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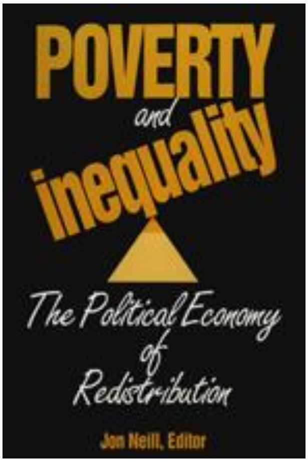

From Parent to Child: Intergenerational Relations and Intrahousehold Allocations

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From Parent to Child

Intergenerational Relations and Intrahousehold Allocations

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Perceptions are widespread that in the United States there has been increasing inequality and persistent, or perhaps increasing, poverty in recent years. The family is viewed as critical in the determination of individuals' income generation capacities, particularly through human resource investments in schooling, but also through the home environment and other channels. In this chapter, I address two sets of questions that are related to these perceptions.

First, what is the extent of intergenerational mobility? How associated across generations is income? There have long been different views on the answers to these questions. On the one hand, there are perceptions of many observers dating at least back to de Tocqueville that the United States is an open society in which mobility is relatively great, with reinforcement by the Horatio Alger stories of advancement from the mailroom to the board room and many anecdotes about "rags to riches" in one generation (and sometimes back to rags in another). On the other hand, there are allegations that often children are "chips off the old block," "biology is destiny," and "the acorn falls close to the trunk." There is an intergenerational transfer of economic status, with poor parents having poor children, while the children of the rich are born "with a silver spoon in their mouths," and according to Herrnstein and Murray in *The Bell Curve* (1994), the heritability of intelligence and perhaps other traits further limits intergenerational mobility.

Second, what is the nature of intrafamily allocations, particularly of schooling, among children? Are such allocations in response to genetic endowments? Do they tend to reinforce those endowments so that better-endowed children receive more, thus increasing earnings inequality? Or do they compensate for such endowments? If schooling allocations reinforce such endowments, do financial transfers from parents to children compensate for the earnings differentials? In making these allocations do parents weigh all children equally, or do they prefer some children identified, perhaps, by gender or birth order?

The objective of this chapter is to consider some elements of how social scientists describe and analyze phenomena related to these two sets of questions. A central point is that it is difficult to identify causality from associations in data that reflect behavioral choices made in part in response to factors that are not observed in the data by analysts. A key example is provided by child genetic endowments related to such attributes as ability, personality, persistence, and motivation. If parents make allocations of schooling in part in response to such endowments and these endowments also have direct effects on earnings, then the association between schooling and earnings does not reflect simply the impact of schooling on earnings, but also the effects of the unobserved endowments on earnings to the extent that they are correlated with schooling. Our grandmothers know that Mary did well in school because she was smart and diligent, and that these characteristics—in addition to schooling—served her well in the job market. Therefore, to estimate the impact of schooling per se on Mary's earnings there would have to be control for her smartness and diligence, control that simple associations do not provide.

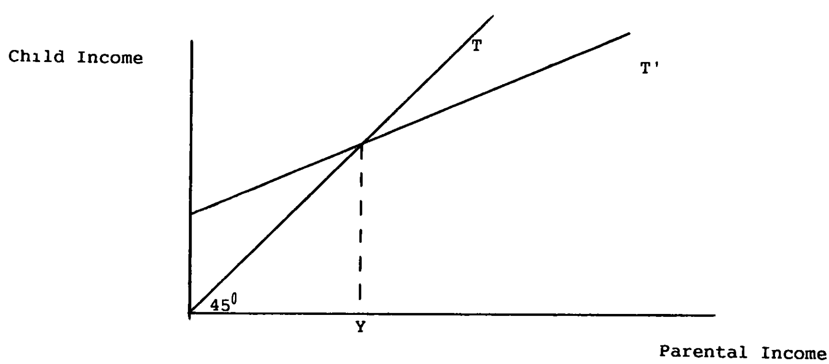
Describing Intergenerational Associations

How strong are intergenerational associations? As noted, popular characterizations range considerably, from very low ones implied by Horatio Alger stories and other "rages to riches" fables, to very high ones implied by the "intergenerational culture of poverty" and *The Bell Curve* characterizations. Two major means of describing such associations are through correlation coefficients and through heritability estimates.

