" 4 percent of U.S. persistence and less than 1 percent in Great Britain.



Corak and Patrizio Piraino (2011) also note that transmission of employers may reflect fathers' possible direct role in the hiring process, including nepotism. They measure inherited employers in two ways: whether the son has ever worked for an employer that ever employed their father; whether the son's main employer at age thirty-three was also the father's main employer when the son was in his teens. They find that about 40 percent of a cohort of Canadian young men meet the first criterion, largely reflecting early jobs (in the teen years and early twenties), and that 6 percent to 9 percent have the same main employer in adulthood. Although Corak and Piraino are unable to infer causality, their findings are consistent with all of these hypothesized mechanisms. Intergenerational transmission of employers is higher when the father has self-employment income and is at or near the top of the fathers' earnings distribution. They also find that transmission of employers contributes to nonlinearities in intergenerational earnings elasticities: high elasticities in the middle and at the upper tail of the fathers' distribution reflect the pattern of those who inherit an employer from their father. Similar research using Canadian and Danish data yields similar findings (Bingley, Corak, and Westergaard-Nielsen 2011). Regarding the correlation with father's earnings level, the study notes that "mobility out of the bottom has little to do with inheriting an employer from the father, while the preservation of high income status is distinctly related to this tendency" (1).

One example of recent U.S. labor market institutions that may be contributing to unequal opportunity, even among those with a college education, is internships. Unpaid internships

are said to provide important job experience and connections to young graduates and sometimes lead to offers of paid employment. But low-income labor market entrants, with or without college debt, often cannot afford to work without pay and therefore lose out on these opportunities. Some court decisions have limited employers' exploitation of young workers and some colleges have raised funds to provide scholarships to provide living stipends to low-income students who want to serve as interns, but these remedies are unlikely to have made a serious dent in the prevalence of the practice and its disparate impact.<sup>27</sup> As Ross Eisenbrey of the Economic Policy Institute observes, "It's hard to quantify the impact of this phenomenon [internships] on the decline in economic mobility, but I suspect it has been substantial and will continue to grow until the Department of Labor cracks down on what is, in many cases, illegal exploitation" (2012).<sup>28</sup>

Existing research finds an important role for parental income and other family-related factors in determining labor market earnings, even beyond parental influence on educational attainment. These effects occur via transmission (by both nature and nurture) of attitudes, skills, preferences, and social networks, and even nepotism. Depending on one's interpretation of the unexplained portion of intergenerational earnings elasticities, noneducation factors account for one-quarter to three-quarters of U.S. earnings transmission from parents to sons.<sup>29</sup> These numbers are higher when taking account that part of the education portion reflects returns to educational attainment determined in the labor market; indeed, much of the difference in intergenerational

**27.** Data are generally lacking on the prevalence of unpaid internships. In promoting a 2011 event to discuss internships in the U.S. labor market, and the book *Intern Nation* by Ross Perlin, the Economic Policy Institute noted, "Internships have become a principal point of entry for young people seeking white-collar careers, and it is estimated that half of all college students will do an internship before graduating. Between 1 and 2 million people overall will work as interns this year in the United States, saving firms \$600 million dollars."

**28.** Two key criteria in determining the legality of an internship at a for-profit private sector employer is that "the internship experience is for the benefit of the intern," "the intern does not displace regular employees, but works under close supervision of existing staff," and "the employer . . . derives no immediate advantage from the activities of the intern" (U.S. Department of Labor 2010).

**29.** These figures are based on reported U.S. estimates (Blanden et al. 2014, table 6, column 1).

transmission between the United States and Great Britain represents differences between the two nations in education returns.

Do these findings suggest policy interventions that might reduce parental influence in the labor market? Although rules exist to limit outright nepotism—at least in public employment, many interventions aimed directly at reducing parental influence would be seen as impinging on parents' autonomy in raising their children. However, policies that enhance opportunities for all children to succeed, as discussed earlier would have two positive impacts on the labor market: More disadvantaged children would attain higher education, thereby directly improving their labor market outcomes, and the resulting increase in the supply of educated workers would moderate the high returns to education that still prevail in U.S. labor markets and contribute, as documented, to the heritability of earnings.

Additional policies in the labor market could further equalize opportunities. Jared Bernstein (2014), for example, argues that after education, the next most important policy actions governments must undertake are to level the playing field for workers who seek to form or join unions, and to increase the minimum wage to counter the lack of bargaining power of many in the workforce. Raising the minimum wage and promoting unions is likely to reduce the labor market returns to education (and occupation) relative to less-regulated market outcomes. Furthermore, labor regulations and policies that nudge firms toward adopting human resource practices that result in opportunities for workers to learn by doing and to acquire occupation- and firm-specific human capital (perhaps by creating career ladders in positions with relatively modest educational requirements) may reduce the association between parental income and early labor market attachment and advance the interests of employers by reducing worker turnover. As noted, action to limit the prevalence and exploitative aspects of internships or to provide more equitable access to internships would

also reduce inequality of opportunity in the labor market.

### THE ROLE OF GEOGRAPHY IN INEQUALITY OF OPPORTUNITY

Children have no choice over the geographic area where they are born and raised, so geography is clearly a dimension of circumstance that should be considered in evaluating the extent of inequality of opportunity. Research on the role of geography in economic opportunity, which we survey in this section, shows that economic opportunity varies substantially across geographic areas, though the mechanisms underlying this relationship are not yet fully understood.

Branko Milanovic (2015) summarizes the degree of inequality of opportunity associated with geography globally by decomposing total global income inequality into inequality of opportunity (between-country inequality) and residual inequality. He finds that inequality of opportunity constitutes a “huge but decreasing” share of overall inequality between 1988 and 2008, amounting to almost 70 percent of total interpersonal inequality in 2008. He reports that a measure of intercountry inequality, the mean log deviation of income, was 0.68 in 2008, down from 1998 and 1988, and that the global interpersonal mean log deviation was 0.98 in 2008, also lower than in 1998 and 1988 (see the top panel of table 1).<sup>30</sup>

Milanovic provides a metaphor for his analytical framework: he suggests seeing the world income distribution as a long pole and each country's distribution as being represented by a plaque on that pole. An individual's income lies within the range covered by the plaque representing his or her home country, and that home country substantially circumscribes the person's economic prospects. The plaque represents two “circumstances beyond individual control: level of development of one's country of residence, proxied by its GDP per capita or average number of years of education, and inequality of distribution within that country” (2015, 456). Milanovic uses the term *circum-*

**30.** The mean log deviation measure is often referred to as Theil L. Milanovic's dataset includes 118 countries in 2008, representing 92 percent of the world population. This inter-country inequality measure depends only on average income in each nation.

**Table 1.** Geographic Inequality of Opportunity

Inequality is measured as mean log deviation (Theil L) of income

Geography, Income Unit, and Year	Total Inequality <sup>a</sup>	Inter-Area <sup>b</sup> (Geographic)	Between-Area Percentage of Total
<b>Global, across countries (Milanovic)</b>			
1988	1.070	0.862	80.6
1998	1.035	0.764	73.8
2008	0.983	0.677	68.9
<b>United States households</b>			
1988	0.401		
1998	0.488		
1999	0.476		
2008	0.541		
<b>U.S. commuting zones, cohort families<sup>c</sup></b>			
1996–2000	0.492	0.031	6.3
<b>U.S. counties, cohort families<sup>c</sup></b>			
1996–2000	0.492	0.055	11.2
<b>U.S. census tracts, households</b>			
1999		0.081	17.0

Source: Authors' compilation based on Milanovic 2015 and U.S. Census Bureau 2014a; authors' calculations based on Chetty, Hendren, Kline, and Saez 2014b and U.S. Census Bureau 2014b.

<sup>a</sup>Total measures inequality between individuals, households, or cohort families. For cohort families, total is inequality across centiles of the distribution, not individual families.

<sup>b</sup>Inter-area measures inequality between areas, assuming area mean income applies to all units in an area.

