The Determinants of Children's Attainments: A Review of Methods and Findings

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I. Introduction

THE LEVEL of the nation's investment in children is enormous. Government expenditures on elementary, secondary, and postsecondary schooling alone totaled about $372 billion in 1991, about 6.6 percent of GNP (U.S. Bureau of the Census 1992, Table 211). In addition, hundreds of billions of dollars are spent for housing, feeding, and clothing children, for transporting them, for providing nonparental care services, and for assuring provision of health care services. Perhaps the largest of all costs is the implicit value of the time that parents spend nurturing, monitoring, teaching, and caring for their children.

Table 1 presents a rough—and lower-bound—estimate of the annual social investment in the 66.5 million American children (ages 0–18), who in 1992 com-prised about 27 percent of the population. Our calculations distinguish the investments made by the public sector from those made by parents and other individuals. We estimate that annual expenditures on children total about $898 billion, nearly 15 percent of GDP. The largest component of the private cost of children is the direct expenditure of parents. Another important component of parental costs is the time spent by parents who forgo either work or leisure time in caring for children in the home.[1]

[1] We assume that the total time that a mother spends in either work or child care is 2080 hours per year. If she works full time, year round, child care time is taken to be zero. The child care time for a nonworking mother is taken to be the time worked by women with her educational level but without children. This procedure presumes that, because of children, the mother sacrifices this counterfactual level of work time. The child care time for a mother who works part time, year round (taken to be 1040 hours) (note continued on p. 1831)

TABLE 1
Expenditures on Children

		1992 Dollars (in millions)
By Parents		$616,599
Direct costs[a] ($7,579 per child)	$504,003	
Food	20.7%	
Housing	14.4%	
Transportation	22.6%	
Other (recreation, health care, clothing, etc.) 42.3%		
Indirect costs (opportunity cost of mother's child care time; $1,693 per child)[b]	112,596	
By Government		$333,473
Elementary and secondary education[c]	235,560	
Federal	5.8%	
State	45.3%	
Local	40.5%	
Private and others	8.4%	
Social services program[d]		
Early childhood development[e]	3,085	
Foster care	2,039	
Delinquency, abuse, and violence services[f]	165	
Child welfare	277	
Child support enforcement	1,745	
Summer youth employment[c]	761	
Other	35	
Legal system		
Crimes by children[c]	287	
Crimes against children[d] (includes juvenile justice and missing programs)	79	
Housing[c]		
Lower-income housing assistance	5,183	
Low-rent public housing	1,920	
Federal food programs		
Food stamps[d]	12,357	
National school lunch program[c]	3,492	
School breakfast and milk	669	
Child and adult care	782	
Summer feeding of children	158	
Commodities donated to child nutrition	792	
Health care[c]		
Maternal, child health programs	2,229	
Medicaid	16,006	
Social security benefits to children[c]	13,037	
Aid to Families with Dependent Children (AFDC)[c]	14,015	
Earned Income Tax Credit[g]	18,800	
By Nonprofit Organizations[c]		3,009
TOTAL[h]		$898,767
Expenditures per child (in dollars)		$13,515
Total expenditures as percentage of GDP[i]		14.5%

[a] From Thomas Espenshade (1984), updated using 1992 CPS data to correct for changes in the labor force participation patterns of women and the size of families.
[b] Calculated using 1992 CPS data for women's labor force participation (including full-time and part-time) by level of education and presence of children by age, and the U.S. Bureau of the Census (1992) for average earnings by level of education for full-time and part-time work.

TABLE 1 *(Cont.)*

c U.S. Bureau of the Census (1992). Expenditures on higher education total $157 billion (federal, 12.5%; state, 28.9%; local, 2.5%; other, 56.1%).

d U.S. Office of Mangement and Budget (1993; for Fiscal Year 1994).

e Including services through Head Start, comprehensive child development centers, day care assistance, and dependent care.

f Including services through runaway youth, child abuse, emergency protection, abandoned infants, drug abuse protection, and family violence.

g Wendell Primus, Federal Expenditures on Children—FY 1994, communication from staff of the U.S. Department of Health and Human Services, Fall 1994.

h Total is net of AFDC, food stamps, housing, foster care, and Earned Income Tax Credit.

i U.S. Congress. Joint Economics Committee (1993) (for GDP).

Neglecting any costs of mother's child care time beyond 40 hours and all father's child care time, and assuming that child care time equals the difference between actual work time and an estimate of the mother's work time if she did not have children, we arrive at a lower bound estimate of the opportunity costs of child care time of nearly $1,700 per child.[2] The public share totals $333 billion, including about $236 billion on education (excluding all expenditures on higher education) and $63 billion on transfer programs targeted on children in low-income families.[3] Using our lower-bound estimate of opportunity cost, we estimate that average annual total costs per child are approximately $13,500 in 1992, of which slightly more than one-third (35 percent) are public expenditures.

is taken to be the time in excess of 1040 hours that women with her educational level but without children actually work. This difference, then, is assumed to be the reduction in work time due to the presence of children, and taken to be the opportunity cost in terms of hours of the children. For all women, opportunity cost child care hours are valued by a predicted wage rate based on women of the same educational level. The estimated value of child care time for each mother is divided by the number of children less than 18 years in her household. This calculation neglects the opportunity cost of father's child care time and of forgone leisure.

[2] If we had assumed that all deviations of mother's work time from full-time, year-round work are the opportunity cost of child care, our per child cost estimate more than doubles, to about $4,000 per year. With this assumption, the total parental cost of children increases from $.616 trillion to $.756 trillion, and the total cost of children from $.898 trillion to $1,038 trillion. This excludes the opportunity cost of father's child care time and leisure beyond 40 hours per week. An upper-bound estimate could be obtained by assuming that one-half of Mayer's (1994) estimate of 76 hours of available parental child care time per week is actually used in child care. Valuing this time by the average female wage rate yields a per child cost estimate of nearly $20,000 per year. This upper-bound estimate, which includes father's opportunity cost and forgone leisure, yields total parental costs of children of $1.835 trillion, as compared to our lower-bound estimate of $.616 trillion, and total costs of children of $2.117 trillion as compared to our estimate of $.898 trillion. This upper-bound estimate is about $32,000 per child per year, or 34 percent of GDP.

[3] The share of total expenditures devoted to children equals the proportion of recipients who are children in federal food programs, publicly provided health care, and AFDC. We do not include the value of AFDC, Food Stamps, housing assistance, and foster care in the total in order to avoid double-counting. In our calculation of the public share of children's expenditures, we include these as public expenditures and subtract them from parents' direct costs.

In this paper, we review and critique the empirical research on the links between investments in children and children's attainments. The studies that we include in our review emphasize the potential effects on children of family (parental) choices and neighborhood characteristics, the latter taken to reflect social choices.[4] While our focus is on the economics literature, we include relevant studies from other social sciences.

In Section II we summarize the primary theoretical perspectives that have guided research on the determinants of children's attainments; a more general and comprehensive economic perspective on this issue is presented in Section III. In Section IV we discuss a number of empirical issues that pervade research in this area. Section V is the heart of our review; the children's outcomes that we emphasize include educational attainment, fertility choices (especially nonmarital births during teenage years), and work-related outcomes such as earnings and welfare recipiency. Finally, we summarize the principal findings of this research and offer a critique of it.

II. *Perspectives on the Determinants of Children's Attainments*

The past quarter century has seen a growing body of social science research on the processes that explain why some children achieve success in young adulthood while others do not. In most of this literature, "success" is typically measured by schooling attainments, occupation or earnings (income) levels, and the choice of certain behaviors or life situations (e.g., teen nonmarital motherhood

or welfare recipiency). Most of the earliest explorations of this issue were empirical analyses by sociologists; the contributions of economists have come later. Relative to the earlier work, the economic studies are distinguished by attention to more formal models of this attainment process.

A. *Economic Perspectives*

From the outset, economists have viewed the process of children's attainment to be an aspect of the theory of family behavior.[5] The family is viewed as a production unit which employs real inputs in order to generate utility for its members. Adults in the family (typically parents) make decisions regarding the generation of family economic resources (e.g., labor supply); they also determine the uses (e.g., consumption, asset accumulation, or investment in children) of these resources. Parents make a variety of other choices such as fertility, location, and family stability that both influence the returns to productive efforts and directly affect the well-being of members of the family.

The amount of family resources allocated to children, the nature of these resources, and the timing of their distribution influence the attainments of children in the family. Children are also affected by choices made by parents regarding such things as the number of their siblings, the type of neighborhood in which they grow up, and the number of location moves and family structure changes.