Intergenerational correlation exists when some characteristic of the parents is a determinant of that characteristic for their children. For instance, it could be that the income of a child is dependent on that of its parents. If so, a person's economic status is not entirely the product of his or her abilities and choices; those of his parents also impact on the child's income. If a positive relationship between the incomes of parents and children exists, then the children of low-income parents would, on average, be poorer than the children of high-income parents. But while such a relationship may inhibit social mobility, it does not imply a class society, or that economic status will be passed on from generation to generation.

To illustrate, suppose that the line labeled T in figure 1, the 45° line, shows the relationship between the income of parents and children, *ceteris paribus*. Then there is absolutely no social mobility. The children's income will always equal the parents' income. On the other hand, suppose the T′ line indicates how a child's income changes as the income of the parents changes. In this case, though the children of high/low income parents tend to have high/low incomes, over successive generations a family's income converges to Y. In this society, there is regression toward the mean. However, this process may not be particularly rapid. For example, if Y is $40,000 and the slope of T′ is 0.8, it takes eight generations for a family's income to increase from $10,000 to $34,500.

Figure 1. Parental-Child Income Positively Correlated



What is the evidence regarding the extent of intergenerational parent-child income correlations in the United States? There are relatively few estimates because not many data sets have information on the incomes of two generations (see estimates and surveys in Becker and

Tomes 1986 and Behrman and Taubman 1985). Until recently, the available studies were all based on one year of data. These studies indicated a correlation of about 0.2, that for every additional dollar of parental income, child income tended to increase by about 20 cents. This suggests a positive association between parental and family income, but not an overwhelming one. Such estimates suggest considerable intergenerational mobility, with many Horatio Algers and reverse Horatio Algers.

One problem with these estimates, however, is that one year of reported income data may not represent very well income over longer periods of time. There may be reporting errors as well as fluctuations in incomes from year to year because of fluctuations in the economy, the luck of individuals, or choices that people make that affect their incomes. Such fluctuations mean that estimates based on one year are likely to understate the extent of the intergenerational income associations over longer periods. It would seem then that the associations over periods longer than a year are what is of interest in describing intergenerational mobility. The question of primary interest is whether children who have relatively high-income parents during the children's childhood years are likely to have relatively high income themselves over their adult years, not for any particular year.

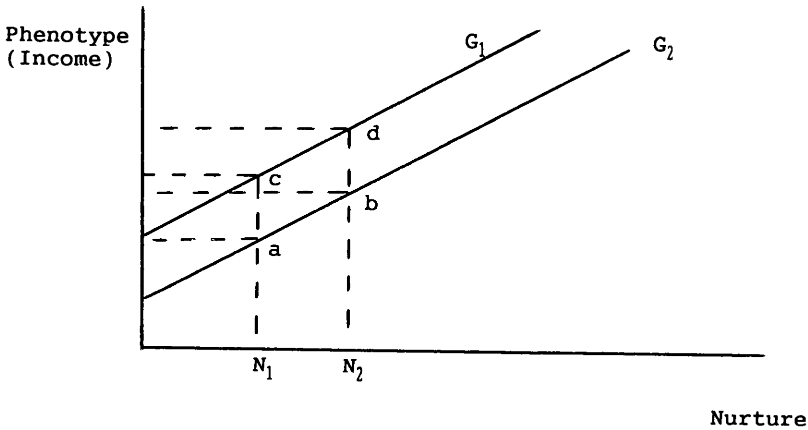
Recently data sets have been available in which income information on parents and on their adult children has been collected for a number of years. These data permit the exploration of the possibility that previous studies overestimated intergenerational mobility because they used only one year of income data. Estimates made from these data find that using up to ten years of income data makes a considerable difference in the estimated intergenerational correlation, and in fact, cause it to roughly double to about 0.4, with the implication that for every additional dollar of parental income child income is about 40 cents higher (Behrman and Taubman 1990; Solon 1992; Zimmermann 1992). Thus, controlling for something as simple as the fluctuations in income from year to year makes a considerable difference in the estimates of intergenerational mobility and leads to estimates of considerably less mobility and considerably stronger familial associations.

Heritability estimates indicate the proportion of the total variance in some observed outcome (phenotype) such as income that is associated with the variance in genetic endowments (genotype). Standard estimates assume that the phenotype is related to the genotype and to other determinants in a simple linear relation in which the genetic effects and the other relevant factors each can be summarized in one indicator, with no interaction between them. Such estimates are common in the literature that attempts to identify the importance of "nature" (genetic endowments) versus "nurture" (other influences on the phenotype, including behavioral choices such as schooling investments). Heritability estimates can range in value from 0 to 1, with the variance in genotype a larger share of the variance in phenotype the higher the estimate.