<sup>c</sup>Cohort families are tax filing units that claimed children born in 1980–1982 on tax returns in 1996–2000.

*stances* in the Roemerian sense, as elements of “fate, decided at birth” (as he puts it) or public goods reflecting the country in which they reside. To improve her lot, an individual has three options: she can rely on hard work or luck to rise within her country’s distribution; she can hope for her country to experience strong growth and have its plaque move up the pole; or she can migrate to a higher-income country.

Milanovic notes that “the topic of inequality of opportunity is traditionally studied at the national level” at least in part because of “the unstated view that equality of opportunity is something that ought to hold at the national

level or for which only national governments can be held responsible” (2015, 452–53). Geographic aspects of inequality of opportunity within the United States are the focus of the remainder of this section, but Milanovic’s global measures (for comparison) and his pole metaphor also prove useful in what follows.

Looking within the United States, overall interhousehold income inequality is, of course, considerably smaller than Milanovic reports among global individuals and across nations.<sup>31</sup> The Census Bureau reports a mean log deviation of household income equal to 0.54 in 2008, up from 1998 and 1988 (see second panel of table 1). Data on family income for parents re-

**31.** If the U.S. data were those that Milanovic included for the United States in his global measures, they would necessarily show less inequality within the United States than globally, given that the United States is one nation among many.

ported by Chetty, Hendren, Kline, and Saez (2014b) show a mean log deviation across centile means of 0.49 during the 1996 to 2000 period.<sup>32</sup> With these data, we can also follow Milanovic and decompose total inequality into the part associated solely with geography and the residual. This exercise applied to commuting zones as the geographic unit within the United States yields a between-area mean log deviation of 0.03 during the 1996–2000 period, which amounts to only 6 percent of total inequality (measured across centiles for the same tax-filing population of parents). Repeating the same exercise across counties, the smaller geographic building blocks of commuting zones, yields a mean log deviation of 0.06, or 11 percent of total inequality.

Given the prevalence of economic segregation in residential location, one might expect that a higher share of inequality would be explained by a more-detailed geography. That is, in fact, the case: if we go down to the neighborhood level, we find somewhat greater interarea disparities, with a mean log deviation of 1999 household incomes across census tracts nationwide of 0.08, or 17 percent of the 0.48 nationwide 1999 mean log deviation of household incomes published by the census (see table 1). Although this represents greater interarea disparities than the CZ or county figures, it is still small compared with Milanovic's intercountry differences. Differences in mean incomes across commuting zones, across counties, or even across census tracts do not explain much of the total inequality of incomes in the nation; within the United States, the length of the "pole" in Milanovic's metaphor is shorter and

the area "plaques" are wider and have much greater overlap. Moreover, the measures of geographic location used in the decompositions are for current location, not where people grew up. Given the prevalence of geographic migration, especially between neighborhoods, one should not necessarily interpret the interarea component as measuring inequality of opportunity, although it may indicate inequality of circumstances for the generation currently growing up.

### Inequality of Opportunity Across U.S. Commuting Zones and Counties

Chetty, Hendren, Kline, and Saez (2014a) explore the geography of inequality of opportunity in the United States, using commuting zones as their geographic units; they analyze data on 709 commuting zones covering virtually all U.S. territory and population.<sup>33</sup> Using measures of relative and absolute intergenerational mobility, they document wide variations in mobility across commuting zones within the United States. Moreover, they note that relative mobility patterns across CZs are highly correlated with absolute mobility.<sup>34</sup> They provide a much-cited heat-map of absolute mobility variations across CZs nationwide, showing broad regional patterns of mobility as well as variations within regions and differences between rural and urban areas. Even though variation within regions is substantial, the map shows concentrations of low mobility across the southern United States. This is quite consistent with the finding of Gustavo Marrero and Juan Rodriguez (2013) that southern U.S. states exhibit high inequality of opportunity

**32.** This mean log deviation figure is remarkably close to the U.S. Census Bureau figure cited above for all households in 1998. This is surprising, given that 0.49 from Chetty, Hendren, Kline, and Saez is an underestimate of total household inequality for at least two reasons. First, the inequality of incomes across individual households or filing units should be higher than inequality across centile means of households or filing units. (Milanovic's analysis, however, also used centiles for each country and computed the (weighted) mean log deviation among those values.) Probably more important, the Chetty data are tax-filing-unit incomes of a subset of the population that is undoubtedly more homogeneous than the set of all tax filers; their 1996 to 2000 sample is parents with children born between 1980 and 1982.

**33.** The 709 CZs with data contained 99.96 percent of the U.S. population in 2000.

**34.** Their measure of relative mobility is the slope coefficient from the child-rank on parent-rank regression, which indicates the difference in expected ranks between children in the richest versus poorest families. Their primary measure of absolute mobility is the mean percentile income rank of children whose parents were at the 25th percentile of the national income distribution.

when measured across circumstance groups defined by race and parental education (see especially figures 2a, 2b, and table 1).

What mechanisms might be at work to cause such substantial differences in opportunity—and hence differences in intergenerational mobility—among commuting zone areas? Chetty, Hendren, Kline, and Saez explore a number of covariates of mobility at the CZ level. These explorations do not attempt to establish causation, but they do suggest some geography-related forces that may be at work. Discussing such factors may help us sort out circumstances, as Milanovic uses the term (based on Roemer), that are mediated by physical nearness versus those that are not, even though they may exhibit geographic patterns.

One of Chetty, Hendren, Kline, and Saez's five important covariates of income mobility across CZs is the degree of income inequality in the CZ (2014a). We explored this factor in discussing the Great Gatsby curve—the relationship between inequality of outcomes and subsequent inequality of opportunity or intergenerational mobility.

The most important covariates of income mobility across CZs in the Chetty, Hendren, Kline, and Saez analysis relate to family structure, specifically the fraction of families with children that are headed by single mothers (2014a).<sup>35</sup> CZs in which a substantial fraction of children are living in single-parent families display lower absolute mobility. Analysts offer many links, both causal and associational, between single motherhood and low family income that explain why more children in CZs with a high proportion of single mothers start at the bottom (of the national income distribution)—and hence are likely to be nearer the bottom as adults. In addition, hypotheses about why, given parental income, children in single-parent households may have less opportunity to advance, focus on factors such as parental education and associated aspirations for children, as well as parental time available to devote to interacting with children. Chetty, Hendren, Kline, and Saez note, however, that

low mobility in CZs characterized by high prevalence of single-parent households is not simply a compositional result; children of married-couple families show lower mobility, on average, in CZs with high fractions of single parents (2014a).

A third strong correlate of mobility across CZs is the quality of local schools. We discussed earlier the importance of K–12 school quality and the U.S. pattern of local public school provision in generating opportunity.

Chetty, Hendren, Kline, and Saez find measures of social capital strongly related to mobility outcomes across commuting zones, citing earlier studies that establish the importance of social networks and engagement in community organizations in determining social and economic outcomes (2014a). They measure social capital with indicators of violent crime rates, religiosity, and a social capital index constructed by other researchers, which they aggregate to the CZ level. To the degree that social capital has a geographic aspect, it is presumably at a considerably smaller geographic unit than the commuting zone. For example, Robert Putnam's work focuses on the community and neighborhood level, investigating people's interaction, trust, and cooperation with neighbors and their social peers (2000, 2015, 2016). His discussion comments accompanying this issue examine the interaction between propinquity (geographic nearness) and social networks in various contexts. It is among the traditional working classes that neighborhood ties have tended to be most important, and researchers have documented greater success for those living in neighborhoods with what the literature calls collective efficacy. Putnam notes that the nongeographic networks characteristic of higher-income parents and children appear to provide access to broader opportunity.