The most full-bodied statement of this model is in the work of Becker; in particular Becker and Tomes (1986; see also
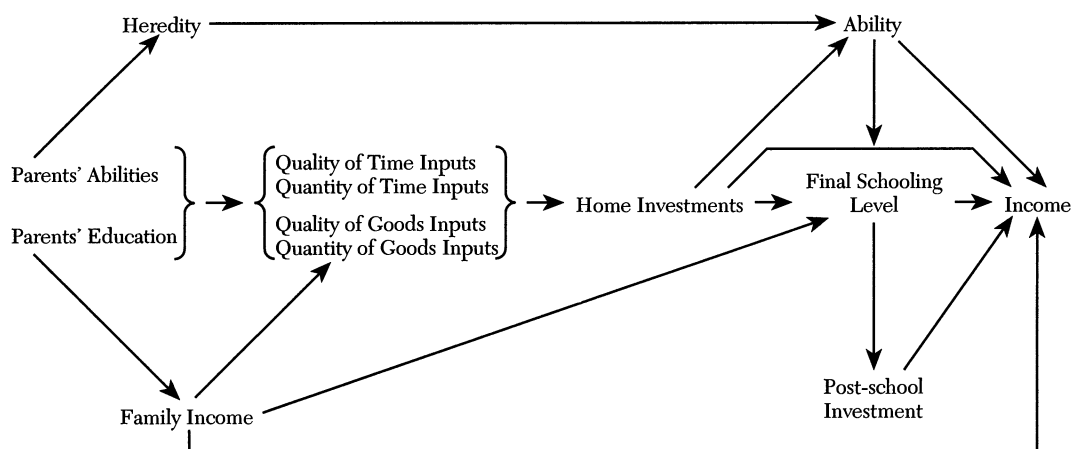

Figure 1. Home Investments in Children[a]

[a]Adapted from Leibowitz (1974).

Becker and Tomes 1979; and Becker 1967, 1981). In this framework, children begin life with a genetic endowment transmitted by their natural parents, apart from any decisions by parents to alter the endowment. The transmission of the endowment (and in some versions the augmented or eroded endowment) is described by a Markov process, in which the degree of "inheritability" is taken to be greater than zero, but less than one. On average, parents with levels of educational attainment far above the mean will produce children who attain high levels of schooling, but not so high relative to the mean as those of the parents. By much the same process, children also inherit cultural endowments—for example, a commitment to learning or musical skills. These "inheritances" translate into human capital, and into earnings when rented on the labor market.

Parents care about the economic capabilities and success of their children, and can influence their human capital and earnings by making "expenditures on their skills, health, learning, motivation, 'credentials,' and many other characteristics" (Becker and Tomes 1986, p.

S5).[6] These expenditures depend on parental preferences, income, and fertility.[7] Parents can also affect the economic

[6] The model has similar implications if it is assumed that parents value the utility of their children, rather than their human capital or attainments. See Becker and Tomes (1979).

[7] If nonhuman capital can be bought or sold in efficient markets, if the debts incurred by parents for investments in their children can be assigned to them when they become adults, and if the "endowed luck" of children is known by parents prior to their investment in them, parents can achieve the (private) optimal level of human capital and attainments of their children by borrowing against the future earnings of their offspring. In this case, no reduction in parental consumption is necessary to attain the optimal level of children's human capital (or, in some versions of the model, children's well-being), and the level of parental investment in children's human capital need not be directly related to parental income. If capital markets are inefficient, however, parents can invest in the human capital of their children only by reducing their own consumption or the consumption of their children, selling assets, or raising their own work effort or that of their children. In this case, parental income is a direct determinant of children's human capital, as the cost of resources allocated to children is no longer constant across families. These market constraints also imply that public expenditures on children will increase the total amount invested in them, and that there exists a tradeoff between the number of children and the investment in each (Hanushek 1992).

This basic framework can be expanded by al-

position of their children by transferring gifts or bequests to them.[8]

While Becker and Tomes' framework provides testable hypotheses regarding the effects of a few of the family-based determinants of investments in children (e.g., parental income and family size), it yields little empirical guidance beyond this (Arthur Goldberger and Becker 1989). Arleen Leibowitz (1974), building on this general framework, presents an economic model of the process of children's attainments with additional implications for empirical work (Figure 1). In this model, the genetic endowments of parents (e.g., their abilities in a number of dimensions) are to some extent passed along to children via heredity. The abilities of parents and their educational choices jointly determine the level of family income and the quantity and quality of both time and goods inputs (or "home investments") that parents devote to their children. Children's ability and the levels of parental income and home investments in time and goods determine the schooling attained by children and, through schooling, the level of post-school investment (e.g., work experience). All of these, in turn, affect children's earnings and income.[9] Given their

abilities, then, parents make a wide variety of decisions—including parental schooling, work effort, consumption, time allocation, and bequests—that are expected to be related to children's schooling and labor market attainments.[10]

B. *Related Perspectives from Other Disciplines*

Sociologists and developmental psychologists have contributed to the literature on children's attainments in ways that complement the work of economists. Here, we briefly describe the most important conceptual perspectives that have guided thinking in these fields.

The Socialization/Role Model Perspective. This explanation stresses the potentially important effect of role models and socialization (adults or peers to whom children or adolescents relate and who set norms of behavior and achievement to which they aspire) during childhood and adolescent years on achievements as young adults. The primary role models are parents and older siblings, and their behavior (e.g., work, fertility), aspira-

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lowing individual members of the family to be self-interested and to engage in bargaining among themselves for resources, including the allocation of parental investments in children's human capital (see Yoram Ben-Porath 1980 and Robert Pollak 1985). In general, the results of these extensions are consistent with those of the more basic model regarding the relationship between parental income and their investments in children.

[8] Another view of the literature investigates whether parents compensate for differences in genetic endowments of their children or instead reinforce these differences and whether they do so consistently across human and nonhuman capital investments. See for example, Zvi Griliches (1979) and Jere Behrman, Mark Rosenzweig, and Paul Taubman (1994).

[9] An empirical analogue to this framework is the following three-equation, recursive system.

Children's Ability = f_1 (Genetic Factors, Home Investment)

Children's Schooling = f_2 (Children's Ability, Home Investment, Family Income)

Children's Income = f_3 (Home Investment, Children's Schooling, Post-School Investment, Children's Ability, Family Income)

[10] Both the Becker-Tomes and Leibowitz models assume that all household decision makers share a common utility function (or, that families have a dictator who makes choices based on his own preferences or those of another person). This assumption has been subject to criticism by those who view family decisions to be the outcome of bargaining within the household among individuals with specific utility functions. Marjorie McElroy (1990) has formulated Nash-Stackelberg type bargaining models of the family decision process; Duncan Thomas (1990) and Mary Jean Horney and McElroy (1988) have attempted to test the common preference vs. individual preference models, without particularly convincing results (Paul Schultz 1990). More recent results, and analyses, suggest behavior more consistent with individual preference models (Behrman, Pollak, and Taubman 1995; and Behrman, Rosenzweig, and Taubman 1994).

tions, and values (e.g., educational expectations) are taken to affect directly the cognitive and social-psychological development of children. While the channels of transmission in this framework are quite different from those emphasized by economists, the implications of this perspective are consistent with the economist's with respect to the potential effects of parental education, labor supply, and fertility choices on children's attainments.[11]

The Life-Span Development Approach. This perspective (also referred to as the "life course" or "ecological systems" perspective) guides much of the research in the developmental psychology literature (see Urie Bronfenbrenner 1989). It emphasizes that development occurs over an individual's life, and that events impinging on a person have different effects depending on when they occur, the length of time since the occurrence of the event, the experiences that occur subsequently, and the historical context in which it occurs. The development process is viewed as one of continuous adjustment and adaptation to exogenous forces, where the nature of the adjustment depends on the transactions and interactions in which a person engages. For example, the divorce of parents may affect children quite differently depend-

ing on the age of the child (which may indicate the existence of peers for support), the nature of the separation (accommodating or antagonistic), the subsequent remarriage of one or both of the parents, or the time spent with the absent parent (Seltzer 1994). This attention to the timing of events has supported attempts by empirical analysts to identify the different effects of events on children's attainments depending on when during childhood they occur.

Stress Theory and Coping Strategies. This psychological perspective suggests that stressful events during childhood—as opposed to the persistence of adverse circumstances—may dislodge an individual from an equilibrium path of development (see Glen Elder 1974 and Seltzer 1994). Such events (e.g., the separation or divorce, incarceration, or unemployment of parents) are viewed as creating emotional uncertainties that impede normal development. In a related model, the psychological resources of parents—their abilities to cope—are presumed to positively influence the performance and attainments of children (see Hamilton McCubbin et al. 1980). These resources are reflected in such parental traits as ambition, trust, and motivation that may serve as standards internalized by children. The ability to cope is often viewed as offsetting the negative effects of stressful events, such as family breakup, on children's success.

Other Perspectives. A variety of other hypotheses regarding the determinants of children's development and attainments can be found in the social science literature. One of the most prominent of these is the "working mother perspective." Mother's absence from the home, it is postulated, may reduce the level of control, guidance, and monitoring given to the child. Conversely, mother's work may also be associated with increased parental income, offsetting the reduction

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[11] The socialization framework emphasizes the transmission from parent to child of a pattern of behavior. A variant of the socialization model emphasizes the importance of having two parents present in a family in order to foster normal personality development. The presence of two parents also strengthens parental control and monitoring, and weakens the potential adverse influence of other role models (Judith Seltzer 1994). Another variant—one emphasizing neighborhood or peer group characteristics—stresses the attributes and circumstances of, and aspects of behavior present in, the neighborhoods in which children grow up (Christopher Jencks and Mayer 1990). Interaction of a child with peers and neighbors may result in adoption of their attitudes, aspirations, and behavior as norms; neighbors and peers become role models.

in child care time.[12] A second of these more specialized perspectives is known as the "economic deprivation perspective," which suggests that growing up in poverty has adverse effects on children's development, net of those factors that are related to low family income. The deprivation perspective is difficult to distinguish from the "welfare culture perspective," which ascribes harmful effects on children's aspirations and attainments from the dependence and stigma associated with the receipt of public assistance (Jacqueline Macauley 1977).