Heritability estimates usually are obtained from data on phenotype of twins by using the fact that identical twins have identical genetic endowments but fraternal twins have differing genetic endowments. Therefore, if genetic endowments are important, phenotypes are more similar for identical twins than for fraternal twins. For example, for the National Academy of Science-National Research Council sample of white male twins born in the United States between 1917 and 1927 who subsequently served in the military, the correlation in earnings is 0.56 for identical twins and 0.32 for fraternal twins, which implies a heritability estimate of 0.48.[1] That is, the ratio of the variation in earnings due to variations in genotypes is about half of the total variation in earnings. In *The Bell Curve*, Herrnstein and Murray (1994) claim that most measures of heritability for IQ in the United States recently tend to be in the range of 0.4 to 0.8. Estimates of these magnitudes often have been interpreted to mean that nature (genotypes) is quite important, leaving little scope for the impact of nurture through, for example, schooling. Herrnstein and Murray give such an interpretation.

But changes in nurture may have large impacts even if heritability estimates are high. Consider, for illustration, the situation in which there are only two genotypes (G_1 and G_2), each of which accounts for half of the population. Both phenotypes respond to "nurture" as in figure 2. In this figure, income is measured on the vertical axis and nurture is measured on the horizontal axis. Both genotypes respond positively to nurture, so the income lines for each of the genotypes is upward-sloping. But genotype 2 is assumed to have greater genetic endowments, so the line for this genotype is higher than for genotype 1. Assume further that half of the members of each genotype are exposed to nurture level 1 and half are exposed to nurture level 2. Therefore, one quarter of the population will have the income-genotype-nurture combinations indicated by each of the points marked a, b, c, and d. Then, as figure 2 is drawn, the heritability estimate will be high. Most of the observed variation in income is due to the difference between the two genotypes.

Figure 2. High Heritability But Still Large Impact of Changing "Nurture"



But this does *not* mean that nurture has no effect. To the contrary, increasing nurture—say, by increasing schooling—has a positive effect on income. The high value of heritability only reflects the relatively small difference between nurture levels 1 and 2. Indeed, the heritability estimate would be much smaller if the same two genotypes were divided equally between nurture levels 1 and 3 instead of between 1 and 2. The basic point is that to evaluate the impact of nurture through schools or other means, the slopes of the lines are what are of interest. This impact may be large whether the heritability estimate is large or small. The small estimate for heritability does not tell us what would happen if nurture were to be changed. But often the literature on "nature versus nurture" is not clear on this critical point. For example, Herrnstein and Murray (1994) suggest that because heritability estimates are high, schooling and other forms of nurture are not very effective. As is illustrated in figure 2, this is not a logical deduction.

What Underlies Family Allocations among Children?

The descriptions provided by correlations and heritability estimates summarized earlier are consistent with families being important in determining children's economic experiences as adults. This raises questions about how families allocate resources among children. For example, do families allocate human resources, such as schooling, in response to children's genetic endowments? Do they allocate resources so as to reinforce or to compensate for differences in genetic endowments? Do they have greater concern about some children—say, identified by sex or birth order—than others?

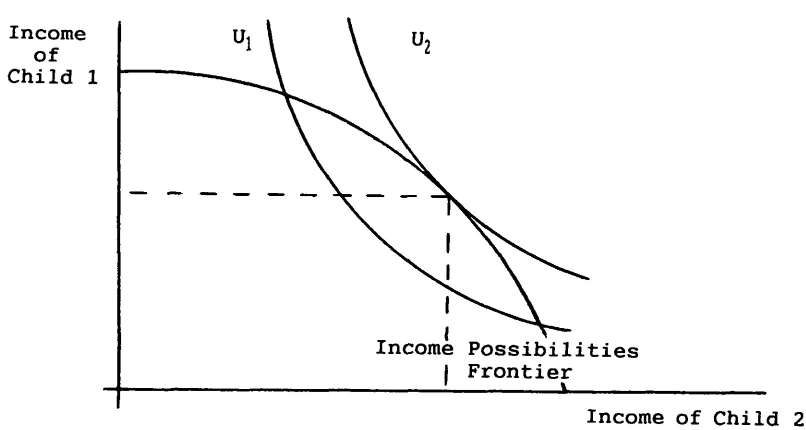
Economists have developed different models of intrahousehold allocations that provide a framework for thinking about such questions. Such frameworks are useful because it is difficult to analyze these (and other) behaviors that in part are in response to variables not observable by social scientists but that affect the decisions being made—in this case, genetic endowments of children. Because of such unobservable variables, one cannot simply look at associations (correlations) among observed variables in order to answer questions such as those posed above. I consider two models of intrahousehold allocations below in which parents make the decisions regarding allocations of human resources among their children.[2] Before turning to these models, however, I introduce some basic elements common to the models.