The last of Chetty, Hendren, Kline, and Saez's five most important covariates is the degree of geographic segregation—by income or by race—within a CZ (2014a). Measures of segregation likely capture shared versus separate experiences of children raised in rich and poor

**35.** In the family structure category, they also examine the fractions of CZ adults who are divorced and who are married, and they find similar results, but not as strong as for single mothers



families within a CZ and their exposure to families in the other group. Partly because spatial residential segregation is often associated with separate schools and other public institutions from parks to libraries, it is likely to limit favorable peer effects and positive economic role models for low-income children in addition to reducing the funding and quality of the public services to which they have access. Like social capital measures, these segregation indicators point to smaller geographies as important loci in which opportunity takes shape.

In a 2015 paper, Chetty and Hendren explore another path for improving one's situation highlighted by Milanovic—moving to a new area (geographic mobility) to achieve upward mobility. The authors find that children gain the positive outcomes of destination counties in proportion to how young they were when their parents moved there from a county with poorer outcomes.<sup>36</sup> Unlike Milanovic's scenario, however, Chetty and Hendren do not find that the positive effects of moving extend to adults (twenty-four and older at the time of the move). They identify causal effects of residence location (county) when growing up and estimate these effects for every county nationwide, interpreting them as neighborhood exposure effects. They also explore county characteristics associated with better outcomes, as indicated by more positive causal effects and find better outcomes for children who grow up in counties with “less concentrated poverty, less income inequality, better schools, a larger share of two-parent families, and lower crime rates” (Chetty and Hendren 2015, 1).

Covariates such as family structure or school quality, though they have geographic patterns, are not inherently related to physical adjacency in the way that social capital, crime rates, and segregation are, because the latter depend at least in part on neighborhood proximity. Thus, isolating geography's role might

require controlling for (subtracting out) geographic disparities that are not based on proximity.<sup>37</sup>

### Inequality of Opportunity Across Neighborhoods

Inequality of opportunity across neighborhoods potentially involves different mechanisms than inequality of opportunity associated with coarser measures of geography. Although causality has been difficult to pin down, the association between the characteristics of the neighborhoods children grow up in and the economic outcomes of those children as adults is clear.

William Julius Wilson (1987) is credited with being among the first to hypothesize that neighborhood environment has an important role in shaping opportunity. In particular, he focused on the potentially negative consequences of growing up in inner-city areas of concentrated poverty after both manufacturing jobs and the black middle class had largely moved out. Socially isolated, with few positive (employed) role models and few jobs available locally, children growing up in severely disadvantaged neighborhoods were likely to be scarred in terms of educational attainment and eventual employment.

Patrick Sharkey's paper in this issue summarizes key research on the role of neighborhoods in enhancing or limiting access to opportunity. As noted, many of the mechanisms at work at the neighborhood level relate to spatial segregation, which limits exposure of members of different income groups, racial groups, cultural groups, or other dimension of segregation to each other. This can in turn perpetuate the disadvantages suffered by one generation, passing them on to their children. These arguments are based on the idea that neighborhoods are more than just the combination of individuals who live there and in-

**36.** “Better” destination counties are those with more positive outcomes for children who live there throughout childhood compared with outcomes for children who live in the origin county throughout childhood. The outcome on which they focus is income as a young adult (age twenty-four or twenty-six), but they find similar “exposure” effects on college attendance, teenage birth rates, and marriage rates.

**37.** Julia Burdick-Will and her colleagues (2011), for example, report the conclusion of Dobbie and Fryer that test scores are unresponsive to changes in neighborhood environments in the absence of school-quality changes.



stead also depend on peer effects, role models, social networks, and the like being important aspects of access to opportunity.

Sharkey notes in this issue that observational studies find strong correlations between child neighborhood conditions and adult economic outcomes and that the consequences in terms of academic performance and educational attainment of growing up in a disadvantaged environment appear to be cumulative; that is, outcomes worsen with length of exposure. Sharkey also summarizes his joint work with Bryan Graham (2013), which examines the links between spatial segregation and economic mobility, noting that the tight connection between family economic status and neighborhood economic status that segregation creates will increase the transmission of family economic status across generations. Their paper confirms a relationship between mobility and spatial economic segregation using three data sets, but notes that the association does not provide evidence of causation.

As Julia Burdick-Will and her colleagues (2011) point out, many nonexperimental studies find substantial effects of neighborhood on children's life chances—findings that admittedly include some bias from selection effects—yet the Moving to Opportunity (MTO) experiment found no discernable neighborhood effects. Burdick-Will and her colleagues attempt to reconcile experimental, quasi-experimental, and observational studies of neighborhood influence, and come out in the middle, concluding that some neighborhood circumstances do matter for children's outcomes. In particular, they argue that what seems to matter is whether children live in the most economically distressed or dangerous neighborhoods. They find little support for either neighborhood differences in school quality or racial composition playing a key role in children's differential school performance outcomes. By contrast, they see concentrated neighborhood disadvantage as an important

influence, and also find that crime rates and exposure to violence are negatively related to children's test scores.<sup>38</sup> They note, however, that this evidence is mostly circumstantial, based on large differences in levels of violent crime and neighborhood disadvantage between the MTO cities of Baltimore and Chicago (where test score improvements did occur among the MTO treatment group) and the other three MTO cities of Boston, New York, and Los Angeles.

Chetty, Hendren, and Lawrence Katz (2015) bring new data to bear and successfully reconcile the all-cities experimental MTO results with observational studies, finding substantial neighborhood “exposure” effects on adult outcomes (earnings and college-going) of children whose families were offered the MTO voucher requiring they move to a low-poverty neighborhood when they were young (younger than thirteen). They combine Internal Revenue Service data with MTO data to look at recent (young adult) outcomes (through 2012) and differentiate by age of the child when the family was randomly assigned to one of the MTO treatments or to control group status. They find negative effects, sometimes significantly different from zero for children who were older when the MTO moves occurred, a finding that, they argue, may reflect disruption effects; these would be offset for younger children by positive exposure effects proportional to the length of exposure to lower-poverty neighborhoods.

In summing up existing research on the role of neighborhoods in access to opportunity, Sharkey (this issue) notes the wide variation in opportunity and economic mobility across geographic areas in the United States. Investigating sources of that variation, the research mostly identifies correlations but has not succeeded in establishing causal relationships or even pinned down key mechanisms; as a result, he notes, “as a whole, however, the research explaining geographic variation in economic mobility remains at a very early stage.”

**38.** They measure “concentrated neighborhood disadvantage” following Sampson, Sharkey, and Raudenbush (2008), as a weighted average of neighborhood poverty, percentage of residents who are black, percentage of adults who are unemployed, percentage of households with a female head, percentage of residents on welfare, and percentage of residents under age eighteen.

## THE RELATIONSHIP BETWEEN INEQUALITY OF OPPORTUNITY AND ECONOMIC GROWTH

Our focus has been on the mechanisms through which barriers to opportunity arise and how they affect economic outcomes for individuals, along with potential policy remedies. This raises the question of what effect policies that reduce barriers to opportunity would likely have on aggregate economic performance. If removing barriers to opportunity promotes economic growth, these spillovers reduce the overall cost of such policies.

The literature relating inequality of opportunity and aggregate economic performance is extremely limited and most of it was developed out of the considerably more extensive literature relating overall inequality (that is, inequality of outcomes) and growth. Hypotheses regarding the effects of overall inequality on growth lay out plausible effects with both positive and negative signs and the empirical literature is correspondingly inconclusive. By contrast, theory suggests that inequality of opportunity will be a drag on economic growth, because individuals who lack opportunity will not be able to produce to their full potential and thus some capital will not be put to its most productive use.