These perspectives have much in common with a nonlinear version of the economic framework with inefficient capital markets. In such a model, parental income—and factors related to income, such as family structure, asset holdings, and work effort—become a direct determinant of investments in children, as the resource cost of investments in children varies with family traits and choices (see footnote 8). In such a framework, it is difficult to distinguish variables reflecting environmental/cultural factors emphasized by sociologists and psychologists from economic variables such as family income, living in a single-parent (earner) family, or the receipt and level of welfare benefits.

III. *Toward a More Comprehensive Economic Perspective*

Both economic and other social science perspectives on the determinants of children's attainments have emphasized the role of parental (or family) circumstances and choices, often to the neglect of other important considerations. A more comprehensive framework would view the attainments of children as dependent on three primary factors—the choices made by the society (or government) that determine the opportunities available to both children and their parents (the "social investment in children"), the choices made by the parents regarding the quantity and quality of family resources devoted to children (the "parental investment in children"), and the choices that children make given the investments in and opportunities available to them.

In such a framework, society (government) employs a wide variety of policy instruments—taxing, spending, and regulatory policies, judicial pronouncements, moral suasion—in setting the basic environment within which families and children make their choices. All of these investments entail both costs and benefits, and government can be viewed as choosing among these options in order to maximize its objective (e.g., the collective well-being, somehow defined) subject to both economic and political constraints.[13] With reference to Figure 1, government's investment in children can be viewed as indirectly affecting children's attainments through its effect on the level of home (or parental) invest-

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[12] Mavis Hetherington, Kathleen Camara, and David Featherman (1983) discuss the effects of parental time and presence on children's development. An economic interpretation of this perspective would emphasize the tradeoff between monetary and time resources in the production of child quality.

[13] Among the most important of government's choices that affect children's attainments are those involving resources devoted to schooling and to the quality of the neighborhoods in which children grow up (e.g., crime rates, lack of sanitation, park and community facilities). Even more broadly, governmental decisions set the social and cultural environment and make clear what are and are not society's standards and expectations for minimally acceptable behavior and performance; current public admonitions designed to reduce the prevalence of nonmarital teen births are an example. James Coleman (1988) emphasizes the potential role of "social capital" in children's attainments. In his view, social (e.g., governmental) organizations can create a structure of support, trust, expectations, and nurture based on the character of social relations—social capital—that contributes to children's attainments apart from more explicit and measurable inputs such as resources or personnel.

ment, and as directly affecting children's success.

The choices made by parents also influence how children develop, and the level of success they achieve. Parents have objectives, just as do governments. In making choices that reflect these objectives—subject to their resources and other constraints[14]—families make decisions concerning household size and structure, consumption levels and saving, work and leisure, and the allocation of income and time. Even more basically, parents choose the sort of monitoring, disciplinary, nurturing, and expectational environment in which their children are raised. Taken together these choices determine the level of "parental investment in children."

The maximizing framework that underlies decisions made by society (government) and parents that affect children's success applies as well to the decisions made by children themselves. In this view, children are also decision makers seeking to make themselves as well off as possible.[15] It is presumed that they have weighed carefully the benefits and costs associated with the options available to them, and have made the choices which we observe, given their resources and the constraints that they face.[16]

This more comprehensive economic framework reflects a choice-based view of the world—governments, parents, and children all have their own utility functions and resource constraints, and they make choices that best serve their interests in light of these. The choices made by society (government) and parents relate to investments made on behalf of children; only the choices made by children themselves reflect their own utility functions and constraints, and these choices determine the investments they make in themselves.

Our characterization of the process of children's attainment reflects a sequential view of the world. Society (government) acts first, making some direct investments in children, but more importantly setting the economic environment in which both parents and children operate. Given this environment, parents choose how much to work and earn and how much time to spend with their children and then, given their income, they decide how much time and income to devote to their children. They also make decisions about family structure and location that serve their own interests, but which also affect their children. Finally, given their own talents, the resources that have been invested in them, and the incentives that they confront, children make choices about their education,

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[14] In some cases, social (governmental) decisions may serve as constraints on parental choice. For example, some parents are constrained in what they earn or whether they work by the quality of education made available to them by the public school system when they were growing up, or by the failure of public macroeconomic policies to ensure full employment.

[15] Baerbel Inhelder and Jean Piaget (1958) suggest that children's capacity for understanding the relationship between behavior and outcomes—the ability to reason in an "if/then" framework—is developed by the age of 13 to 15.

[16] For example, a teenage girl observed to have given birth out of wedlock is interpreted as having made a choice that leaves her at least as well off, given the constraints that she faces, as the alternative choice of not giving birth, at least in terms of expected utility. The decision to give birth out of

wedlock carries with it gains in the form of public welfare, social service, health care, and job-specific training and education benefits. This decision also offers independence from parental control that may be perceived as oppressive. The costs of the nonmarital birth choice include the sustenance cost of the child, child care costs (if market work or continued schooling is chosen), and the forgone earnings from employment opportunities or marriage attributable to the presence of the child. Other effects of the choices may include reduced pressure to attend traditional schools (with potential discipline, failure, and boredom correlates) or to work in unpleasant low-skill jobs, increased feelings of worth and "being needed," and the ability to form a community with other young women in like circumstances.

their fertility and family structure, and their work effort.[17] We observe the outcome of these choices—children's attainments.

IV. *On Modeling the Determinants of Children's Attainments*

As in other areas of empirical research, both the question posed and the data and modeling constraints influence the design of studies seeking to identify the determinants of children's attainments and to measure the relative importance of them.[18] These considerations also determine the extent to which research is able to reveal the nature of the *process* by which children succeed or fail.

Consider, first, the question posed. At one extreme, researchers may have little interest in the process of attainment, and seek only a measure of particular gross relationships. The numerous "mobility studies" illustrate this approach (Sections V.A and V.B, below). Here, the question is, "To what extent are children's outcomes (e.g., earnings) related to those of their parents?" The higher the estimated correlation between parents' and children's earnings, the more structured is the social and economic system; a lower correlation implies a more economically mobile society. To estimate this simple relationship, re-

searchers may use data on annual (or life-cycle adjusted, or multi-year) earnings for parents and their children, and nothing else. And the estimated relationship gives no insight into the process by which parents' success influences that of their children.

At the other extreme, researchers may seek to understand the nature of the attainment process. The research process in this case is more difficult, as illustrated by both the Leibowitz-style model of Figure 1 and the comprehensive economic perspective on children's attainment outlined in Section III. The latter framework, for example, implies the need for a multi-stage structural model. In a first stage, the determinants of government choices affecting the opportunity sets or constraints of parents and children would be modeled. A second stage would characterize parental choices that affect children's development—choices regarding family size and structure, income, and time allocation— as a response to opportunities and constraints that have been affected by governmental choices. Finally, children's own choices would be modeled as reflecting their individual tastes, opportunities, and constraints, the last being affected by both social and parental choices. Such a multi-equation causal framework could specify multiple children's attainments—as well as parental and social choices—as independent, sequentially related, or jointly determined. In turn, these relationships would imply a complex pattern of direct and indirect links, with diverse lag structures.

The lesson is clear: Depending on the question which is posed, both reduced-form and complex structural models are able to yield interesting and important findings regarding the determinants of children's attainments.

In addition to the question posed, modeling and data constraints also influ-

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[17] In fact, these decisions may be interdependent, rather than sequential. For example, if parents are viewed as not providing certain services to children that society views as desirable (e.g., immunizations), government may elect to provide these services directly, or to regulate parents to ensure that such services are provided.

[18] Here, children's "attainments" are taken to be those outcomes in young adulthood with important implications for ultimate economic success— human capital (education), work and earnings, and (for young women) teen nonmarital childbearing and welfare recipiency. The noneconomic literature on children's attainments covers a variety of other children's outcomes, including school behavior, delinquency, and emotional security.

ence the design of studies of children's attainments, and the extent to which they reveal the underlying process. For example, besides the complex modeling problems which our comprehensive economic perspective poses, the data requirements for estimation of such a process-revealing model are daunting. First, to estimate the effect of social investments (e.g., school, health care, neighborhood quality) on children's attainment, the level of each type of investment must be associated with each child at various ages during childhood and young adulthood. Because these investments reflect social choices, the determinants of each form of decision must be modeled. Similar demands are imposed on the level and quality of data describing numerous parental characteristics and choices. In addition to information on basic family characteristics (e.g., parental education and number of children), measures of numerous aspects of the home environment—such as family structure, parental interactions, attitudes, and expectations, and the level of intrahousehold stress—must be available. This information too must be associated with individual children at various times during their childhood. If parental decisions are modeled in a maximization framework, data on the opportunity set and constraints facing the families are also required. Finally, information sufficient to model children's own choices is necessary, including information on the benefits and costs to the adolescent of each of several available options.

Although the studies that compose the empirical literature on the determinants of children's attainment are designed to reveal some important aspect of the underlying attainment process, without exception they are constrained by both data and modeling limitations. While some of the estimates do derive from causal models, the typical study explores the reduced-form relationship between a limited number of parental characteristics or choices (e.g., family structure, income, and welfare recipiency) and some aspect of children's attainment, controlling for as many other relevant factors (e.g., parental education or neighborhood characteristics) as the data permit.