In these models, parents are assumed to maximize their satisfaction by deciding how much to invest in the schooling of each of their children. Parents are interested in their own consumption, but in order to sharpen considerations about how they allocate resources among their children, I assume that the allocation of resources among the children is separable from the parents' decision about how they themselves consume. I also assume that the parents' satisfaction increases as any child's income rises, *ceteris paribus*.

As in any economic model of household choice, the incomes that parents "choose" for their children depend on the exact nature of parental preferences and a budget constraint—in this case, the income possibilities frontier, those combinations of incomes that are attainable by the children. The income possibilities frontier would presumably have the appearance of the textbook production possibilities frontier; its precise curvature and position would depend on the endowments of each child, the resources that the parents devote to their children, the prices of schooling, and so forth.

Figure 3 shows how the parents' preferences and the income possibilities frontier interact to determine each child's income. Two characteristics of equal-satisfaction curves are of interest. First, there is the "distribution-total income" tradeoff, which relates to the curvature of the equal-satisfaction curves. If equal-satisfaction curves are straight lines, parents are only concerned with the total income of their children. The distribution of this income among the children is unimportant to the parents. In contrast, if these curves are rectangular (L-shaped), parental satisfaction increases only if the incomes of both children increase. In this case, the primary concern is with how income is distributed between children. If these curves have the textbook curvature of indifference curves, both total income and its distribution are of concern to parents.

Figure 3. Constrained Maximization of Parental Satisfaction Regarding Child Income



A second characteristic of these curves that merits attention is their symmetry, or lack thereof. These curves are symmetric if switching the incomes of two children has no effect on the satisfaction of their parents. If equal-satisfaction curves do not have this property, parents care which child receives the higher income when some total income is distributed between the two children. If equal-satisfaction curves are symmetric and children have equal endowments, parents will invest in the education of their children and make financial transfer so as to produce equal incomes for their children. However, if either of these conditions do not hold, income equality will not necessarily obtain.

Currently, the wealth model (Becker and Tomes 1976) is the paradigm that economists most commonly use to analyze intrafamily allocation of resources. In the wealth model, parents are concerned only with the total wealth of each child, not with its composition of sources. Therefore, they do not distinguish between earned income and unearned income. If parents both invest in the schooling of their children and transfer financial and physical assets to their children, they do so in order to maximize the total wealth of the children. This of course requires that parents increase their investment in the education of a child as long as the marginal rate of return to that investment exceeds the rate of return on financial assets.

In the wealth model, as originally presented by Becker and Tomes, it is assumed that parents provide enough resources to their children that all children receive financial transfers in addition to wealth-maximizing investments in schooling. Parents invest in the human capital of each child until the marginal rate of return to education is driven down to the rate of return on financial assets; any additional resources provided to children take the form of transfers such as gifts and bequests. Parents with more than one child and equal concern for all their children (symmetric equal-satisfaction curves) use transfers to offset fully inequalities in their children's earnings. Hence, the wealth model with equal concern predicts a pattern of unequal earnings, unequal transfers, and equal wealth. But parents' investments in their children's human capital are socially efficient provided there are no externalities and well-functioning capital markets.

However, the assumption that parents are rich enough and altruistic enough that they provide all of their children the wealth-maximizing level of schooling is critical (Behrman, Pollak, and Taubman 1995). If parents do not allocate "enough" resources to their children, then some children receive less than the socially efficient level of human capital, and those children receive zero transfer. In this case, (a) schooling investments are not efficient, and (b) even if parents have equal concern, the incomes of the children are not equalized because the child with greater endowments receives greater schooling investments and earns greater income, but transfers are not used to equalize total income between the children.

In contrast to Becker and Tomes, the separable earnings transfer (SET) model of Behrman, Pollak, and Taubman (1982) assumes that parents care differently about income that their children earn from working than about income their children receive from clipping bond coupons. So, they consider the distribution of earnings among their children separably from the distribution of nonearnings income.