### Evidence on Effects of Unequal Opportunity on Growth

Two papers that directly investigate the influence of inequality of opportunity on growth decompose total inequality into two parts, inequality of opportunity and a residual inequality labeled inequality of effort, and include the two parts in a growth regression in place of a total inequality measure (Ferreira et al. 2014; Marrero and Rodriguez 2013). They measure inequality of opportunity as the between-group dispersion in outcomes, where groups are defined in terms of circumstances individuals face that are not within their control, as in Roemer's framework, summarized earlier. Francisco Ferreira and his colleagues (2014) use a set of circumstance variables observed only selectively for individuals in an international panel analysis. They fail to find negative effects of inequality of opportunity on growth, perhaps because their circumstance groups

are unevenly measured or possibly because such effects are not detectable or do not operate across nations with different cultural and institutional contexts. By contrast, Marrero and Rodriguez (2013) analyze inequality of opportunity and growth across U.S. states and time and use eight circumstance groups, defined on the basis of four categories of parental educational attainment, cross-classified by two racial groups. They find significant and negative effects of inequality of opportunity on growth, effects that persist through various robustness checks. They argue that "returns to effort may encourage people to invest in education and to exert an effort, while inequality of opportunity may not favor human and physical capital accumulation in the more talented individuals" (120).

Bradbury and Triest measure inequality or equality of opportunity in a different way in this issue; they use indicators of relative and absolute intergenerational mobility at the commuting-zone level of geography within the United States that were developed and published by Chetty, Hendren, Kline, and Saez (2014a, 2014b). Intergenerational mobility measures reflect how equal or unequal opportunity is by indicating how tied a child's adult income is to the (parental-income) circumstances in which he or she grew up. Bradbury and Triest find positive effects of intergenerational mobility, especially absolute mobility, on income growth between 2000 and 2013 in a cross-section of commuting zones, indicating that inequality of opportunity, as proxied by low intergenerational mobility, acts as a drag on local-area growth.

A fourth paper takes an entirely different approach, investigating the addition to output associated with the reduction over the last several decades in the inequality of access to high-level occupations suffered earlier by women and blacks compared with white men in the United States. Chang-Tai Hsieh and his colleagues (2013) do not directly estimate the effect of inequality of opportunity on growth. Instead, they mark the stark differences in occupations in the United States in 1960 between white men, on one hand, and white women, black women, and black men, on the other. They argue that, because these differences

were so great, they cannot possibly be random or the result of unequal talent—white men, for example, accounted for 94 percent of U.S. physicians and 96 percent of lawyers in 1960—and instead largely reflect unequal opportunity. They then estimate the addition to U.S. output made by the degree to which those differences shrank in the ensuing years and attribute that contribution—a remarkable 15 to 20 percent of U.S. economic growth—to equalization of opportunity via great reductions in the barriers women and blacks face in their access to skilled professions, encouraging members of these formerly severely disadvantaged groups to invest in their own human capital and gain the ability to contribute more fully to the national output.

These various approaches to measuring the impact of inequality of opportunity on growth point to negative effects, at least in the United States. (The international panel analysis by Ferreira and his colleagues [2014] failed to find negative effects.) As noted earlier, this is not surprising, given that theory consistently suggests negative effects to the degree that unequal opportunity prevents individuals from performing to their full potential and prevents capital from being invested in the most high-value projects. Although not unexpected, these findings imply that the economic effects of unequal opportunity are large enough to be measurable at the macro level of output or economic growth and hence that policymakers have an additional impetus to reduce inequality of opportunity.

### **Policies to Improve both Economic Opportunity and Aggregate Performance**

The empirical evidence reviewed suggests that removing barriers to economic opportunity may also improve aggregate economic performance. Certain policies may have the potential to achieve both of these objectives.

Bernstein (2014) points toward policies that have positive output effects via enhancing opportunities without negative side-effects from reducing incentives for others to achieve or invest. His first policy recommendation is that governments should enhance their investments aimed at helping disadvantaged children overcome barriers in the U.S. educational

system. As noted earlier, a rapidly growing empirical literature indicates that early childhood interventions targeted at disadvantaged populations have high social rates of return; this topic is also addressed by Magnuson and Duncan in their paper in this issue. Health, nutrition, and preschool programs help to lessen the effect of poverty in early childhood on long-term outcomes. Payoffs would also be positive for policies to lessen the link between the quality of elementary and secondary schooling and parental income or wealth, as discussed earlier. The Duncan and Murnane paper in this issue focuses on specific policies to raise K–12 educational quality for disadvantaged children.

Beyond high school, policies are also needed to break the link between family economic status and college attendance. Children of low-income parents are much less likely than their high-income counterparts to enroll in and graduate from four-year college programs, even conditional on standardized test scores. Better-targeted financial aid programs, greater outreach to disadvantaged students, and more widespread and effective compensatory programs to guide disadvantaged students through college have the potential to reduce the effect of parents' income on post-secondary schooling investment.

Other policies are needed to provide more opportunities for people to get back on track after suffering the effects of being born disadvantaged. Children from disadvantaged backgrounds are more likely to fall off standard academic and career tracks, and do not enjoy the same degree of insurance more affluent families offer. Enhanced opportunities for adult education and degree completion, and programs to improve labor market and educational opportunities for people with criminal records would attenuate some of the obstacles facing those who have slipped off track.

### **SUMMARY**

The research reviewed offers grounds for both optimism and pessimism regarding prospects for addressing inequality of opportunity in the United States. Barriers to economic opportunity are pervasive, and the growth in inequality of outcomes has both increased the stakes associated with confronting barriers and in-

creased the difficulty in overcoming these obstacles. Absent substantial increases in the scope and scale of policy interventions, inequality of opportunity is likely to persist, along with stagnation or deterioration of economic mobility. On the other hand, research has made great strides in identifying and understanding the mechanisms relating barriers to opportunity to economic outcomes. Although detailed research and analysis are required to evaluate the success of specific policies in breaking down barriers to opportunity and improving labor market outcomes, such policies clearly exist and some have already been implemented. In considering whether the future will bring improvements in economic opportunity and mobility, the most problematic question and thus the largest area of uncertainty may be in whether the political

will exists to enact policies of sufficient scale and scope to address the problem.

## APPENDIX

This appendix reports the results of the multiple regression analysis discussed earlier. The regression results underlie our analysis of whether the Great Gatsby curve relationship between intergenerational mobility and inequality of outcomes for the older generation holds up when one controls for other factors that arguably might also affect intergenerational mobility. Descriptive statistics (variable means, etc.) for the variables used in the regressions are presented in table A1.

Tables A2 and A3 report regression results in a cross-section of commuting zones, with relative and absolute mobility as the dependent variables, measures of inequality as

**Table A1.** Summary Statistics

	Mean	SD
Absolute mobility	43.94	5.681
Relative mobility	67.49	6.479
Gini (inequality) of parental income	0.410	0.0792
Parental middle class	0.550	0.0786
Top 1 percent income share	10.84	5.049
Per capita income, 1980	8.538	1.777
Per capita income, 1990	15.88	2.989
Per capita income growth, 1970–1980	149.2	26.42
Per capita income growth, 1980–1990	87.68	20.83
Foreign born, 1980	0.0252	0.0318
Foreign born, 1990	0.0275	0.0391
Workers with commute < fifteen minutes, 1980	0.508	0.142
Workers with commute < fifteen minutes, 1990	0.489	0.139
Households with kids headed by single mom, 1980	0.0491	0.0168
Households with kids headed by single mom, 1990	0.0582	0.0194
Less than high school, 1980	0.381	0.110
Less than high school, 1990	0.287	0.0907
More than high school, 1980	0.399	0.0809
More than high school, 1990	0.441	0.0912
Male labor force participation rate, 1980	72.27	6.050
Male labor force participation rate, 1990	70.62	5.787
Female labor force participation rate, 1980	46.07	5.966
Female labor force participation rate, 1990	52.87	6.206
Logarithm of population, 1980	11.57	1.406
Logarithm of population, 1990	11.60	1.454
Observations	709	

Source: Authors' calculations based on U.S. Census Bureau 2014c, U.S. Bureau of Economic Analysis 2014, and Chetty, Hendren, Kline, and Saez 2014b.

