"Intergenerational Transmission"
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Abstract:

Intergenerational transmission refers to the transfer of individual abilities, traits, behaviors and outcomes from parents to their children. This article analyzes the key theoretical and empirical issues in studies of intergenerational transmission of educational attainment, welfare receipt and fertility. Mechanisms that lead to intergenerational transmission of these outcomes are discussed in detail. The role of government policy in affecting intergenerational transmission is also considered.

Intergenerational transmission refers to the transfer of individual abilities, traits, behaviors, and outcomes from parents to their children. Economists have largely focused on the intergenerational transmission of educational attainment, earnings and income, wealth, fertility decisions, and welfare receipt. When intergenerational transmission is strong, children turn out much like their parents and social mobility is low.

Raw intergenerational correlations in education, earnings, teenage childbearing, and welfare receipt in the U.S. are sizeable. Correlations between parents' and children's educational attainment and earnings are both around 0.4. Daughters of teen or welfare mothers are nearly twice as likely to have a child when they are teenagers compared to daughters of older or non-welfare mothers. Mothers who grew up in a welfare family are four to six times more likely to receive welfare themselves than other mothers.

What gives rise to the intergenerational transmission of these outcomes? Parents may genetically pass on abilities, endowments, or preferences to their children that pre-dispose them to choose similar actions as they themselves chose. This can generate an intergenerational correlation in outcomes even if there is no actual causal effect of a parent's behavior or outcome on the child. However, parents' actions themselves may encourage their children to take similar actions. For example, parents' schooling choices may directly impact their children's decisions to stay in school. Intergenerational transmission incorporates both causal and non-causal channels.

Identifying the mechanisms that lead to the intergenerational transmission of education, earnings, fertility, or welfare receipt is central to understanding the role played by economic conditions or government policies in shaping those relationships. For example, if differences in earnings or welfare receipt primarily reflect differences in genetically endowed abilities, then policies to expand educational opportunities may have little effect on the intergenerational transmission of earnings and welfare. On the other hand, if ability primarily influences earnings by altering

individual access to or the financial rewards from schooling, then college subsidies for low-income families should weaken the link between parents' and their children's earnings and welfare receipt.

The rest of this article offers more detailed analyses of the key theoretical and empirical issues in studies of intergenerational transmission of educational attainment, welfare receipt, and fertility. See Solon's Palgrave article on 'intergenerational income mobility' for a discussion devoted to earnings and income transmission.

Educational Attainment

The economics literature has emphasized the role of skill and human capital development in analyzing intergenerational transmission. To begin, consider an overlapping-generations economy that generalizes the model of Becker and Tomes (1986) in which parents choose between investing in their children's human capital, their own current consumption, and borrowing or saving in the form of debts or bequests left for their children. Parents care about their own current consumption, but they also care about the consumption of their children and all future generations. While schooling is costly for parents and children, it raises human capital (or skill) levels, which increases subsequent earnings. Suppose that the production of a child's human capital, H_c, depends positively on parental human capital levels, H_p, the child's 'natural' ability, A_c, and the total years of child schooling, s_c, such that $H_c = h(H_p, A_c, s_c)$. Further, assume that both child ability and parental human capital raise the marginal productivity of schooling (i.e. $\partial^2 h/\partial s_c \partial H_p \geq 0$ and $\partial^2 h/\partial s_c \partial A_c \geq 0$). These assumptions imply that: (i) for any given level of child investment or schooling, an increase in parental education or child ability produces more child human capital, and (ii) more able children from more educated parents will tend to invest more in their skills through schooling. Finally, assume that the abilities of children and parents are positively (but not perfectly) correlated. That is, bright parents tend to have bright children while dull parents tend to have dull children, but there is, on average, regression to the mean.