The SET model has two important different implications from those of the wealth model with substantial resources devoted to children as originally presented by Becker and Tomes. First, the SET model does not imply that human capital investments are efficient, even with well-functioning capital markets and no externalities. If parents value earnings income more than nonearnings income, for example, they may invest more in the schooling of a child than wealth-maximizing. Second, it does not imply that parents with equal concern for their children attempt to offset fully differences in earnings by allocating transfers unequally. The consideration of earnings separably from transfers in fact means that there is no relation between earnings gaps between siblings and patterns of transfers received from parents. Therefore, rather than equal income among children in the same family with different endowments, the SET model generally implies unequal income. While these are important differences in comparison with the Becker and Tomes original formulation of the wealth model, the wealth model implications when parents do not devote enough resources to their children to provide positive transfers to each are similar (though not identical since the SET model results are consistent with positive transfers).

Data limitations make it difficult to estimate critical parameters of either of these models directly or to distinguish empirically between the wealth model and the SET model. Some critical variables simply are not observable in any data set, namely endowments and marginal rates of return to schooling for individuals. Other data are only partially observed. For example, to assess these models it would be desirable to have lifetime transfers (inter vivos and bequests) received by all children in a family from their parents and lifetime schooling investments and earnings. But at best data sets provide a subset of this information. Nevertheless, by using special data on adult siblings and in some cases specific assumptions about the underlying relations, some progress has been made in estimating critical dimensions of these intrahousehold allocation models. I discuss three examples.

First, conditional on particular functional forms for parental levels of satisfaction and for the impact of genetic endowments and schooling on earnings, estimates of the SET model provide insight into the total income-distribution tradeoff and unequal concern in the parental objective function underlying intrahousehold allocations (Behrman, Pollak and Taubman 1982, 1986; Behrman and Taubman 1986; Behrman 1988a, 1988b). For the United States, these estimates indicate that investments in schooling are not determined solely by concerns about maximizing total income of the children: distribution also weighs heavily in intrafamily allocations. For rural India, a much poorer society, similar results have been found for the allocation of nutrients among children during the surplus season when food is relatively abundant, but during the lean season when food is scarce, allocation is determined almost entirely by productivity concerns.

Parents might provide unequal education to daughters and sons because their preferences favor children of one gender or because they know that the labor market rewards unequally women and men with the same ability and the same human capital. Estimates of the SET model show that the preferences of parents in the United States do not favor sons over daughters; indeed, if marriage market as well as labor market returns are incorporated into the analysis, the empirical evidence suggests that parents' preferences give slightly more weight to daughters than to sons. These results contrast with the finding that there is unequal concern favoring sons in the lean season in rural India.

Birth-order effects have been widely discussed in the biological, psychological, and popular literatures. Lower birth-order children (i.e., older children) may benefit from developing in more adult-oriented environments and from teaching their younger siblings. Higher birth-order children, on the other hand, may benefit from having more experienced parents. Casual observation (perhaps primarily by older siblings) suggests that the youngest child is often spoiled by excessive parental attention and indulgence. Finally, birth order may be related to health because of the relationship between birth order and mother's age, with less healthy children borne by very young and very old mothers.

Birth order may affect intrafamily allocation through preferences or through constraints. On the preference side, parents may fail to exhibit equal concern and instead favor the eldest or youngest child. On the constraint side, parents with many children may allocate less to each child, and borrowing constraints may vary over the parents' life cycle, differentially affecting children of different birth orders. Estimates of the SET model find that intrafamily allocations favor children of lower birth order both for the United States and for rural Indian in the lean season. For the United States, borrowing constraints are part of the explanation.

Second, an implication of the wealth model with high resources given to children and equal concern is that differences in income yielded by transfers of financial and physical assets given to children offset differences in labor market earnings of children in the same family. The data, however, show that for most households the absolute magnitudes of gifts and bequests are insufficient to offset fully earnings differentials among siblings (Behrman, Pollak, and Taubman 1995; Menchik 1979, 1980, 1988; Wilhelm 1991). Moreover, the dominant pattern for bequests—equal or almost equal bequests for all children in the same family—is not consistent with bequests offsetting earnings differentials among children in the same family. Differences in inter vivos transfers to children do compensate a little for differences in their earnings, but offset very little of these differences. Finally, for families for which the resources devoted to children are not sufficient that all children receive transfers, the wealth model still implies that one child may receive transfers. But available data on bequests indicates that it is rare that one but only one child receives bequests. Thus, all in all, the data on transfers to children, though fragmentary, does not provide much support for the wealth model. They are consistent, however, with the SET model.