Table A2. Mobility Regressions, 1990 Demographics

	Absolute Mobility			Relative Mobility		
	(1)	(2)	(3)	(4)	(5)	(6)
Gini (inequality) of parental income	-8.082*** (2.148)		-16.057*** (3.780)	-2.806 (3.133)		-16.735** (5.576)
Parents middle class		16.581*** (2.910)	11.903*** (3.090)		12.154** (4.276)	7.905+ (4.559)
Top 1 percent income share			0.143*** (0.041)			0.214*** (0.060)
Per capita income growth, 1980–1990	0.009 (0.007)	0.007 (0.006)	0.011+ (0.006)	0.007 (0.010)	0.008 (0.009)	0.010 (0.009)
Per capita income, 1990	-0.089 (0.063)	-0.036 (0.064)	-0.074 (0.065)	-0.460*** (0.092)	-0.409*** (0.093)	-0.481*** (0.095)
Foreign born, 1990	17.775*** (3.576)	20.535*** (3.590)	21.656*** (3.569)	53.898*** (5.215)	56.814*** (5.275)	57.243*** (5.264)
Workers with commute < fifteen minutes, 1990	12.199*** (1.727)	10.821*** (1.736)	11.080*** (1.733)	3.997 (2.519)	2.584 (2.551)	3.515 (2.557)
Households with kids headed by single mom, 1990	-122.617*** (7.036)	-96.319*** (8.945)	-89.355*** (9.010)	-137.107*** (10.262)	-114.768*** (13.146)	-105.832*** (13.291)
Less than high school, 1990	-2.648 (3.616)	3.380 (3.797)	2.564 (3.768)	-8.714+ (5.275)	-3.584 (5.581)	-5.165 (5.558)
More than high school, 1990	7.000* (3.188)	10.147** (3.234)	10.493** (3.227)	14.188** (4.649)	17.475*** (4.752)	16.639*** (4.759)
Male labor force participation rate, 1990	0.221*** (0.032)	0.226*** (0.031)	0.215*** (0.031)	0.001 (0.046)	-0.002 (0.046)	-0.004 (0.046)
Female labor force participation rate, 1990	-0.250*** (0.034)	-0.249*** (0.033)	-0.267*** (0.033)	-0.009 (0.049)	-0.011 (0.049)	-0.032 (0.049)
Logarithm of population, 1990	0.149 (0.165)	-0.023 (0.165)	0.119 (0.166)	-0.453+ (0.240)	-0.571* (0.242)	-0.402 (0.245)
Constant	41.513*** (3.635)	26.052*** (4.271)	33.224*** (4.558)	83.439*** (5.302)	72.856*** (6.277)	79.590*** (6.723)
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	709	709	709	709	709	709
R <sup>2</sup>	0.781	0.787	0.792	0.642	0.646	0.652

Source: Authors’ calculations based on U.S. Census Bureau 2014c, U.S. Bureau of Economic Analysis 2014, and Chetty, Hendren, Kline, and Saez 2014b.

\* $p < 0.10$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

explanatory variables, and various other commuting-zone characteristics as exogenous and predetermined control variables that help explain mobility. These regressions build on those reported elsewhere in this issue (Bradbury and Triest, table 4). Table A2 uses 1990 measures of those characteristics—when the children whose mobility is observed were about age ten, and table A3 uses measures

from 1980, just before they were born (1980 to 1982). Columns 1 through 3 (absolute mobility as dependent variable) and 4 through 6 (relative mobility) of tables A2 and A3 include alternative measures of inequality; specifically, columns 1 and 4 include the Gini coefficient to measure inequality (as in figure 1), columns 2 and 5 the proportion middle class (as in figure 2), and columns 3 and 6 include the Gini, the



**Table A3.** Mobility Regressions, 1980 Demographics

	Absolute Mobility			Relative Mobility		
	(1)	(2)	(3)	(4)	(5)	(6)
Gini (inequality) of parental income	-5.855** (1.845)		-14.972*** (3.444)	-3.459 (2.930)		-16.073** (5.487)
Parents middle class		11.530*** (2.438)	7.000** (2.694)		14.966*** (3.867)	11.141** (4.293)
Top 1 percent income share			0.153*** (0.036)			0.218*** (0.058)
Per capita income growth, 1970–1980	0.014** (0.005)	0.015*** (0.005)	0.017*** (0.004)	0.025*** (0.007)	0.027*** (0.007)	0.028*** (0.007)
Per capita income, 1980	-0.397*** (0.105)	-0.339** (0.104)	-0.420*** (0.104)	-0.890*** (0.166)	-0.820*** (0.165)	-0.917*** (0.166)
Foreign born, 1980	28.319*** (3.672)	32.071*** (3.787)	32.006*** (3.744)	67.457*** (5.832)	73.760*** (6.009)	73.178*** (5.965)
Workers with commute < fifteen minutes, 1980	11.413*** (1.586)	10.540*** (1.591)	11.188*** (1.581)	3.251 (2.518)	1.760 (2.524)	2.818 (2.518)
Households with kids headed by single mom, 1980	-162.948*** (7.775)	-140.580*** (9.547)	-133.013*** (9.648)	-154.203*** (12.348)	-121.291*** (15.146)	-109.104*** (15.372)
Less than high school, 1980	-3.853 (2.740)	-1.263 (2.794)	-2.034 (2.763)	-12.532** (4.352)	-8.713* (4.433)	-9.649* (4.403)
More than high school, 1980	9.468** (3.159)	10.542*** (3.143)	10.278** (3.122)	16.325** (5.017)	18.828*** (4.987)	17.659*** (4.974)
Male labor force participation rate, 1980	0.278*** (0.025)	0.279*** (0.024)	0.272*** (0.024)	0.103** (0.039)	0.097* (0.039)	0.09* (0.039)
Female labor force participation rate, 1980	-0.245*** (0.026)	-0.248*** (0.026)	-0.262*** (0.026)	-0.077* (0.042)	-0.079* (0.041)	-0.101* (0.041)
Logarithm of population, 1980	0.526*** (0.149)	0.378* (0.149)	0.519*** (0.151)	-0.204 (0.236)	-0.368 (0.236)	-0.228 (0.240)
Constant	31.422*** (3.455)	21.541*** (3.792)	27.994*** (4.095)	74.786*** (5.488)	63.204*** (6.017)	68.971*** (6.524)
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	709	709	709	709	709	709
R <sup>2</sup>	0.815	0.818	0.823	0.641	0.648	0.655

Source: Authors' calculations based on U.S. Census Bureau 2014c, U.S. Bureau of Economic Analysis 2014, and Chetty, Hendren, Kline, and Saez 2014b.

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ ; \*\*\*\* $p < 0.001$

proportion middle class, and the income share of the top 1 percent in the CZ.

The control variables include a rough measure of past immigration (percentage of foreign-born residents), the mix of educational attainments among adults ages twenty-five and older in the CZ, the proportion of single-mother households, labor force participation

rates for men and women, the proportion of workers with average commuting times of less than fifteen minutes, and economic variables including per capita income, growth in per capita income in the prior decade, and population size. The regressions also include fixed effects for census divisions.

The strong negative coefficient on the Gini

coefficient in the scatter plot lines persists into column 1 in the two tables (with 1990 or 1980 controls) for absolute mobility but is not statistically significant for relative mobility (column 4). In both cases, the slope coefficient is much smaller when controls are added; in the relative mobility case, the estimate is so small that it is dwarfed by the standard error. However, columns 2 and 5 indicate that even for relative mobility, the size of the (parental) middle class has a statistically significant positive relationship with children's mobility. And both estimated relationships show up in columns 3 and 6, where the Gini and proportion middle class obtain coefficient estimates significantly different from zero, as does the size of the income share of the richest 1 percent of families in the commuting zone. The latter coefficient is opposite in sign to that of the Gini, even though they are both indicators of inequality; this sign reversal for the top 1 percent income share suggests that while inequality in the lower parts of the CZ income distribution constrains mobility, inequality at the very top does not. The use of 1980 measures (table A3) versus 1990 (table A2) for the control variables makes little difference to the coefficients on the inequality measures.