If parents are free to leave any amount of bequests/debts to their children, optimal child schooling for each generation will be chosen to maximize discounted earnings less investment costs. In this case, schooling for any child, $s_c = \sigma(H_p, A_c, \pi)$, is an increasing function of his parents' human capital and his own ability, while it is decreasing in the price of schooling, π. Importantly, the optimal schooling level will not depend on parental earnings or wealth, although it may be correlated with both since they depend on parental abilities and human capital. In this simple model, a positive correlation in schooling between parents and children arises for two primary reasons: (1) parental human capital directly raises the productivity of child schooling, and (2) abilities are positively correlated across generations and ability raises the productivity of schooling. Economists interested in identifying the 'causal effect' of parental schooling on child schooling attempt to estimate effect (1). This reflects the amount child schooling would increase if policy interventions were to raise parental schooling (and all else were held constant).

Effect (2) depends on the intergenerational transmission of ability. To the extent that this is driven by genetics, it reflects the main role played by nature. If a child's human capital only

depended on his own ability and schooling (so $\partial h/\partial H_p = 0$ as assumed in Becker and Tomes, 1986), only effect (2) would matter, and the intergenerational transmission of educational attainment would be driven by the intergenerational transmission of ability. Even in this case, nurture plays a role to the extent that schooling and other family investments are choices made by families. When schools change their prices (or quality), schooling decisions and the intergenerational transmission of educational attainment are affected.

Imperfect credit markets with limited borrowing opportunities also weaken the link between ability and schooling for poor families. When poor parents cannot borrow against their own future earnings or leave debts for their children, they may be forced to compromise on both their own consumption and schooling for their children (see, e.g. Becker and Tomes, 1986, Caucutt and Lochner, 2006). Among constrained families, schooling choices depend on family income, I_p, such that $s_c = \sigma'(H_p, A_c, \pi, I_p)$ where $\partial\sigma'/\partial I_p \geq 0$. Poorly educated (and, consequently, low income) parents lucky enough to have bright children may not be able to afford the efficient amount of schooling for them. (This need not be true when parental human capital has a very strong effect on the marginal product of schooling; in this case, poorly educated parents may not want to invest much in their children even when they are bright.) This implies a strong intergenerational transmission of schooling among the least educated who cannot escape their misfortune. To the extent that more educated and wealthier parents can afford efficient investments in their children, their behavior is driven by the forces described earlier (i.e. $s_c = \sigma(H_p, A_c, \pi)$). That the most disadvantaged under-invest in their children (while the most advantaged do not) when borrowing opportunities are limited implies that policies designed to subsidize the schooling of poor children will help reduce economic inequality while improving aggregate efficiency.

Most researchers agree that the primary reason many college-age children from poor families do not attend college is that they are ill-prepared and not because they are unable to borrow for college. This raises the question: are these youth ill-prepared because their parents have been unable to borrow the resources needed to prepare them for college in the first place? Direct evidence is scant, but indirect evidence suggests that poor parents sometimes fail to make early educational investments in their children that have substantial long-run payoffs. Cunha, et al (2007), therefore, argue that policies promoting early investments (e.g. preschool) in children do not face the same equity-efficiency tradeoff that late investments (e.g. college or post-school training) do.

The intergenerational transmission of preferences (e.g. altruism, patience, or risk aversion) and other causal channels (e.g. schooling may stimulate intellectual curiosity that is passed on to children) may also play important roles in the intergenerational transmission of education. While Mulligan (1997) explores the implications of endogeneous altruism, most economists have not incorporated these channels into their theoretical models.

The empirical literature typically considers a linearized version of the schooling decision described earlier:

$$S_{ci} = \alpha S_{pi} + \beta A_{ci} + \gamma I_{pi} + X_i\delta + \varepsilon_i, \quad (1)$$

where X_i reflects variables that may affect the costs or benefits of schooling (e.g. parenting skills, neighborhood characteristics, school quality, or tuition prices) for child i. With ideal data, estimates from this equation inform us about the schooling choice function. Estimates of α tell us the direct effect of an increase in parental schooling, net of any effects parental schooling has on family income (or neighborhood and school characteristics included in X). To obtain the total effect of parental education ($\alpha_T = \alpha + \gamma\, \partial I_p/\partial S_p + \delta\, \partial X/\partial S_p$), one must incorporate its effects through family income and the X variables. These effects are typically referred to as causal effects, since they measure how much a change in parents' education causes children's education to change. Most empirical studies suggest that the difference between α and α_T is small. See Haveman and Wolfe (1995) or Behrman (1997) for surveys of standard multivariate regression estimates of equation (1).