Third, there are recent estimates, based on minimal assumptions, of whether intrahousehold allocations of schooling investments are in response to endowments and, if so, whether they reinforce endowment differentials or compensate for endowment differentials among siblings. These estimates utilize data on adult identical and, in some cases, fraternal twins.[3] The essence of the procedures used to obtain these estimates is now illustrated with reference to the following relations.

Assume that earnings of the ith child (E_1) in a family depends linearly on that child's schooling (S_1), an unobserved family earnings endowment that is common to all children in the family (f), an unobserved child-specific endowment that distinguishes that child from the common family endowment (a_1), and a random error term (e_1) due to measurement error in earnings. Then for two children in a family, the earnings relations are:[4]

$$(1)\ E_1 = b\, S_1 + f + a_1 + e_1$$

and

$$(2)\ E_2 = b\, S_2 + f + a_2 + e_2$$

where b is the true impact of schooling. Assume further that there are linear schooling allocation rules that indicate how parents allocate schooling to two children depending on the unobserved endowments of each (a_1, a_2), some common family characteristics including parental wealth and education and the common family endowments (X), and random disturbance terms (u_1 and u_2, respectively):

$$(3)\ S_1 = \alpha_1\ a_1 + \alpha_2\ a_2 + \beta X + u_1$$

and

$$(4)\ S_2 = \alpha_1\ a_2 + \alpha_2\ a_1 + \beta X + u_2$$

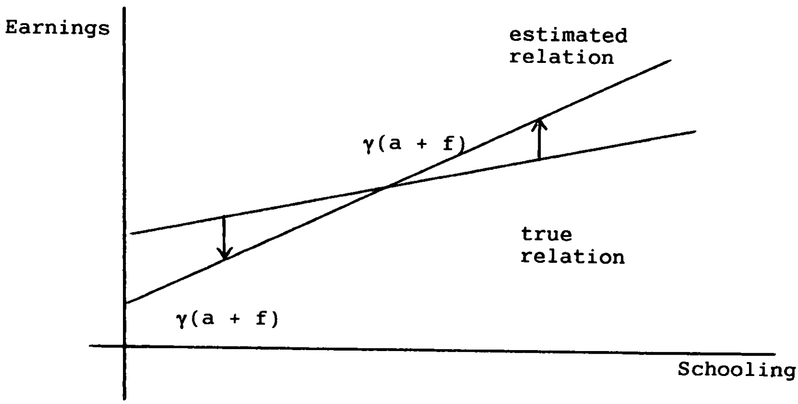
where α_1 is the parental schooling allocation response to the endowment of the child being invested in α_2 is the parental schooling allocation response to the endowment of the other child, and β is the parental schooling allocation response common family characteristics. If a_1 is positive and α_2 is negative, parents reinforce endowment differentials by investing more in the schooling of the child with greater endowments, thus increasing the inequality of the distribution of earnings. If

α_1 is negative and α_2 is positive, parents compensate for endowment differentials by investing more in the schooling of the child with lesser endowments, thus reducing inequality in the distribution of earnings.

The critical parameters in neither the earnings relations nor the schooling allocation relations can be estimated consistently with data on individuals or even on siblings. To see why, consider what happens if one tries to estimate the schooling effect on earnings (i.e., the parameter b) from relation (1) and observations on schooling and earnings for a number of individuals. The problem is that the schooling allocation rule in relation (3) means that schooling is correlated with family (f, which is in X) and individual-specific endowments (a_1). Those who are more schooled are likely to have greater endowments, so the usual procedure of simply associating individual earnings with individual schooling does *not* indicate the effect of schooling alone on earnings.

Figure 4 illustrates this problem. The solid line gives the true relation between earnings and schooling, with a slope b. For individuals, however, data observations in general are not on this true line because of the random disturbance term (e_1) and because of the unobserved endowments ($f + a_1$). The random disturbance term takes on values that are independent of schooling, so it does not cause the estimated slope of the line to shift. However, if those with more ability tend to have more schooling, the unobserved endowments are likely to be larger for those with more schooling. Figure 4 illustrates the impact of endowments that deviate positively from the average at high schooling levels and negatively from the average at low schooling levels (with γ reflecting the relation of the unobserved endowments with schooling) and how they twist the estimated earnings-schooling relation if they are not controlled in the estimation. If there is not control for such unobserved endowments, what is estimated by looking at the association between earnings and schooling is not the slope of the true relation, but the slope of the dashed line, which reflects in part the effects of the endowments in addition to the effects of schooling. Thus, the usual procedure of associating schooling with earnings without control for endowments might overstate substantially the impact of schooling on earnings and other outcomes.