## REFERENCES

- Aaronson, Daniel, and Bhashkar Mazumder. 2008. "Intergenerational Economic Mobility in the United States, 1940 to 2000." *Journal of Human Resources* 43(1): 139–72.
- Almond, Douglas. 2006. "Is the 1918 Influenza Pandemic Over? Long-Term Effects of in Utero Influenza Exposure in the Post-1940 U.S. Population." *Journal of Political Economy* 114(4): 672–712.
- Almond, Douglas, and Janet Currie. 2011a. "Human Capital Development Before Age Five." In *Handbook of Labor Economics*, vol. 4B, edited by David Card and Orley Ashenfelter. Philadelphia, Pa.: Elsevier.
- . 2011b. "Killing Me Softly: The Fetal Origins Hypothesis." *Journal of Economic Perspectives* 25(3): 153–72.
- Almond, Douglas, Lena Edlund, Hongbin Li, and Junsen Zhang. 2010. "Long-Term Effects of Early-Life Development: Evidence from the 1959 to 1961 China Famine." In *The Economic Consequences of Demographic Change in East Asia*, NBER-EASE vol. 19. Chicago: University of Chicago Press.
- Almond, Douglas, Hilary W. Hoynes, and Diane Whitmore Schanzenbach. 2011. "Inside the War on Poverty: The Impact of Food Stamps on Birth Outcomes." *Review of Economics and Statistics* 93(2): 387–403.
- Altonji, Joseph G., and Richard K. Mansfield. 2011. "The Role of Family, School, and Community Characteristics in Inequality in Education and Labor-Market Outcomes." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg J. Duncan and Richard J. Murnane. New York: Russell Sage Foundation.
- Aud, Susan, William Hussar, Frank Johnson, Grace Kena, Erin Roth, Eileen Manning, Xiaolei Wang, and Jijun Zhang. 2012. *The Condition of Education 2012*. NCES 2012–045. Washington: U.S. Department of Education.
- Aud, Susan, Angelina KewalRamani, and Lauren Frohlich. 2011. *America's Youth: Transitions to Adulthood*. NCES 2012–026. Washington: U.S. Department of Education.
- Avery, Christopher, Jessica S. Howell, and Lindsay Page. 2014. "A Review of the Role of College Counseling, Coaching, and Mentoring on Students' Postsecondary Outcomes." College Board Research, Research Brief (October). New York: The College Board. Accessed January 3, 2016. <http://research.collegeboard.org/sites/default/files/publications/2015/1/college-board-research-brief-role-college-counseling-coaching-mentoring-postsecondary-outcomes.pdf>.
- Baker, Bruce D. 2009. "Within-District Resource Allocation and the Marginal Costs of Providing Equal Educational Opportunity: Evidence from Texas and Ohio." *Education Policy Analysis Archives* 17(3): 1–31. Accessed January 3, 2016. <http://files.eric.ed.gov/fulltext/EJ835083.pdf>.
- Bailey, Martha J., and Susan M. Dynarski. 2011. "Inequality in Postsecondary Education." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg J. Duncan and Richard J. Murnane. New York: Russell Sage Foundation.
- Becker, Gary, and Nigel Tomes. 1979. "An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility." *Journal of Political Economy* 87(6): 1153–89.

- Belley, Philippe, and Lance Lochner. 2007. "The Changing Role of Family Income and Ability in Determining Educational Achievement." *NBER* working paper 13527. Cambridge, Mass.: National Bureau of Economic Research.
- Bernstein, Jared. 2014. "The Impact of Inequality on Growth." Washington, D.C.: Center for American Progress.
- Bettinger, Eric P., Bridget Terry Long, Philip Oreopoulos, and Lisa Sanbonmatsu. 2012. "The Role of Application Assistance and Information in College Decisions: Results from the H&R Block FAFSA Experiment." *Quarterly Journal of Economics* 127(3): 1205–42.
- Bingley, Paul, Miles Corak, and Niels Westergaard-Nielsen. 2011. "The Intergenerational Transmission of Employers in Canada and Denmark." *IZA* discussion paper series no. 5593 (March). Bonn: Institute for the Study of Labor.
- Bischoff, Kendra, and Sean F. Reardon. 2014. "Residential Segregation by Income 1970–2009." In *Diversity and Disparities: America Enters a New Century*, edited by John Logan. New York: Russell Sage Foundation.
- Bjorklund, Anders, and Markus Jäntti. 2009. "Intergenerational Income Mobility and the Role of Family Background." In *The Oxford Handbook of Economic Inequality*, edited by Wiemer Salverda, Brian Nolan, and Timothy M. Smeeding. Oxford: Oxford University Press.
- Black, Sandra E., and Paul J. Devereux. 2011. "Recent Developments in Intergenerational Mobility." In *Handbook of Labor Economics*, edited by David Card and Orley Ashenfelter. Philadelphia, Pa.: Elsevier.
- Black, Sandra E., Paul J. Devereux, and Kjell G. Salvanes. 2007. "From the Cradle to the Labor Market? The Effect of Birth Weight on Adult Outcomes." *Quarterly Journal of Economics* 122(1): 409–39.
- Blanden, Jo. 2013. "Cross-Country Rankings in Intergenerational Mobility: A Comparison of Approaches from Economics and Sociology." *Journal of Economic Surveys* 27(1): 38–73.
- Blanden, Jo, Paul Gregg, and Lindsey Macmillan. 2007. "Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability, and Education." *Economic Journal* 117(519) (March): C43–60.
- Blanden, Jo, Robert Haveman, Timothy Smeeding, and Kathryn Wilson. 2014. "Intergenerational Mobility in the United States and Great Britain: A Comparative Study of Parent-Child Pathways." *Review of Income and Wealth* 60(3) (September): 425–49.
- Bloome, Deirdre. 2015. "Income Inequality and Intergenerational Income Mobility in the United States." *Social Forces* 93(3): 1047–80.
- Bloome, Dierdre, and Bruce Western. 2011. "Cohort Change and Racial Differences in Educational and Income Mobility." *Social Forces* 90(2): 375–95.
- Brunori, Paolo, Francisco H.G. Ferreira, and Vito Peragine. 2013. "Inequality of Opportunity, Income Inequality and Economic Mobility: Some International Comparisons." *Policy Research* working paper no. 6304. Washington, D.C.: The World Bank.
- Burdick-Will, Julia, Jens Ludwig, Stephen W. Raudenbush, Robert J. Sampson, Lisa Sanbonmatsu, and Patrick Sharkey. 2011. "Converging Evidence on Neighborhood Effects on Children's Test Scores: An Experimental, Quasi-Experimental, and Observational Comparison." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg J. Duncan and Richard J. Murnane. New York: Russell Sage Foundation.
- Card, David, and A. Abigail Payne. 2002. "School Finance Reform, the Distribution of School Spending, and the Distribution of Student Test Scores." *Journal of Public Economics* 83(1): 49–82.
- Carrell, Scott, and Bruce Sacerdote. 2013. "Late Interventions Matter Too: The Case of College Coaching in New Hampshire." Cambridge, Mass.: National Bureau of Economic Research.
- Case, Anne, Darren Lubotsky, and Christina Paxson. 2002. "Economic Status and Health in Childhood: The Origins of the Gradient." *American Economic Review* 92(5): 1308–34.
- Chadwick, Laura, and Gary Solon. 2002. "Intergenerational Income Mobility Among Daughters." *American Economic Review* 92(1)(March): 335–44.
- Chaudhary, Latika. 2009. "Education Inputs, Student Performance and School Finance Reform in Michigan." *Economics of Education Review* 28(1): 90–98.
- Chetty, Raj, and Nathaniel Hendren. 2015. "The Impacts of Neighborhoods on Intergenerational Mobility: Childhood Exposure Effects and County-Level Estimates." Cambridge, Mass.: Harvard