Since data do not typically contain reliable measures of child ability, neighborhood and school peer quality, or parental child-rearing skills, most regression-based estimates of equation (1) are probably upward biased for α. Researchers have begun to exploit three alternative econometric techniques aimed at reducing or eliminating biases arising from these types of unobserved factors: comparisons of children born of twin mothers or fathers, studies of adopted children, and instrumental variable approaches.

Some researchers have estimated how schooling differences between cousins whose parents are identical twins depends on the educational differences between their twin parents. This approach assumes that schooling differences among twin mothers or fathers are random rather than the result of different abilities or environments—an assumption often questioned. If the effects of unmeasured ability and parenting skill differences are additively separable from the effects of parental schooling, within-twin-parent estimators remove the effects of genetic differences in parental ability (from the twin parent side of the family) as well as any variation in the twins' parenting skills owing to the similarity of their upbringing—two potential sources of bias. Twin-parent-based estimates generally imply an important role for unobserved ability and parenting skills in determining child schooling levels. Using recent U.S. data on the children of twins, Behrman and Rosenzweig (2002) find that within-twin-parent estimates of the effect of father's schooling are positive and statistically significant, while the estimated effect for mother's schooling is not. That is, differences in schooling between cousins with fathers that are twins are positively correlated with the difference between their fathers' schooling. For cousins with twin mothers, differences in child and differences in mothers' schooling are uncorrelated. (Controlling for differences in spouses' schooling or earnings has little effect on these conclusions.) In explaining the finding that mother's schooling does not affect child schooling, the authors argue that more educated mothers spend more time working and may, therefore, spend less time raising their children. However, this was not true thirty years ago in the U.S. (Leibowitz 1974) nor is it true today in rural India (Behrman, et al. 1999) where women work little outside the home. This shows that the economic environment plays an important role in determining intergenerational relationships.

A different approach estimates the effects of parents' schooling on adopted children. When the effects of nature and nurture are additively separable and adoptees are randomly assigned to adoptive parents, the estimated effects of adoptive parents' education on adoptees schooling eliminates any bias due to the genetic transmission of ability. Under these circumstances,

estimated effects from adoptees provide a measure of the role played by nurture. However, they need not reflect the causal effect of parental education if some unobserved parenting skills are correlated with (but not caused by) parents' educational attainment. Bjorklund, et al. (2006) use a unique data set from Sweden that contains educational attainment for adopted children and *both their biological and their adopting parents*. This enables them to regress adoptee schooling on the schooling of both biological parents, both adoptive parents, and even the interaction of biological and adoptive parents' schooling. While their results suggest important effects of biological and adoptive fathers' and biological mother's education on their children, evidence of the adoptive mother's role is mixed. Interestingly, they estimate a positive and significant interaction between biological and adoptive mothers' schooling, suggesting an important nature-nurture complementarity. This interaction raises questions about methods that rely on the assumption that genetic and environmental effects are additively separable (e.g. twin-parent studies or other adoptee studies that do not use data on both biological and adoptive parents).

Finally, a few recent studies use changes in compulsory schooling laws in the U.S. and Europe as instrumental variables for changes in parental schooling. The law changes largely affect the educational outcomes of parents at the low end of the distribution; thus, their findings measure the impacts of raising schooling among less-educated parents. Furthermore, the laws alter the population distribution of schooling, which may impact marriage markets. As such, they do not necessarily measure the effects of changing a single parent's schooling level. A Norwegian study (Black, et al, 2005) estimates little causal effect of parental schooling (except for the mother-son relationship) when using an increase in compulsory schooling as an instrument, but the effects are not very precisely estimated. By contrast, a U.S. study (Oreopoulos, Page and Stevens, 2006) finds significant effects of mother's and father's education on the probability a young child is behind a grade in school.