Figure 4. True and Estimated Impact of Schooling on Earnings If Schooling Allocated in Response to Endowments



How might endowments be controlled in order to obtain better estimates of the impact of schooling on earnings? One possibility would be to follow the lead of the experimental sciences and randomly assign schooling rather than letting families decide on schooling. This would eliminate the estimation problem caused by schooling being allocated in response to endowments, but in most societies would be very difficult to do. A second possibility is to control for endowments using proxies such as IQ test scores. If endowments can be controlled completely through such observed measures, a consistent estimate of the true schooling effects can be obtained. But it is not clear that it is possible to measure all aspects of endowments. Moreover, some of the observed indicators that have been proposed to be used to control for endowments, such as IQ scores, may represent not only endowments but also dimensions of behavior including treatment at home and schooling.

A third possibility is to use data on identical twins to estimate the difference between relations (1) and (2):

$$(5)\ E_1 - E_2 = b\,(S_1 - S_2) + (f - F) + (a_1 - a_2) + (e_1 - e_2).$$

The effects of the family components of endowments disappear in such a relation. For identical twins (and only for identical twins) there are only common endowments (not individual-specific endowments), so estimation of relation (5) eliminates biases due to endowments.[5] Early estimates using this procedure indicate that the true impact of schooling on earnings is only about a third as large suggested by associations that do not control for endowments (Behrman and Taubman 1976; Behrman, Hrubec, Taubman, and Wales 1980).

But this procedure exacerbates another possible estimation problem noted earlier with regard to intergenerational correlations: measurement error. Random measurement error in a right-side variable in a relation such as (1) causes the coefficient estimate of that variable to be biased toward zero. If the schooling measure used is noisy due to measurement error, in other words, the true impact of schooling on earnings is partially disguised and underestimated. Differencing between two schooling measures as in relation (5) if each is contaminated by noise exacerbates the bias towards zero due to measurement error. A series of recent studies has applied the twins estimator in relation (5) with control for measurement error (Ashenfelter and Krueger 1994; Behrman, Rosenzweig and Taubman 1994, 1996). These studies all find that control for measurement error reduces the apparent biases in the standard studies due to failure to control for unobserved endowments. But for four of the five twins samples used, the estimates still indicate that there are significant upward biases in the standard estimates of the impact of schooling on earnings because of the failure to control for endowments. For some of the U.S. samples, moreover, the proportion of the variance in earnings due to such endowments is considerable: 27 percent of the total for men and 7 percent of the total for women due in individual-specific endowment variations within families (plus another 16 percent for women due to variability in family endowments) in the studies in Behrman, Rosenzweig and Taubman (1994, 1996).

Most of these studies, thus, imply that intrahousehold allocations of schooling are in response to endowments. But estimation of relation (5) alone with identical twins cannot indicate whether, if endowments differ among children, such allocations reinforce or compensate for such differences. Two of these recent twins studies (Behrman, Rosenzweig and Taubman 1994, 1996), however, develop a procedure for estimating whether there is reinforcement or compensation in the schooling allocation rules by using both identical and fraternal twins and by estimating together with relation (5) the difference in the school allocations rules (obtained by subtracting relation (4) from relation (3):

(6) $S_1 - S_2 = (\alpha_1 - \alpha_2)(a_1 - a_2) + (u_1 - u_2)$.

Intuitively, their procedure is equivalent to obtaining a consistent estimate of the parameter b from estimating relation (5) with identical twins, using this parameter to obtain an estimate of $(a_1 - a_2)$ by estimating relation (5) for fraternal twins, and then using this estimate of $(a_1 - a_2)$ to estimate relation (6) for fraternal twins and thus obtain an estimate of $(\alpha_1 - \alpha_2)$. If the estimate of $(\alpha_1 - \alpha_2)$ is positive, parents invest in schooling of their children so as to reinforce endowment differentials and increase income inequalities (and vice versa if $(\alpha_1 - \alpha_2)$ is negative). The estimates indicate that there is parental reinforcement in that children with greater endowments have greater schooling and more resource-intensive (higher quality) schooling. For men, for example, these estimates imply that positive reinforcement of endowments by intrahousehold allocations increases by about 80 percent absolute earnings differentials that emanate from preschool individual-specific endowment differentials.