- University. Accessed January 3, 2016. [http://scholar.harvard.edu/files/hendren/files/nbhds\\_paper.pdf?m=1430722623](http://scholar.harvard.edu/files/hendren/files/nbhds_paper.pdf?m=1430722623).
- Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz. 2015. "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment." *NBER* working paper no. 21156. Cambridge, Mass.: National Bureau of Economic Research..
- Chetty, Raj, Nathaniel Hendren, Patrick Kline, and Emmanuel Saez. 2014a. "Where Is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States." *Quarterly Journal of Economics* 129(4): 1553–623.
- . 2014b. "Data from Chetty, Hendren, Kline, and Saez (2014): Descriptive Statistics by County and Commuting Zone." Data downloaded from the Equality of Opportunity Project. Accessed February 2, 2016. <http://equality-of-opportunity.org/index.php/data>.
- Chetty, Raj, Nathaniel Hendren, Patrick Kline, Emmanuel Saez, and Nicholas Turner. 2014. "Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility." *American Economic Review: Papers and Proceedings* 104(5): 141–47.
- Corak, Miles. 2013a. "Inequality from Generation to Generation: The United States in Comparison." In *The Economics of Inequality, Poverty, and Discrimination in the 21st Century*, edited by Robert S. Rycroft. Santa Barbara, Calif.: ABC-CLIO.
- . 2013b. "Income Inequality, Equality of Opportunity, and Intergenerational Mobility" *Journal of Economic Perspectives* 27(3): 79–102.
- Corak, Miles, and Patrizio Piraino. 2011. "The Intergenerational Transmission of Employers." *Journal of Labor Economics* 29(1): 37–68.
- Cunha, Flavio, and James Heckman. 2007. "The Technology of Skill Formation." *American Economic Review Papers and Proceedings* 97(2): 31–47.
- . 2008. "Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Journal of Human Resources* 43(4): 738–82.
- Cunha, Flavio, James J. Heckman, Lance Lochner, and Dimitriy V. Masterov. 2006. "Interpreting the Evidence on Life Cycle Skill Formation." In *Handbook of the Economics of Education*, edited by Eric Hanushek and Finis Welch, vol. 1. Philadelphia, Pa.: Elsevier.
- Cunha, Flavio, James J. Heckman, and Susanne M. Schennach. 2010. "Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Econometrica* 78(3): 883–931.
- Currie, Janet. 2011. "Inequality at Birth: Some Causes and Consequences." *American Economic Review: Papers and Proceedings* 101(3): 1–22.
- Currie, Janet, and Enrico Moretti. 2007. "Biology as Destiny? Short-and Long-Run Determinants of Intergenerational Transmission of Birth Weight." *Journal of Labor Economics* 25(2): 231–63.
- Currie, Janet, and Maya Rossin-Slater. 2015. "Early-Life Origins of Life-Cycle Well-Being: Research and Policy Implications." *Journal of Policy Analysis and Management* 34(1): 208–42.
- Dahl, Gordon B., and Lance Lochner. 2012. "The Impact of Family Income on Child Achievement: Evidence from the Earned Income Tax Credit." *American Economic Review* 102(5): 1927–56.
- Deming, David. 2009. "Early Childhood Intervention and Life-Cycle Skill Development: Evidence from Head Start." *American Economic Journal: Applied Economics* 1(3): 111–34.
- Duncan, Greg. J., Kenneth T. H. Lee, Ariel Kalil, and Kathleen M. Ziol-Guest. 2015. "Parent Income-Based Gaps in Schooling, Earnings and Family Income: Cross-Cohort Trends in the NLSys and the PSID." Accessed February 2, 2016. <http://sites.uci.edu/gduncan/files/2013/06/RSF-Memo-Duncan-et-al-010815.pdf>.
- Duncombe, William, Phuong Nguyen-Hoang, and John Yinger. 2015. "Measurement of Cost Differentials" In *Handbook of Research in Education and Policy*, edited by Helen F. Ladd and Margaret E. Goertz. New York: Routledge.
- Economic Policy Institute. 2011. "Unpaid and Exploited? Examining Interns in the U.S. Labor Market." *EPI* forum and discussion, May 18. Washington, D.C.: Economic Policy Institute. Accessed December 27, 2015. <http://www.epi.org/event/unpaid-and-exploited-examining-interns-in-the-u-s-labor-market>.
- Eisenbrey, Ross. 2012. "Unpaid Internships Hurt Mobility." *Economic Policy Institute* blog post, January 12. Accessed April 7, 2016. <http://www.epi.org/blog/unpaid-internships-economic-mobility/>.
- Ferreira, Francisco H. G., Christoph Lakner, Maria Ana Lugo, and Berk Ozler. 2014. "Inequality of Opportunity and Economic Growth: A Cross-Country Analysis." *Policy Research* working

- paper no. 6915. Washington, D.C.: The World Bank.
- Figlio, David, Jonathan Guryan, Krzysztof Karbownik, and Jeffrey Roth. 2014. "The Effects of Poor Neonatal Health on Children's Cognitive Development." *American Economic Review* 104(12): 3921–55.
- Fishkin, Joseph. 2014. *Bottlenecks: A New Theory of Equal Opportunity*. Oxford: Oxford University Press.
- . 2016. "From Subgroups to Bottlenecks: New Directions for the Empirical Study of Intergenerational Mobility: Comments on 'Multiple Barriers to Economic Opportunity in the United States.'" In *Additional Materials. RSF: The Russell Sage Journal of the Social Sciences*, volume 2, issue 2. Available at: <http://www.rsfsjournal.org>.
- Fleurbaey, Marc, and Vito Peragine. 2013. "Ex Ante Versus Ex Post Equality of Opportunity." *Economica* vol. 80(317): 118–30.
- Fox, Mary Anne, Brooke A. Connolly, and Thomas D. Snyder. 2005. *Youth Indicators 2005: Trends in the Well-Being of American Youth*. NCES 2005–050. Washington: U.S. Department of Education.
- Garces, Eliana, Duncan Thomas, and Janet Currie. 2002. "Longer-Term Effects of Head Start." *American Economic Review* 92(4): 999–1012.
- Goodman, Joshua. 2008. "Skills, Schools, and Credit Constraints: Evidence from Massachusetts." *Department of Economics discussion paper series* no. 0809–03. New York: Columbia University.
- Graham, Bryan, and Patrick Sharkey. 2013. "Mobility and the Metropolis: The Relationship between Inequality in Urban Communities and Economic Mobility." Washington, D.C.: The Pew Charitable Trusts.
- Holzer, Harry J. 1988. "Search Method Use by Unemployed Youth" *Journal of Labor Economics* 6(1): 1–20.
- Hoxby, Caroline M. 1998. "How Much Does Spending Depend on Family Income? The Historical Origins of the Current School Finance Dilemma." *Papers and Proceedings of the American Economic Association* 88(2): 309–14.
- . 2001. "All School Finance Equalizations Are Not Created Equal." *Quarterly Journal of Economics* 116 (November): 1189–231.
- Hoxby, Caroline M., and Christopher Avery. 2013. "The Missing 'One-Offs': The Hidden Supply of High-Achieving, Low Income Students." *Brookings Papers on Economic Activity* (Spring): 1–65.
- Hoynes, Hilary W., Douglas L. Miller, and David Simon. 2012. "Income, the Earned Income Tax Credit, and Infant Health." *NBER working paper* no. 18206. Cambridge, Mass.: National Bureau of Economic Research.
- Hsieh, Chang-Tai, Eric Hurst, Charles I. Jones, and Peter J. Klenow. 2013. "The Allocation of Talent and U.S. Economic Growth." *NBER working paper* no. 18693. Cambridge, Mass.: National Bureau of Economic Research.
- Ionnides, Yannis M., and Linda Datcher Loury. 2004. "Job Information Networks, Neighborhood Effects, and Inequality." *Journal of Economic Literature* 42(4): 1056–93.
- Isen, Adam, Maya Rossin-Slater, and Reed Walker. 2014. "Every Breath You Take—Every Dollar You'll Make: The Long-Term Consequences of the Clean Air Act of 1970." *NBER working paper* no. 19858. Cambridge, Mass.: National Bureau of Economic Research.
- Jackson, C. Kirabo, Rucker Johnson, and Claudia Persico. 2014. "The Effect of School Finance Reforms on the Distribution of Spending, Academic Achievement, and Adult Outcomes." *NBER working paper* no. 20118. Cambridge, Mass.: National Bureau of Economic Research.
- Jacob, Brian A., and Tamara Wilder Linkow. 2011. "Educational Expectations and Attainment." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg J. Duncan and Richard J. Murnane. New York: Russell Sage Foundation.
- Jäntti, Markus, and Stephen P. Jenkins. 2015. "Income Mobility." In *Handbook of Income Distribution*, edited by Anthony B. Atkinson and François Bourguignon, vol. 2A. Philadelphia, Pa.: Elsevier.
- Kaushal, Neeraj, Katherine Magnuson, and Jane Waldfogel. 2011. "How Is Family Income Related to Investments in Children's Learning?" In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg J. Duncan and Richard J. Murnane. New York: Russell Sage Foundation.
- Kena, Grace., Susan Aud, Frank Johnson, Xiaolei Wang, Jujun Zhang, Amy Rathbun, Sidney Wilkinson-Flicker, and Paul Kristapovich. 2014. *The Condition of Education 2014*. NCES 2014–083. Washington: U.S. Department of Education.
- Kenworthy, Lane. 2012. "It's Hard to Make It in America: How the United States Stopped Being



