

# Intergenerational transmission of income inequality: What do we know?

Gary Solon

---

Gary Solon is Eller Professor of Economics at the University of Arizona.

---

This article presents a brief overview of current knowledge about intergenerational persistence of economic status in the United States, that is, the extent to which position in the income distribution is passed from one generation to the next.

## What is intergenerational income mobility, and why does it matter?

My favorite way to summarize this topic and explain why we should care about it is to tell a tale of two societies: Society A and Society B. These two societies have identical income distributions, and thus at first glance appear to have the same income inequality. But actually there's a difference. In Society A, a child growing up in a wealthy family at, say, the 93rd percentile of the income distribution is certain to end up as an adult at exactly the 93rd percentile in her or his own generation. A child growing up in the 12th percentile is certain to end up at the 12th percentile. Society A is therefore an entirely immobile society, where one's position in the income distribution is predestined by one's origins. In Society B, which has the same income distribution and thus the same degree of inequality at a point in time, the child from the 93rd percentile and the child from the 12th percentile share the same prospects. Because there is no connection between the children's origins and where they will end up in the income distribution, Society B is a perfectly mobile society. Thus, although at first glance the two societies seem equally unequal, they differ in the nature of their inequality. I expect that most people would like to know where our own society lies between the extremes of Society A and Society B.

## Measuring intergenerational income mobility

To answer that question calls for a statistical way of characterizing a society's intergenerational mobility. Many mobility researchers use a regression framework that relates a child's expected long-run income to that of the child's parents. When both generations' income is measured in a certain relative way, the coefficient in the regression equation is the "intergenerational income elasticity." The intergenerational income elasticity tells what percentage

variation to expect in the child's income in connection with a percentage variation in the parents' income. For example, if the intergenerational income elasticity is 0.4, and the parents' income is 50 percent above the average in their generation, then the expected position for the child would be 20 percent (0.4 times 50 percent) higher than the average in the child's generation. If the intergenerational income elasticity is 0, then the child's expected relative income is unrelated to whether the parents are rich or poor (as in Society B above). As the intergenerational income elasticity grows larger, we move towards Society A, with children from rich families enjoying a large advantage relative to children from poor families.

This regression framework is not the only possible way to characterize intergenerational income mobility, but it has become popular because (1) it conveniently provides a single summary statistic for characterizing intergenerational income mobility in a society; and (2) it lends itself well to analyzing estimation biases from measurement error and unrepresentative samples. Like any single summary statistic, it misses a lot of nuance, but it is a convenient starting point.

## What we used to "know" and why it changed

As of the mid-1980s, the conventional wisdom among academic sociologists and economists was that the intergenerational income elasticity in the United States and elsewhere was no more than 0.2.<sup>1</sup> These low estimates implied a highly mobile society in which children from rich and poor families competed on a nearly level playing field.

As it turns out, these early estimates were distorted by certain statistical problems. To begin with, although we are mainly interested in long-run income, the intergenerational income data available at the time were short-term measures (often for only one year) collected from household surveys. Such a measure is not a very accurate indicator of longer-term income, both because survey reports of income are notoriously error-ridden, and because year-to-year income fluctuations cause even an accurately reported single-year measure to be an imperfect indicator of longer-run income. Even if the resulting income measurement error were purely random, this "muddying of the water" would lead to substantial underestimation of the intergenerational income elasticity.

A further issue, highlighted in my own first papers on intergenerational mobility, is that the early researchers had a difficult time locating data containing income measures for two generations of the same families, and the data these

researchers had to settle for happened to involve peculiarly homogeneous samples.<sup>2</sup> For example, the fathers in one sample were drawn from a sample of white male twin pairs in which both members of the pair served in the armed forces and cooperated with a succession of surveys.<sup>3</sup> Such a sample contains less variation in economic status than exists in the larger population. My first papers explained why this compressed variation in parental status aggravates the downward bias from measurement error, leading to even more severe underestimation of the intergenerational income elasticity than there would be in a more representative sample.

### What we have learned from better evidence

Since these early studies, newly available data have enabled more accurate estimates of intergenerational income mobility. An example of such data is the Panel Study of Income Dynamics (PSID), a longitudinal survey administered by the University of Michigan's Survey Research Center. It began in 1968 with a national probability sample of the U.S. population, and it has followed the sample ever since. The PSID data have an intergenerational span because the children from the original sample have been followed as they have grown up and formed their own households. The PSID has two major advantages relative to previous data sets. First, the multi-year measurement of income enables exploration of effects of using longer-run income measures. Second, the PSID's national probability sample avoids the homogeneity issues of the earlier data sets.

The importance of the better data is exemplified by my own first PSID-based study of intergenerational mobility, which estimated the relationship between son's annual earnings in 1984 and father's earnings over the 1967 to 1971 period.<sup>4</sup> When I imitated earlier research by using only one year of father's earnings at a time, the resulting estimates of the intergenerational elasticity were about 0.3. Because of the short-term earnings measure, these estimates were underestimates, but they still were larger than estimates from the previous literature because of the less homogeneous sample. When I proceeded to use longer-term (five-year average) earnings measures for fathers, my estimates rose to about 0.4, or about twice what previously had been believed to be the upper bound.