Implicit in this approach is the assumption that the coefficient on (or simulated effect of) a particular variable reflects its total effect on children's attainment; that the variable is an exogenous determinant of attainment, and as such independent of other potential determinants. Because this assumption is often violated, but to widely varying degrees, the estimated relationships revealed in the studies must be interpreted with caution. In this, as in most other areas of empirical economic research, what one learns about important relationships from reduced-form estimates is not devoid of meaning; however, attributing causality to the estimates requires evaluation of the independence of specific determinants from other variables, whether observed or not. As with the related literatures on the effects of school inputs on student test scores (educational production function studies) and the human capital studies of the returns to education, unassailable estimates of causal relationships describing the underlying process are not yet attainable.[19]

V. *Empirical Studies of the Determinants of Children's Success*

Efforts to identify those factors which affect children's attainments span the social sciences. While we focus on studies

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[19] See Hanushek (1986) for a discussion of the data and modeling limitations that constrain the reliability of estimates of educational production functions; on related grounds, Charles F. Manski (1993a) casts doubt on the reliability of prevailing estimates of the returns to schooling.

by economists, we also discuss studies from other disciplines which emphasize economic factors, beginning with the early studies of sociologists and demographers. We begin our review of recent contributions by discussing research on the question of intergenerational income mobility—the degree to which income status is transmitted from one generation to the next. The simple bivariate relationship estimated in these studies suggests the need for further exploration of the role of a more comprehensive set of social and family characteristics in determining children's success. We organize our review of the recent literature by presenting more comprehensive estimates of social and family effects by outcome, moving from educational attainment to nonmarital fertility to economic status measures reflecting labor market success (earnings) and welfare recipiency.

A. *Family, Education, and Children's Socioeconomic Status: An Overview of Early Studies*

Within the social sciences, empirical study of the determinants of economic success dates as far back as the 1920s. The issue in these early studies was the relationship of father's occupation to son's occupation, and cross-tabulations known as occupational mobility tables measured this link. Little theory guided these studies; the purpose was simply to measure the extent of social mobility, taken to be the strength of the relationship between father's occupation and son's occupation.

The first causal model of this process (Otis Dudley Duncan and Ralph Hodge 1963) envisioned a socioeconomic life cycle of three stages: family, schooling, and job. Success on the job was taken to be the socioeconomic status (SES) of a person's occupation, measured by the now-famous Duncan Index of occupa-

tional prestige (O. D. Duncan 1961). Family background and schooling were viewed as determinants of SES, but schooling was treated as an intervening variable, determined in part by family background but also making an independent contribution to occupational status.

This simple model served as the motivation for an important line of empirical research, first in quantitative sociology and then in economics. A prominent and ambitious study by Peter Blau and O. D. Duncan (1967) still stands as a classic in this area. In it, a system of recursive regression equations were fit to data from a special supplement to the March 1962 Current Population Survey (CPS). The resulting estimates described the relationships among time ordered, life cycle family background characteristics and children's schooling attainments, and in turn the effect of both of these factors on SES.

Robert Hauser and Featherman (1977) and Featherman and Hauser (1978) supplemented the standard life cycle occupational attainment framework with a human capital model in which family background and schooling choices determine wage and earnings outcomes. Using data from a 1973 replication of the 1962 CPS survey, they estimated the changes in generational mobility patterns from the 1960s to the 1970s by comparing the coefficients on similarly specified models using the 1962 and 1973 data.

Two other studies during the 1970s heavily influenced subsequent work in both quantitative sociology and economics: the Wisconsin Longitudinal Study and the study of inequality by Jencks and his coauthors (1972). The empirical base of the Wisconsin study was a uniquely rich body of longitudinal data on 9,000 Wisconsin youths who were high school seniors in 1957. Estimates of the determinants of attainment relied on the life-

cycle framework. However, because of the substantially larger number of family, school, and aspiration variables included in the analyses, the principal researchers using these data[20] acknowledged the complexity of the attainment process far more openly than had earlier studies and made fewer claims regarding the causality of the relationships reported.

Whereas these studies sought to understand the determinants of the level of individual attainment, the volume by Jencks and his colleagues (1972) focused on the role of family characteristics and education in explaining inequality in SES and income. Again the life-cycle model served as the primary organizing framework. Rather than exploiting data from a single survey, Jencks et al. was a synthesis, using information and estimates from a variety of studies to reach conclusions on the relative roles of family characteristics, genetic inheritance, and schooling on success. A central (and highly controversial[21]) finding of this work is that "luck"—interpreted as factors other than family characteristics, schooling, and genetic inheritance—explains more than 50 percent of the variation in SES and 75 percent of that in income. From this they conclude that, in America, schooling has not had a large effect in reducing economic inequality.

This line of research revealed a substantial effect of family background (e.g., parental occupation or education) on children's occupational status or income,

with up to 30 percent of the variation in attainments explained by variation in background.[22] Children's schooling also played an important intervening role, with as much as 30–40 percent of the variation in attainment attributed to their educational choices. The extent of the indirect effect of parental background on children's attainment operating through the children's educational choice variable was an important issue in this research. Although these early studies suggested that up to one-third of the measured role of education on attainments reflects the influence of family background (leaving, say, a 20 percent *net* effect of education), critics argued that both the limited number of family background variables included in the studies—and the fact that they are often measured with error—causes even this to be an overestimate of the role of education and, hence, an understatement of the mobility-retarding effects of family background.[23] At least one-half of the variation in attainment was attributed

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[20] Among the most prominent of the more than 60 published papers and research monographs using the Wisconsin data is the work of William Sewell and Hauser (1975).

[21] Publication of Jencks et al. (1972) was something of a cause célèbre within the social science community. An entire issue of the *Harvard Educational Review* (1973) was devoted to reviews and critiques from several perspectives; see especially the essays by Alice Rivlin, Lester Thurow, and Coleman.

[22] One of the more prominent estimates of intergenerational transmissions was that of Sewell and Hauser (1975), who reported only a 0.18 correlation between sons' earnings and parents' earnings. (See Section V.B below.)

[23] Samuel Bowles (1972) demonstrated analytically that, if family characteristics are measured with error, the resulting estimates will understate the role of family and overstate the effect of own schooling. Bowles also showed that if the degree of measurement error in parental variables (e.g., father's schooling and occupation) exceeds that for children's outcomes, the measured effect of family characteristics will again be understated and that of schooling overstated. Because parental characteristics are reported in interviews of children, there is a strong presumption that measurement error is greater for parental than for children's education and income. By means of an ad hoc series of adjustments using estimated relationships from other studies, Bowles revised previous estimates to reflect the effects of different degrees of error in measuring family background. He concluded that family characteristics are more important determinants of economic success (SES or earnings) than earlier researchers had found, and (as a corollary) that own schooling choices play a less important role. See also Becker (1972).

to factors other than measured family background and own education—"luck," in the terms of Jencks et al. (1972), plays an important role. This research also revealed that the roles of family background and education choices on children's attainments varied by ethnic background, and that the low economic status of black offspring could be explained only partly by low-status family background; a role was attributed to educational, occupational, and wage discrimination. Studies that compared patterns in these measured determinants over time discerned a shrinking effect of family background and an upward trend in the role of schooling, leading to an optimistic conclusion that economic mobility was on the rise and that opportunity was becoming more equal.[24]

This early literature stimulated four important lines of empirical economic research that have continued to the present. The first is a rash of studies designed to improve estimates of intergenerational income correlations through improved measures of fathers' earnings and adjustments for life-cycle bias (see Section V.B). The second is the extensive research using data on siblings in random- and fixed-effects models to control more completely for common family influences on children's attainment, and hence to measure more accurately the effect of schooling on attainment.[25] A third line of research—seeking to improve measurement of the effects of schooling on attainment—attempts to address the measurement error problems raised by Bowles (1972) through estimat-

ing the reliability and validity of survey reports of family variables.[26] A final body of research has built on Becker's model of "home investments" in children. This post-1980s empirical literature employs more complete descriptions of both the characteristics and choices of children's families when they were growing up and their own education, fertility, and labor market outcomes when they are young adults. It is also distinguished by extensive reliance on several detailed and long-duration panel micro-data sets developed during the 1970s and 1980s. The following discussion emphasizes this last body of empirical research.

B. *The Determinants of Children's Attainments: A Review of Recent Findings*

Recent Studies of Intergenerational Mobility. A long research tradition in both sociology and economics has sought to measure the simple correlation between fathers' socioeconomic status—occupational SES, earnings—and that of their sons (see Sections IV and V.A). Most of the early studies used either the income or occupational status of the fathers and sons and were inconsistent in the extent to which they controlled for life-cycle considerations. Cross-sectional data were used in which sons reported on parental economic status; hence economic status measures were "one-year-window snapshots." These proxy reports by adult children of current parental income (taken as an indicator of parental income when the child was growing up) or their recollections of parental income when they were growing up also contain serious measurement error, suggesting downward bias in the estimated relationship. Moreover, adjustments made to eliminate life-cycle bias resulting from

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[24] See Glen Cain (1974), Duane Alwin and Arland Thornton (1984), and Robert Haveman (1987) for earlier reviews and critiques of this early status attainment and mobility research.

[25] Griliches (1979) reviews the early studies. See also Behrman et al. (1980), John Bound, Griliches, and Bronwyn Hall (1986), Hauser and Sewell (1986), and Gary Solon et al. (1991).

[26] Becker and Tomes (1986) review several of these studies.