Conclusions

Family background may play an important role in determining the distribution of income and who is rich and who is poor. Estimates of intergenerational correlations and of heritability are consistent with a major role of family background in determining individuals' economic success. With control for measurement error in earnings, the U.S. intergenerational experience seems characterized by many more individuals born into a "culture of poverty" or "with a silver spoon in their mouths" than by Horatio Alger "rags to riches" (or reverse Horatio Alger "riches to rags") stories. But it is important to remember that correlation or heritability descriptions of limited intergenerational mobility in themselves do not provide direct information about the effectiveness of schooling and other means for affecting economic outcomes. Though this point is often misunderstood, even if heritability estimates are high, schooling and other measures may be quite effective in altering economic outcomes.

The high association for economic outcomes across generations, nevertheless, suggests that what happens within households may have important implications for children's economic alternatives. Models have been developed of intrahousehold allocations of schooling and other human resource investments among children in the presence of unobserved (by social scientists but observed by the parents) heterogenous endowments of the children. The predominant model of intrahousehold allocations, the wealth model, suggests that parents with equal concern who allocate enough resources to their children will (a) invest in the schooling of their children at socially efficient levels if there are not market imperfections, and (b) provide transfers of assets the income from which will offset earnings differentials among their children. An alternative, the Separable Earnings Transfer (SET) model, (a) suggests that even with no market imperfections parents will not necessarily invest in the schooling of their children at socially optimal levels, and (b) posits that the pattern of earnings among these children (resulting from their endowments and schooling) is not related to the pattern of parental resource transfers among these children.

Empirical exploration of these intrahousehold models and their implications is difficult because of data limitations both regarding child endowments and regarding the lifetime economic interactions between children and their parents. But progress has been made with special data, such as data on adult siblings including twins, their economic status, and their economic interactions with their parents. Empirical explorations to date suggest some tentative conclusions. Transfers to children do not compensate for earnings differentials as posited in the wealth model with equal concern and sufficient parental resources devoted to children, so earnings differentials induced by intrahousehold allocations among children of schooling carry over to total income differentials. Parental allocations of human resources among their children in the United States tend to reflect some concern about distribution among the children rather than just maximizing total income of the children, with some unequal concern favoring those of lower birth order (though not according to gender). In contrast, in the much poorer society of rural India, there is much less concern about distribution and there is unequal concern favoring sons when resources are tightest (as well as unequal concern favoring low birth order children). But still, in the United States, parents on net reinforce endowment differentials by investing more in the schooling of better-endowed children in a manner that almost doubles the impact of within-family endowment differentials on earnings. Thus, endowment differentials among children in the same families and intrahousehold allocations in response to such endowments play an important role in increasing earnings and income inequalities in the United States; the within-family endowment differentials alone account for a quarter of the variation of ln earnings for males, which is reinforced by schooling allocations to account for over two-fifths of the total variation in earnings. The importance of unobserved endowments in intrahousehold allocations, finally, reinforces the importance of considering what determines schooling in attempts to evaluate the impact of schooling on economic and other outcomes in order to attain estimates of the effects of schooling per se that are not contaminated by effects of unobserved abilities, motivations, and family connections.

NOTES

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1 It can be shown that heritability as defined above is equal to twice the difference in the correlation for identical versus fraternal twins

2 In these two models, parents make the active decision and the children are passive In other models, the children may attempt to actively manipulate the outcomes to their advantage (e g , Bernheim, Shleifer, and Summers 1985, Pollak 1988) Parents also may have unified objectives or may bargain over various allocations (see survey in Behrman 1995) For simplicity, I limit my attention here to models with passive children and with parents who have unified objectives

3 Some might question whether families with twins are so different from other families that one cannot learn much of general value from studying families with twins. But the procedures that are used to study within-family allocations to twins effectively control for the family effects (f and X below) that might reflect differences in families that have twins from other families

4. I limit this presentation to the two-child family for simplicity, but the basic points hold if there are more children in the family

5. For any siblings, not just identical twins, the common family component is controlled with such estimates It might appear that it is better to control for that common component with sibling data than to use individual data But that is not necessarily true The bias may be greater with sibling estimates due to the difference in individual-specific endowments than in individual estimates (Griliches 1979)

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