Even this higher estimate was an underestimate of the actual intergenerational elasticity for three reasons: (1) even a five-year average is a somewhat inaccurate measure of longer-run income; (2) the PSID survey response rate decreases over time in a way that makes the PSID sample somewhat more homogeneous than the U.S. population; and (3) the average age at which the sons' earnings were measured was slightly under 30. Subsequent research has shown that income variation observed in the twenties tends to understate long-run variation.<sup>5</sup>

What difference does it make if the intergenerational income elasticity is 0.4 or 0.5 instead of 0.2? Table 1 illustrates the

Intergenerational Income Elasticity	Rises Above 50th Percentile	Stays in Bottom 20 Percent
0	50%	20%
0.2	37	30
0.4	24	42
0.5	17	49

probability that a child from a very poor family (in the 5th percentile of their generation's income distribution) will: (1) rise above the 50th percentile as an adult, or (2) remain in the bottom 20 percent. The table considers four scenarios of what the intergenerational income elasticity is, and it assumes that the relative income measure is normally distributed in each generation. So, for example, given the zero intergenerational elasticity of Society B in our initial scenario, the child has a 50-50 chance of being in the upper half of the income distribution, and exactly a 20 percent chance of being in the bottom 20 percent. As the intergenerational income elasticity increases, the probability of the child rising above the 50th percentile as an adult falls, while the probability of remaining in the bottom 20 percent rises. Thus, given a 0.5 intergenerational elasticity, the probability of a child moving from the 5th income percentile to the top half of the distribution is only 17 percent, while the probability of remaining in the bottom 20 percent is nearly 50 percent.

Because these calculations are based on an arbitrary normality assumption, it is worth cross-validating them against more direct evidence. A recent study by Chetty, Hendren, Kline, and Saez used data from millions of federal income tax records to study intergenerational mobility.<sup>6</sup> Because Chetty and colleagues measured the second generation's income for only two years around age 30, they exaggerated the extent of mobility, estimating the intergenerational elasticity at a bit less than 0.4. Still, it is instructive to compare their empirical transition rates to those from the normality-based calculations in Table 1. The numbers from Chetty and colleagues come remarkably close to what Table 1 suggests would apply with an intergenerational elasticity a little below 0.4. They indicate that a child from a family in the 5th income percentile has a 25 percent chance of rising above the 50th percentile as an adult, and a 37 percent chance of remaining in the bottom 20 percent. All these results show that our society is far from the perfect mobility of Society B. Although children from poor families do have a chance of achieving high income as adults, their prospects are not nearly as good as those of children from well-off families.

### Policy implications

During the 1980s, as income inequality grew in the United States and many other developed countries, some pundits wrote that growing inequality need not concern us because, although there are winners and losers in the economic

game, everyone has a fair chance to compete on a level playing field. What we have learned from the last 30 years of mobility research is that the playing field is far from level. Children from poor families are at a substantial disadvantage relative to children from well-off families.

This leads us to the question of what ought to be done to give children from poor families a better chance. Each proposed policy intervention needs to be evaluated on the basis of the best available evidence about its likely benefits and costs, but measuring those is a surprisingly difficult task. The articles in the remainder of this issue take up that challenge by examining recent research in five areas, with a goal of identifying cost-effective policies to reduce intergenerational transmission of poverty. The five areas are: parenting young children; K–12 schooling; neighborhood and school setting; childhood health; and early care and education.■

---

<sup>1</sup>See, for example, J. Behrman and P. Taubman, “Intergenerational Earnings Mobility in the United States: Some Estimates and a Test of Becker’s Intergenerational Endowments Model,” *Review of Economics and Statistics* 67, No. 1 (1985): 144–151; and G. S. Becker and N. Tomes, “Human Capital and the Rise and Fall of Families,” *Journal of Labor Economics* 4, No. 3, Part 2 (1986): S1–S39.

<sup>2</sup>G. Solon, “Biases in the Estimation of Intergenerational Earnings Correlations,” *Review of Economics and Statistics* 71, No. 1 (1989): 172–174; and G. Solon, “Intergenerational Income Mobility in the United States,” *American Economic Review* 82, No. 3 (1992): 393–408.

<sup>3</sup>Behrman and Taubman, “Intergenerational Earnings Mobility in the United States.”

<sup>4</sup>G. Solon, “Intergenerational Income Mobility in the United States.”

<sup>5</sup>See, for example, S. Haider and G. Solon, “Life-Cycle Variation in the Association between Current and Lifetime Earnings,” *American Economic Review* 96, No. 4 (2006): 1308–1320.

<sup>6</sup>R. Chetty, N. Hendren, P. Kline, and E. Saez, “Where Is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States,” *Quarterly Journal of Economics* 129, No. 4 (2014): 1553–1623.