TABLE 2a
RECENT STUDIES OF ECONOMIC MOBILITY USING PANEL DATA: DATA AND ESTIMATION

Study	Data	Time Period	Definition of Outcome Variables	Estimation Method
Behrman and Taubman (1990)	PSID: Sons and daughters 18–34 in 1984 in own households	Outcome, 1984: determinants, 1975–84	Annual ln earnings	OLS
Solon (1992)	348 father-son pairs from random sample of PSID: sons have positive earnings in 1984 and are 25–33, fathers have positive earnings 1967–71	Outcome, 1984: father's earnings, 1967–71	Ln earnings, ln wage, ln family income	OLS, IV
Zimmerman (1992)	876 father-son pairs, both work full-time, 250 maximum pairs used in reported estimates NLS	Outcome, average over 1965–1981 or 1981 only, some control variables, 1965; father's earnings over 4 years	Ln earned income, ln wage, SES index	OLS, IV, and GMM
Buron (1994)	253 father-son pairs from random sample of PSID, sons have + earnings 1984–88 and are 25–33 in 1984	Outcome: 1984–88; father's earnings, 1967–71	Average ln earnings	OLS

Note: Abbreviations and table notes appear at foot of Table 2b.

observing fathers and sons at different ages are both crude and inconsistent. The intergenerational earnings correlations were on the order of .16–.20, suggesting substantial mobility, although studies based on more permanent characteristics such as occupational status found somewhat higher correlations and lower mobility.[27]

Tables 2a and 2b summarize four recent studies that use longitudinal data and, hence, are able to employ longer-term (and consequently more permanent) measures of direct reports of income. These studies are also more consistent in adjusting for life-cycle dif-

ferences in outcome measures than were the earlier studies.[28] All of these studies find correlations approximately twice as high as those of the earlier studies, in part as a result of the errors in variables and life-cycle problems affecting the earlier studies. Their findings call into question Becker's conclusion in 1988 that "low earnings as well as high earnings are not strongly transmitted from fathers to sons" (p. 10).

Social and Family Determinants of Children's Attainments. In Tables 3–6 we describe several recent studies of the social and parental determinants of a variety of attainments of adolescents or

[27] These early studies are reviewed in Becker and Tomes (1986), Becker (1988), Solon (1992), and Lawrence Buron (1994).

[28] All four of these studies are based on small numbers of observations and are sensitive to the exclusion of zero earners.

TABLE 2b
RECENT STUDIES OF ECONOMIC MOBILITY USING PANEL DATA: RESEARCH RESULTS

Study	Background Characteristics, Social, Parental, and Own Choices Controlled (Adjusted) for:	Estimated Coefficient (*t*-statistic), Log Son's Earnings on Log Father's Earnings	Other Results
Behrman and Taubman (1990)	Age[a] Gender[a] Race[a]	Father's recent year earnings: .27 (9.80) Average of father's earnings: .80 (24.40)	Parental income: stronger the longer the observed period of parental income
Solon (1992)	Age Income adjusted for family size (needs) in alternative estimation	Father's recent year earnings: .25 (3.38) Average of father's earnings: .41 (4.44)	Parental income: stronger the longer the observed period of father's earnings
Zimmerman (1992)	Age (life-cycle) Experience	Father's recent year earnings: .36 (5.76) Average of father's earnings: .54 (6.90)	Father's earnings: stronger the longer the observed period of father's economic status
Buron (1994)	Experience, race-ed-occ experience	Exp only, .37 (5.50); race-ed-occ * experience .46 (7.01)	Correlation higher if people with disabilities excluded Shows estimates sensitive to treatment of zero earners.

Abbreviations: PSID - Michigan Panel Study of Income Dynamics
NLS - National Longitudinal Survey
SES - Index of Socioeconomic Status
OLS - Ordinary Least Squares
IV - Instrumental Variables
GMM - Generalized Method of Moments

[a] In regressions with interaction terms only.

youths—high school graduation (Tables 3a and 3b), years of schooling (Tables 4a and 4b), teen nonmarital fertility (Tables 5a and 5b), and labor market success (Tables 6a and 6b). All of these studies extend the simple intergenerational mobility estimates by estimating the relationships between children's outcome variables and more or less extensive sets of social and family background variables.

Three criteria have guided our decisions regarding which of the many existing studies to include in our discussion. The first criterion is the quality of the studies, based on our appraisal of the data and estimation methods used. Second, all of the included studies have some "economic" orientation; each emphasizes one or more social or parental choices or characteristics which reflect economic conditions (e.g., state welfare benefit levels, family income, or poverty status). Finally, we have emphasized those that rely on longitudinal (panel) micro-data.

Each of the columns of Tables 3–6 describes a particular characteristic of the studies. The "determinant" variables are roughly grouped into categories describing social (governmental), parental, and "own" choices, consistent with

TABLE 3a
STUDIES OF THE FAMILY AND NEIGHBORHOOD DETERMINANTS OF HIGH SCHOOL GRADUATION: DATA AND ESTIMATION

Study	Data	Time Period	Definition of Outcome Variables	Estimation Method
Mayer (1991)	HSB: 26,000 10th graders in 1980, followed up in 1982	Outcome: 1980–1982; determinants: 1980	Dropped out of high school between 1980 and 1982 = 1	OLS and logit models
Ribar (1991)	NLSY: 4741 women aged 14–21 in 1979, from 1979 to 1985	Outcome: graduated high school by age 20; determinants: 1979	Graduated high school by age 20 = 1	Bivariate probit model
Astone and McLanahan (1991)	HSB: About 10,000 high school sophomores in 1980, interviewed over 1980–1986	Outcome: 1986; determinants: 1980–1982	High school completion by 1986 = 1	Probit models
Haveman, Wolfe, Spaulding (1991)	PSID: 1258 children aged 0–6 in 1968, 19–23 in 1987	Outcome: 1987; events and circumstances: 1968–1983	Graduated high school by 1987 = 1	Probit model
Manski et al. (1992)	NLSY: 2800 males and females aged 14–17 in 1979	Outcome: 1985; determinants: 1979 or at age 14	High school completion by age 20 = 1	Probit, bivariate probit, trivariate probit, nonparametric models
Sandefur, McLanahan, and Wojtkiewicz (1992)	NLSY: 5246 youths aged 14–17 in 1979 living with parents	Outcome: 1985; determinants: 1979	High school, GED graduation by 1985 = 1; college attendance	OLS and probit models
Brooks-Gunn et al. (1993)	PSID: 1132 black and 1214 white women between 14 and 19 in 1968–1985	Outcome: age 20; determinants; age 14	Dropped out of high school by age 20	Logistic

Note: Abbreviations and table notes appear at foot of Table 3b.

our comprehensive economic framework.[29]

A variety of measures of the attainments of children are used in the studies, including both categorical dummy variables (e.g., whether the child gradu-

[29] In most cases, we interpret neighborhood variables as social investments. However, neighborhood variables also reflect parental choices, and could be included in that category.

ated from high school), and continuous variables, indicating the extent of attainment (e.g., annual earnings). While some of the studies use ordinary least squares estimation methods, most employ maximum likelihood techniques (e.g., probit, tobit); a few employ simultaneous estimation methods designed to characterize interrelated or joint outcomes (e.g., having a teen nonmarital birth and sub-

TABLE 3b
STUDIES OF THE FAMILY AND NEIGHBORHOOD DETERMINANTS OF HIGH SCHOOL GRADUATION: RESEARCH RESULTS

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Mayer (1991)	Black = 1: (−) 1% Hispanic = 1: (−) 1%	School mean SES:(−) 5% School proportion black: (−) ns School proportion Hispanic: (+) 1% School mean math score: (−) 1% School mean educational expectation: (+) 10% School mean parents female head: (+) 1%	Parents SES: (−) 1% Female-headed family in 10th grade = 1: (+) 1%	Math score: (−) 1% Own education expectation in 10th grade: (−) 1%
Ribar (1991)	Black = 1: (+) 10% Hispanic = 1: (−) ns	State max. AFDC benefits (−) ns Max. food stamp benefits (−) ns Urban resident at age 14 = 1: (−) 5% South resident at age 14 = 1: (−) 5%	Mother only = 1: (−) 1% Mother and stepfather = 1 (−) 1% Other family structure = 1: (−) 1% Number of siblings: (−) 5% Foreign language at home = 1: (−) ns Mother's education: (+) 1% Mother in labor force = 1: (−) ns Magazines at home = 1: (+) 1% Newspapers at home = 1: (+) 1% Family library card = 1: (+) 5%	Gave birth before age 20 = 1: (−) 1% PDV earnings no HS: (−) ns PDV earnings HS: (−) ns Attend religious services often = 1: (+) 1% Attend religious services infreq. = 1: (+) 1%
Astone and McLanahan (1991)	Gender − NR Race − NR	Region − NR	Single-parent family = 1: (−) 5% Stepparent family = 1: (−) 5% Other family = 1: (−) 5% Parent's aspirations: (+) 5% Mother monitors school progress = 1: (+) 5% Father monitors school progress = 1: (+) ns General parental supervision = 1: (+) 5% Parent talks with child = 1: (−) ns Parental SES (parental education, occupation, income, possessions) NR Number of siblings − NR	