- the Land of Opportunity." *Foreign Affairs* 91(6): 97–109.
- Lane, Brett, and Phomdaen Souvanna. 2013. "Mass Math + Science Initiative 2013 High School Impact Study." Boston, Mass.: Institute for Strategic Leadership and Learning.
- Lareau, Annette, and Kimberly Goyette. 2014. Preface. In *Choosing Homes, Choosing Schools*. New York: Russell Sage Foundation.
- Lee, Chul-In, and Gary Solon. 2009. "Trends in Intergenerational Income Mobility." *Review of Economics and Statistics* 91(4): 766–72.
- Levine, David E., and Bhashkar Mazumder. 2007. "The Growing Importance of Family: Evidence from Brothers' Earnings." *Industrial Relations* 46(1): 7–21.
- Marrero, Gustavo A., and Juan G. Rodriguez. 2013. "Inequality of Opportunity and Growth." *Journal of Development Economics* 104 (September): 107–22.
- Mazumder, Bhashkar. 2011. "Black-White Differences in Intergenerational Economic Mobility in the United States." Working paper no. 2011-10. Chicago: Federal Reserve Bank of Chicago.
- Milanovic, Branko. 2015. "Global Inequality of Opportunity: How Much of Our Income Is Determined by Where We Live?" *Review of Economics and Statistics* 97(2): 452–60.
- Mitnik, Pablo A., Erin Cumberworth, and David B. Grusky. 2013. "Social Mobility in a High Inequality Regime." Stanford Center for the Study of Poverty and Inequality. Stanford, Calif: Stanford University.
- Palardy, Gregory J. 2013. "High School Socioeconomic Segregation and Student Attainment." *American Education Research Journal* 50(4): 714–54.
- Putnam, Robert D. 2000. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster.
- . 2015. *Our Kids: The American Dream in Crisis*. New York: Simon & Schuster.
- . 2016. "Social Networks and Geography: Comments on 'How Does Geography Affect Equality of Opportunity.'" In *Additional Materials. RSF: The Russell Sage Journal of the Social Sciences, volume 2, issue 2*. Available at: <http://www.rsfjournal.org>.
- Ramos, Xavier, and Dirk Van de Gaer. 2012. "Empirical Approaches to Inequality of Opportunity: Principles, Measures, and Evidence." IZA discussion paper no. 6672. Bonn: Institute for the Study of Labor.
- Reardon, Sean F. 2011. "The Widening Academic Achievement Gap Between the Rich and the Poor: New Evidence and Possible Explanations." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg J. Duncan and Richard J. Murnane. New York: Russell Sage Foundation.
- Roemer, John E. 1993. "A Pragmatic Theory of Responsibility for the Egalitarian Planner." *Philosophy and Public Affairs* 22(2): 144–66.
- . 1998. *Theories of Distributive Justice*. Cambridge, Mass.: Harvard University Press.
- Roemer, John E., and Alain Trannoy. Forthcoming. "Equality of Opportunity: Theory and Measurement." *Journal of Economic Literature*.
- Sacerdote, Bruce. 2011. "Peer Effects in Education: How Might They Work, How Big Are They and How Much Do We Know Thus Far?" In *Handbook of the Economics of Education*, vol. 3, edited by Eric A. Hanushek, Stephen J. Machin, and Ludger Woessmann. Philadelphia, Pa.: Elsevier.
- Sampson, Robert J., Patrick Sharkey, and Stephen Raudenbush. 2008. "Durable Effects of Concentrated Disadvantage on Verbal Ability Among African-American Children." *Proceedings of the National Academy of Sciences* 105(3): 845–53.
- Smeeding, Timothy M. 2013. "On the Relationship Between Income Inequality and Intergenerational Mobility." *GINI* discussion paper no. 89. Madison: University of Wisconsin. Accessed April 7, 2016. <http://gini-research.org/system/uploads/589/original/89.pdf?1385131374>.
- Solon, Gary. 1999. "Intergenerational Mobility in the Labor Market." In *Handbook of Labor Economics*, edited by Orley Ashenfelter and David Card. Philadelphia, Pa.: Elsevier.
- . 2002. "Cross-Country Difference in Intergenerational Earnings Mobility." *Journal of Economic Perspectives* 16(3): 59–66.
- . 2004. "A Model of Intergenerational Mobility Variation over Time and Place." In *Generational Income Mobility in North America and Europe*, edited by Miles Corak. Cambridge: Cambridge University Press.
- U.S. Bureau of Economic Analysis. 2014. "Regional Data: GDP and Personal Income," tables CA1–3 (Personal income summary), CA4 (Personal income and employment summary), CA25 (Total

- full-time and part-time employment by SIC industry), and CA25N (Total full-time and part-time employment by NAICS industry). Washington: U.S. Government Printing Office. Accessed September 17, 2014. <http://bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1>.
- U.S. Census Bureau. 2014a. "Selected Measures of Household Income Dispersion: 1967 to 2014." Washington: U.S. Government Printing Office. Accessed December 15, 2014. <https://www.census.gov/hhes/www/income/data/historical/inequality/Table%20IE-1.pdf>.
- . 2014b. Census tract data accessed via Minnesota Population Center. *National Historical Geographic Information System: Version 2.0*. Minneapolis, Minn.: University of Minnesota. Accessed December 19, 2014. <https://nhgis.org/>.
- . 2014c. Data from decennial censuses accessed via Minnesota Population Center. *National Historical Geographic Information System: Version 2.0*. Minneapolis, Minn.: University of Minnesota. Accessed August 27, 2014. <https://nhgis.org/>.
- U.S. Department of Labor, Wage and Hour Division. 2010. "Fact Sheet #71: Internship Programs under the Fair Labor Standards Act." Washington: U.S. Government Printing Office. Accessed December 2, 2015. <http://www.dol.gov/whd/regs/compliance/whdfs71.pdf>.
- Urahn, Susan K., Erin Currier, Dana Elliott, Lauren Wechsler, Denise Wilson, and Daniel Colbert. 2012. *Pursuing the American Dream: Economic Mobility Across Generations*. Washington, D.C.: Pew Charitable Trusts.
- Wilson, William Julius. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago: University of Chicago Press.
- Winship, Scott, and Stephanie Owen. 2013. "Guide to the Brookings Social Genome Model." Washington, D.C.: Brookings Institution.