Summarizing, most researchers conclude that parental education has a causal effect on child education, albeit substantially smaller than raw correlations suggest. While a few recent studies comparing children with twin parents or focusing on adopted children suggest that changes in mother's education may have very small effects, instrumental variables studies do not confirm this pattern. Adoptee studies suggest that the educational outcomes of biological parents are important even when the child is raised by others. Thus, the genetic transmission of abilities and preferences plays an important role in intergenerational transmission. Bjorklund, et al. (2006) estimate an important interaction between nature and nurture that is often neglected in empirical analyses. Finally, even studies that estimate causal effects do not separately identify the mechanisms by which parents' schooling affects child schooling. We are still left wondering whether schooling changes the preferences or information of parents, or whether it changes the marginal productivity of investing in one's children.

Teenage and Nonmarital Fertility and Welfare Receipt

Studies of intergenerational fertility transmission have typically focused on non-marital and teenage births, as these are often associated with a wide range of negative outcomes for mothers and their children. Studies of intergenerational welfare receipt invariably discuss intergenerational patterns for education, earnings, and fertility as well. Economic theories of

fertility (e.g. Becker 1991) generally say little about intergenerational patterns in child-bearing and marital decisions. Formal economic models of intergenerational welfare transmission are also notably absent. Despite the lack of formal theory, social scientists have identified a number of factors that may affect the intergenerational transmission of fertility and welfare outcomes, including intergenerational correlations in cognitive ability, age of puberty, education, and earnings. Economists are most interested in causal channels, however. Studies of teenage and non-marital fertility often refer to parental role model effects and the impacts of early/non-marital childbearing on subsequent family structure and economic resources. Studies of intergenerational welfare patterns stress that parental welfare receipt may affect children's views about accepting public transfers, inform children about the welfare system, limit connections in and information about the labor market, and augment family resources.

Empirical researchers primarily aim to estimate the causal effects of parental teenage or out-of-wedlock childbearing and welfare receipt on daughters' choices; however, it is difficult to separate causal effects from other factors contributing to intergenerational correlations. Analyses typically employ multivariate regression techniques to control for measured family and environmental conditions, but concerns about unobserved heterogeneity plague most studies. Unmarried welfare mothers almost certainly differ from married mothers not on welfare, even when current family income and other observable characteristics are the same.

Kahn and Anderson (1992) estimate very different roles of teen motherhood on the fertility decisions of black and white children. They find that teen motherhood largely affects white daughters' marital teen childbearing whereas black daughters' non-marital teen childbearing is most affected. Differences in family background drive much of the intergenerational correlation of teen motherhood for whites but not blacks. Biological links related to the age of puberty play no role in teen fertility for either race. Two more recent studies (Haveman, et al. 2001, Wolfe, et al. 2001) separate the effects of mother's age and her marital status at childbirth on the probability that a daughter has an out-of-wedlock birth as a teenager. The first study finds that mother's age is the more important factor, while the second concludes that marital status is more important. There is no consensus in the literature as to the relative importance of mother's age or marital status at the time of birth on her daughter's subsequent fertility decisions.

Most empirical studies of intergenerational welfare receipt control for parental income levels (or welfare eligibility), attempting to estimate how parental welfare acceptance itself affects daughters' future welfare receipt. A few studies use instrumental variables (typically, local unemployment rates or state welfare benefit levels) to further account for unobserved heterogeneity in family tastes or productivity levels (e.g. Levine and Zimmerman 1996, Pepper 2000). Gottschalk (1996) exploits the timing of parental welfare receipt (while the daughter lives at home and afterwards) in an attempt to control for unobserved permanent family characteristics. These studies generally conclude that parental welfare receipt increases the daughter's subsequent welfare receipt and child-bearing, but much (or even most) of the raw intergenerational correlation is attributed to the correlation in both income and unobserved heterogeneity. Recent studies suggest that there is a small positive causal effect of family income on children's educational outcomes (e.g. see Dahl and Lochner 2006); however, most intergenerational welfare studies find that income-enhancing effects from parental welfare

payments do not reduce the probability of daughter's welfare receipt enough to offset other direct effects on daughters' tastes or information.

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