TABLE 3b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Haveman, Wolfe, and Spaulding (1991)	Nonwhite = 1: (+) ns Female = 1: (+) ns Nonwhite (x) female: (+) ns Firstborn = 1: (+) ns Head foreign born = 1: (+) ns Grandparents poor = 1: (+) ns	Years in SMSA: (−) 5%	Parental time in preschool years: (+) ns Father high school grad. = 1: (+) 1% Father some college = 1: (+) 1% Father college grad. = 1: (+) 1% Mother high school grad. = 1: (+) 1% Mother some college = 1: (+) 1% Mother college grad. = 1: (+) ns Number of years in poverty: (−) ns Years in poverty × AFDC: (−) 10% Years mother worked: (+) 1% No. of location moves: (−) 1% No. of parental separations: (−) ns No. of parental remarriages: (+) ns No. of other changes in family: (−) ns No. of siblings: (−) ns Catholic = 1: (+) 5% Jewish = 1: (+) ns Protestant = 1: (+) ns	
Manski et al. (1992)	Black = 1: (+) 1% Hispanic = 1: (−) 1% Female = 1: (+) 1%	North central resident = 1: (+) ns[b] West resident = 1: (−) ns[b] South resident = 1: (+) ns[b] Southern born = 1: (−) ns[b]	Mother high school grad. = 1: (+) 1% Mother some college = 1: (+) 1% Mother college grad. = 1: (+) 1% Father high school grad. = 1: (+) 1% Father some college = 1: (+) 1% Father college grad. = 1: (+) 1% Nonintact family at age 14 = 1: (−) 5% Mother's education > father's = 1: (+) 1%	

TABLE 3b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Sandefur, McLanahan, and Wojtkiewicz (1992)	Race NR Gender NR	Others want child in college = 1: (+) ns[c] Others don't want child in college = 1: (−) 1%[c] Attitudes of others missing = 1: (−) 1%[c]	Stepparent at age 14 = 1: (−) 1% Single parent at 14 = 1: (−) 1% No parent at 14 = 1: (−) 1% Stepparent at ages 14–17 = 1: (−) 1% Single parent at ages 14–17 = 1: (−) 1% No parent at ages 14–17 = 1: (−) 1% Intact to step- or single parent at ages 14–17 = 1: (−) 1% Other family structure changes at ages 14–17 = 1 (−) 1% Adjusted family income: (+) 1% Parent doesn't want child in college = 1: (−) 1% Parent education NR Number of siblings NR	Self-esteem: (+) 1%
Brooks-Gunn et al. (1993)	Calendar year at age 14 (+) 1% Black (−) ns	% families with income < $10,000 (−) ns % families with income < $30,000 (−1) 1% % income < $10,000 × Black (+) ns % income < $30,000 × Black (+) 5% % income < $10,000 × Inc/needs < 1.5 (+) ns % income > $30,000 × Inc/needs < 1.5 (+) ns % black (+) 10%[d] % families with children and female headed (+) 5%[d,e] % with public assistance (+) ns[d] % males not in labor force (+) ns[d,e] 40% + poor and < 10% families with income > $30,000 (−) ns[d]	Income/needs (−) 1% Mother's education (−) 1% Female head (+) 5%	

TABLE 3b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Brooks-Gunn et al. (1993)		Managerial/professional < 5% (+) 1% Managerial/professional 5% −10% (+) ns		

Abbreviations:	PSID – Michigan Panel Study of Income Dynamics	SES – Index of Socioeconomic Status
	HSB – High School and Beyond Survey	OLS – Ordinary Least Squares
	PUMS – Public Use Microdata Samples	AFDC – Aid to Families with Dependent Children
	NLSY – National Longitudinal Survey of Youth	ns – not significant
	CPS – Current Population Survey	NR – No results reported
	NLS – National Longitudinal Survey	

[a] (−), (+) = negative, positive coefficient; statistical significance level indicated.
[b] Based only on probit model.
[c] Refers to person child identified as the most influential person in their life. If parent, listed as parent's opinion.
[d] This neighborhood variable was the only neighborhood variable included in the regression. The regression did control for the family-level variables.
[e] Results reported are for tract-level neighborhood variables. Zip-code level variables had different sign or significance level.

sequent welfare recipiency). Several of the studies of the determinants of teen out-of-wedlock births view this outcome as an age-dependent probabilistic phenomenon, and employ hazard rate estimation methods.[30]

The extensiveness of variables describing social and parental investments in children ranges widely across the studies. Only a few use specific indicators of social (governmental) choices affecting children's attainments; the use of local indicators of abortion accessibility in studies of nonmarital childbearing (Shelly Lundberg and Plotnick 1990, 1995) is noteworthy. Most of the studies that attempt to measure the effects of social investments rely on variables that describe living environments (e.g., crime

[30] Hazard function estimation methods have also been employed when the dependent variable is right-censored. The problem of truncated records due to the duration-constrained nature of most longitudinal data sets is regularly encountered when attainments during young adulthood (e.g., years of school completed) serve as the dependent variable.

rates or poverty incidence) at the regional or neighborhood level to capture differences in living conditions that may be affected by policy measures. Information on parental investments in children range from very sparse family-based information to extensive and detailed time-specific variables constructed from longitudinal data describing a wide range of parental decisions or family characteristics.

Only a few of the studies attempt to estimate a structural model of the choices of the adolescent child or youth; the study by Greg Duncan and Saul Hoffman (1990) of the nonmarital birth decisions of African American girls and the study by Behrman, Rosenzweig, and Taubman (1994) of postsecondary education are the exceptions. However, a number of the studies attempt to characterize (at least partly) the opportunity costs or the benefits associated with a particular choice.

Few of the studies include prior choices made by the child. Those that do

TABLE 4a

STUDIES OF THE FAMILY AND NEIGHBORHOOD DETERMINANTS OF YEARS OF SCHOOLING: DATA AND ESTIMATION

Study	Data	Time Period	Definition of Outcome Variables	Estimation Method
Datcher (1982)	PSID: 552 male heads age 23–32 in 1978, living with parents in SMSA in 1968	Outcome: 1978; determinants: 1968	Years of schooling	OLS, race specific
Hill and Duncan (1987)	PSID: 854 youths living with parents, age 14–16 in 1968–72 and 27–29 in 1983	Outcomes: ages 27–29 (1983); determinants: ages 14–16 (1968–72)	Years of schooling	OLS, gender specific
Krein and Beller (1988)	Various NLS surveys: 2544 matched mother-son and mother-daughter pairs	Outcome: 1980; event and circumstance determinants: ages 0–18	Years of schooling completed at age 26	OLS; race-gender specific
Case and Katz (1991)	Poor Boston neighborhoods in 1989: 1200 youths aged 17–24	Outcome and determinants: 1989	Years of schooling	OLS and probit models
Crane (1991)	1970 Census PUMS: 96,000 16–19-year-olds living with parents	Outcome and determinants: 1970	Graduated or in high school = 1	Piecewise linear logit model
Duncan (1994)	PSID: 3,439 white and black teens observed between the ages of 16–22 in the period 1968–1991. Only individuals in metropolitan areas of the U.S.	Outcome: 1991; determinants: ages 10–16	Years of schooling completed	OLS, race and sex specific
Graham, Beller, and Hernandez (1994)	March/April CPS match file (including child support data): 5038 children ages 16–20 living with mother in 1988	Outcome: 1988; determinants: 1987–88	Five education variables, including years of schooling completed, high school dropout, entered college	OLS, probit
Behrman et al. (1994)	NLSH72, resurveyed in PETS, 1973–86: 9110 youths who were high school seniors in 1971–72	Outcome: 1986; determinants: 1972	Postsecondary attainment (none, two years, four years) High school test scores Quality of post-secondary school	Multinomial logit

Note: Abbreviations and table notes appear at foot of Table 4b.

tend to include only religion (or religiosity), or a measure of school performance. Only for the earnings outcome (Tables 6a and 6b) have children's own choices (e.g., own schooling) been formally incorporated into the models.

We attempted to summarize the quantitative magnitude of the effects of the social, parental, and "own" choice variables estimated in the studies. These measures would answer such questions as "What is the effect of growing up in a poor family on children's schooling attainment?" They would also allow one to

TABLE 4b
STUDIES OF THE FAMILY AND NEIGHBORHOOD DETERMINANTS OF YEARS OF SCHOOLING: RESEARCH RESULTS

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Datcher (1982)	Age: (+) 1%[b]	Percentage neighborhood white: (−) ns; (+) ns (black)[b] Average neighborhood income: (+) 1%; (+) ns (black)[b] Rural origin = 1: (−) ns (+) 1% (black)[b] City origin = 1: (+) ns; (+) 1% (black)[b] Southern origin = 1: (−) ns[b]	Father's education: (+) 10%; (+) 1% (black)[b] Mother's education: (+) 10%; (−) ns (black)[b] Parent's family income: (−) ns[b] No. siblings: (+) 1%; (−) ns (black)[b] Parent's educational aspirations for the child: (+) 1%[b] Parent's own job decision important = 1: (−) ns; (+) 1% (black)[b]	
Hill and Duncan (1987)	Black = 1: (+) 5%[c]	South = 1: (−) ns[c] City size: (−) ns[c]	Father's education: (+) 1%[c] Mother's education: (+) 1%; (+) ns (women)[c] Father's SES: (−) ns; (−) 5% (women)[c] Head self-employed = 1: (+) ns; (+) 1% (women)[c] Mother's work hours: (−) 5%; (−) ns (women)[c] Father present = 1: (+) ns[c] No. of siblings: (−) 1%[c] Total family income: (+) 1%[c] Father's labor income: (+) 1%[c] Mother's labor income: (+) ns[c] Any father's labor income = 1: (−) ns; (−) 1% (women)[c] Any mother's labor income = 1: (−) ns; (−) 10% (women)[c] Any asset income = 1: (+) 1% Any welfare income = 1: (+) ns; (−) 1% (women)[c] Any other income = 1: (−) ns[c] Add'l dollars of father's labor income: (+) 1%[c] Add'l dollars of mother's labor income: (+) ns; + 5% (women)[c] Add'l dollars of asset income: (−) ns; + 1% (women)[c] Add'l dollars of welfare income: (−) ns; (+) ns (women)[c] Add'l dollars of all other income: (+) ns; (−) ns (women)[c]	Catholic = 1: (+) ns[c]

TABLE 4b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]

Krein and Beller (1988)	South = 1: (+) ns[d]	Mother's education: (+) 1%[d]
		Father's education: (+) 1%;
		  (+) ns (black)[d]
		Know father's education = 1: (−)
		  1%; (−) ns (black men);
		  (+) ns (black women)[d]
		Family income during high
		  school: (+) 1%; (+) ns
		  (women, black men)[d]
		Years single-parent family:
		  (−) 5%; (−) 1% (black men);
		  (−) ns (women)[d]
		Preschool years in single-parent:
		  (−) 5%; (−) ns (black men,
		  white women); (−) 10%
		  (black women)[d]
		Elementary years in single-
		  parent: (−) ns; (+) ns (women)[d]
		High school years in single-
		  parent: (+) ns; (−) ns (women,
		  black men)[d]
		No. of siblings: (−) 1%; (−) 5%
		  (black men); (−) ns (white
		  women)[d]
		Mother ever worked = 1:
		  (−) 1%; (+) ns (black men);
		  (−) ns (women)[d]
		Reading materials in home
		  = 1: (+) ns; (+) ns (black men);
		  (+) 5% (women)[d]		

Case and Katz (1991)	Female = 1: (+) ns
	Black = 1: (+) 5%
			Both parents present
			  = 1: (+) 1%
			Mother less than 20 at birth
			  = 1: (−) ns
			Parents not married = 1: (−) ns
			Parents' years of schooling:
			  (+) 1%
			Family member in jail
			  = 1: (−) 10%
			Family member with
			  drug/alcohol problem
			  = 1: (−) ns
			Adults in family attend church
			  often = 1: (−) ns	

Crane (1991)		Percentage high-status workers in neighborhood: (+) 5%		

TABLE 4b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Duncan (1994)	Calendar year child turned 16 (−) 1%; (−) ns (black males, white females)	% families income < $10,000 (+) 1%; (+) ns (black males, white females)[f] % families income > $30,000 (+) 1%; (−) ns (black males) % individuals black (−) ns; (−) 1% (black males); (+) ns (black females) % female-headed families with children (−) ns; (−) 1% (black females) % adult women working 26+ weeks (+) 5%; (+) ns (black males, white females); (−) 1% (black females) Northeast (+) ns; (+) 5% (white females); (+) 1% (black females) North central (+) ns; (+) 1% (blacks) West (+) ns; (+) 1% (blacks)	Income /needs (+) 1% % time in mother-only family (−) ns; (+) ns (white females) (+) 1% (black females) Mother's schooling (+) 1% % income from welfare (−) ns; (−) 1% (blacks); (−) 5% (white females) % time mother worked (−) ns; (−) 1% (blacks)	
Graham, Beller, and Hernandez (1994)	Age: NR Male = 1: NR Black = 1: NR Hispanic = 1: NR	Northeast = 1: NR North central = 1: NR South = 1: NR SMSA = 1: NR Central city = 1: NR	Mother's education: (+) 1% Age mother gave birth: (+) ns Mother works = 1: (+) 1% Total family income: (+) 1% Child support eligible = 1: (−) 1% Child support eligible not receiving child support = 1: (−) 1% Child support eligible receiving child support = 1: (−) ns Awarded child support = 1: (+) ns Due child support = 1: (+) ns Received child support = 1: (+) 1% Nonintact family = 1: (−) 1% Widowed-mother family = 1: (−) ns Child support income = 1: (+) 10% Father has visitation rights = 1: (+) ns[f] Father lives in same state = 1: (+) ns[f] No. of days of parental contact: (−) ns[f] Other non-child-support = 1: (−) 5%	Own child = 1: NR

TABLE 4b (*Cont.*)

Study	Background Characteristics[a]	Some Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Behrman et al.	Female = 1: (−) 5%; (−) 10% (2 year)[e] Birth order: (+) ns; (−) ns (white) Hispanic = 1: (−) 10%; (+) ns (2 year)[e]	Unemployment rate age 18–21: (+) ns; (−) ns (nonwhite, 4 year)[e] Average state tuition, 4 year college: (−) ns; (−) 5% (for 2 year); (+) ns (nonwhite 4 year); (+) 5% (nonwhite 2 year)[e] State/local higher education expenditures: (−) ns; (+) 5% (2 year);[e] (+) ns (nonwhite 4 year) Ave. family income in the high school (−) ns; (−) 10% (2 year); (+) 5% (nonwhite 4 year); (+) ns (nonwhite 2 year); > 50% high school teachers with grad degree = 1: (+) 5%; (−) 10% (2 year); (+) ns (nonwhite) Private or Catholic high school (+) 10%; (+) 5% (nonwhite 4 year); (+) ns (nonwhite 2 year)	Mother high school = 1: (+) 10%; (+) ns (nonwhite 4 year); (−) ns (white 2 year, nonwhite 2 year)[e] Mother some college = 1: (+) 5%[e]; (+) 10% (nonwhite 4 year); (+) ns (nonwhite 2 year) Mother 4+ years college = 1: (+) 5%; (+) ns (nonwhite 4 year); (−) ns (nonwhite 2 year)[e] Dad high school = 1: (+) 5%; (+) ns (nonwhite)[e] Dad some college = 1: (+) 5%; (+) ns (nonwhite 2 year); (+) 10% (white 2 year, nonwhite 4 year)[e] Dad 4+ years college = 1: (+) 5%; (+) ns (white 2 year, nonwhite 4 year); (−) ns (nonwhite)[e] Family income $6,000–8,999 = 1: (−) 5%; (+) ns (nonwhite, white 2 year)[e] Family income $9,000–11,999 = 1: (−) 5%; (+) ns (nonwhite, white 2 year)[e] Family income $12,000–14,999 = 1: (+) ns Family income > = $15,000 = 1: (+) 5%; (+) ns (2 year nonwhite)[e] No. of siblings: (−) 5%; (−) ns (2 year)[e] Father SES index: (+) ns; (−) ns (2 year)[e] Miles to closest 2 year school: (+) 5%; (−) 5% (2 year); (+) ns (nonwhite 4 year); (−) 5% (2 year)[e] Miles to closest 4 year school: (−) 5%; (+) ns (nonwhite) (+) 5% (white 4 year)[e]	Achievement test score: (+) 5%[e,g] Opportunity wage: (−) 5%; (+) ns (2 year); (+) ns (nonwhite 4 year); (−) ns (nonwhite 2 year)[e] College//high school earnings differential (+) ns; (+) 5% (2 year); (+) ns (nonwhite)[e]

Abbreviations:
PSID - Michigan Panel Study of Income Dynamics
HSB - High School and Beyond Survey
PUMS - Public Use Microdata Samples
NLSY - National Longitudinal Survey of Youth
CPS - Current Population Survey
NLS - National Longitudinal Survey
NR - No results reported

SES - Index of Socioeconomic Status
OLS - Ordinary Least Squares
AFDC - Aid to Families with Dependent Children
PETS - Post Secondary Education Transcript Study
NLSH - National Longitudinal Study of the High
 School Class of 1972

[a] (−), (+) = negative, positive coefficient; statistical significance level indicated.
[b] First entry for whites; black shown only if sign or stat. sign. differs.
[c] First entry for men; second for daughters (women) shown only if sign or stat. sign. differs.
[d] First entry is for white males; other race-gender groups shown only if sign or stat. sign. differs.
[e] First entry is for white, four year; other education/race groups shown only if sign or stat. sign. differs.
[f] Sample limited to those eligible for child support.
[g] When treated as endogenous, predicted scores are (+) 10% (white); (−) ns (nonwhite).

judge the robustness of the findings and to assess policy suggestions based on them. Our efforts to accomplish this—by inferring elasticities of response, or the simulated change in a dependent variable from a specified change in an explanatory variable—were largely unsuccessful. A primary obstacle to accomplishing this is the substantial variation among the studies in the extent to which account is taken of the potential endogeneities among the determinant variables included in the estimates.[31] For example, if part of the impact on children's educational attainments of the level of parental education acts through its effect on family income, and if this relationship is not explicitly accounted for in the estimation, inferences regarding the effect of both parental education and family income on children's education derived

from the respective estimated coefficients will be unreliable and quite different from inferences based on estimates in which this relationship is modeled. Because of these difficulties, our tables report what is comparable across the studies—primarily the signs of the estimated relationships between the variables of interest and the outcomes, and the extent to which the estimated relationships are statistically significant.

The Determinants of Children's Educational Choices. Variables describing parental characteristics or choices are the most commonly used in studies of children's educational attainment. Among these, perhaps the most fundamental economic factor is the human capital of parents, typically measured by the number of years of schooling attained. This variable, emphasized in the earlier studies of the intergenerational transmission of socioeconomic status, is included in virtually every study described in Tables 3a, 3b, 4a, and 4b; it is statistically significant and quantitatively important, no matter how it is defined. The human capital of the mother is usually more closely related to the attainment of the child than is that of the father. Parental completion of high school and one or two years of postsecondary schooling are typically found to have a larger effect on children's schooling than years of parental schooling beyond that level.

The income level of the family in which a child grows up is perhaps the best measure of the level of economic resources devoted to the child by the parents, and is often included in the studies of children's educational attainment.[32] With but one exception (Linda

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[31] Numerous other difficulties were also encountered in our attempt to make such estimates, including substantial variation in estimation methods (e.g., ordinary least squares, tobit, and hazard models); the distressingly small overlap in the explanatory variables included in the models; the large variation in specification of the variables designed to indicate the same phenomenon (determinant) across the studies; differences among the studies in the age of the child at which the parental or neighborhood variables are measured; the paucity of studies that either report simulated effects of quantitative magnitudes or provide sufficient sample statistics to allow calculation of the numerical magnitude of effects; the large variation in the number and the character of the covariates included in the estimation models; inconsistency among the studies in reporting effects for entire samples as opposed to specific subsamples of the population (often ethnic and gender groups); and substantial variation across the studies in the specification of the outcome variable of interest (e.g., a dummy variable for high school graduation, number of years of schooling completed or highest grade attained). A few studies have attempted a "meta-analysis" designed to estimate the quantitative magnitude of effects. While no technique for combining the findings from many diverse studies gains universal applause, we have found the few studies of this sort to be helpful in understanding which measured relationships have sufficient consistency in sign, significance, and magnitude to be labeled "robust," and to gain some insight into the quantitative magnitude of effects (Paul Amato and Bruce Keith 1991).

[32] It should be noted, however, that the family income variable may be a rather crude proxy of the economic resources available to a child. Often family income is recorded only in a single year, and hence measures permanent income with er-

Datcher 1982),[33] the family income variable is positively associated with the educational attainment of the child, and the variable is statistically significant in more than half of all cases where a positive relationship is estimated. Simulated changes in family economic resources, however, are associated with relatively small changes in educational attainments.[34] The range of elasticities is wide—about .02 to .2—for reasons we have discussed (see footnote 32). In one of the most careful explorations of the relationship between family income and children's education (Martha Hill and Greg Duncan 1987), a 10 percent increase in family income (controlling for a large number of other variables) was associated with an increase in educational attainment of less than one percent.[35]

There is some evidence that the source of income matters; for example, while earned income has a positive effect on children's schooling, income from welfare programs tends to have a smaller positive—or even a negative—effect.[36]

The contribution to children's education by two other parental investment variables has been regularly studied—family structure (e.g., living in a one- vs. two-parent family) and the extent of mother's work. In all of the studies that included information on family structure, growing up in a one-parent family (or experiencing divorce or marital separation) is negatively related to the level of schooling attained and in most cases is statistically significant. Estimates of the magnitude of effect of this determinant range from modest to rather large. For example, Haveman, Wolfe, and Spaulding (1991) estimate that the probability of high school graduation of the mean child experiencing two parental separations during ages 6–15 is about five percent lower than that of the child growing up in an intact family. Sandefur, McLanahan, and Wojtkiewicz (1992) report that a prototypical child living in a one-parent family during ages 14–17 has a 16 percent smaller probability of graduating from high school than a child living in an intact family during these years. The smaller simu-

ror. Moreover, it may convey little about family allocation of income to children and fail to capture other economic resources devoted to the child (e.g., parental time allocation). The measurement of this variable varies widely across the studies. A few studies employ either a single year of family income or an average of income over a limited number of years; most employ the ratio of the income level of the family to the income needs of the family, reflecting its size and structure. Others measure the effect of having annual family income below the official family size specific U.S. poverty line. A few of the studies use an indicator of family SES which attempts to summarize the combined effect of a variety of economic resource factors. A single study (Mayer 1991) focuses on the differences between income, expenditures, and the material well-being of children. Education itself can be interpreted as a measure of permanent income, a point that suggests that the full effect of income (education) would, to some extent, include the effect of education (income).

[33] In Datcher (1982), the income level of the family's neighborhood is included in the analysis, in addition to the family's own income level. The potentially high (though unreported) correlation between these two variables probably accounts for the insignificant effect of the family's own income.

[34] When income is measured over a long period of time or few other variables are taken into account, the estimated impact of income or of poverty is far greater. See for example, Children's Defense Fund (1994).

[35] See also Haveman, Wolfe, and James Spaulding (1991) and Gary Sandefur, Sara McLanahan,

and Roger Wojtkiewicz (1992). Becker and Tomes (1986) find elasticities in the .01–.02 range in their survey of earlier literature on this topic. Sheila Krein and Beller (1988) and John Graham, Beller, and Pedro Hernandez (1994) find elasticities of .01 to .04.

[36] Hill and Greg Duncan (1987) find that the participation of the family in welfare programs has a negative and significant effect on the educational attainment of daughters; Haveman, Wolfe, and Spaulding (1991) and Beller and Graham (1993) find a significant negative effect of welfare receipt combined with being poor, and Graham, Beller, and Hernandez (1994) find that child support has a larger impact than other sources of support.

lated impact of family structure in the former study is perhaps explained by the substantially greater number of variables controlling for other parental choices and circumstances (e.g., family income) which may be related to change in marital status.[37] Evidence on the effects of mother's work on children's educational choices is mixed, some studies finding a negative and significant effect on children's attainment, others finding either no significant effect or a positive impact.[38]

Several additional parental investment factors have been found to have statistically significant and quantitatively large effects on children's educational attainment, including the number of geographic moves during childhood,[39] the number of siblings, religiousness, school-related parenting practices, and the pres-

ence of reading materials in the home. Most of the studies find that race is not associated significantly with educational attainment when family income and other background characteristics are included in the models; indeed, when these factors are controlled for, African American children, especially daughters, have more schooling than do non-African Americans.

The effect of the characteristics of children's neighborhood on their educational attainment is the focus of several recent studies. After controlling for a wide variety of parental choice and background characteristics, the income, occupational status, and other supportive characteristics of the neighborhood are positively associated with children's educational attainment, but often of marginally statistical significance.[40] Estimates of neighborhood effects should be interpreted with caution; the zip code or census track data used rarely correspond to a "true" neighborhood. More important, parental choice of neighborhood is likely to be dependent on family economic resources; no studies have successfully modeled this causal relationship. Because the variation in family income within narrowly defined neighborhoods is typically small, it is difficult to separate the independent effects of family and neighborhood economic circumstances on children's educational attainment (William Evans, Wallace Oates, and Robert Schwab 1992; and Manski 1993b). There is some evidence that the relationship between neighborhood characteristics and children's schooling is nonlinear; for example, children living in neighborhoods with adverse characteristics that are several standard deviations from the mean have significantly

[37] Amato and Keith (1991) report the results of a "meta-analysis" of the effects of living in a divorced or intact family during childhood on educational attainment. Their analysis is based on 18 studies of this relationship, and reflects the inclusion of a variety of other family characteristics in the estimation. They conclude that, on average, having parents who are divorced reduces educational attainment by nearly .2 standard deviations. (Using the mean and standard deviation of the sample of children included in Haveman, Wolfe, and Spaulding 1991, the effect of experiencing a divorce and living in a nonintact family translates into a reduction of about 10 percent in the probability of graduating from high school, and about one-third of a year of schooling attained.) McLanahan and Sandefur (1994) compare the proportion who graduate from high school having grown up in a one- versus two-parent family across five data sets: the differential ranged from 7 to 16 percentage points.

[38] Hill and Greg Duncan (1987) find that the level of mother's earnings (when the child was aged 14–16) had a less positive effect on children's educational attainment than income from other sources. See also Krein and Beller (1988) and Datcher (1982). Haveman, Wolfe, and Spaulding (1991) find a positive association between mothers working while the child is 12–15 and the child's educational attainment; Beller and Graham (1993) have similar findings for those aged 16–20.

[39] Haveman, Wolfe, and Spaulding (1991) and Haveman and Wolfe (1994) find a negative, significant, and large effect of this variable.

[40] Jencks and Mayer (1990) review the effects of neighborhood characteristics on a wide variety of children's outcomes.

TABLE 5a

STUDIES OF THE FAMILY AND NEIGHBORHOOD DETERMINANTS OF ADOLESCENT OUT-OF-WEDLOCK FERTILITY OUTCOMES: DATA AND ESTIMATION

Study	Data	Time Period	Definition of Outcome Variables	Estimation Methods
Hogan and Kitigawa (1985)	Young Chicagoans Survey: 1078 black females aged 13–16 in 1979	Outcomes: 1979; determinants: 1979	Pregnancy = 1	Continuous time semi-Markov (hazard) model
Antel (1988)	NLSY: 2302 females less than 19 years living at home in 1979	Outcomes: 1981–85; determinants: 1977–79	Birth by age 21 = 1 Out-of wedlock birth by age 21=1	Two-stage probit model (mother's welfare participation is first equation)
Bumpass and McLanahan (1989)	NSFG: 7969 females ages 15–44 from 1982	Outcomes: ages 15–44; determinants: child's age 0–14 or age 14	Out-of-wedlock birth = 1	Proportional hazard model, race specific
Duncan and Hoffman (1990)[f]	PSID: 874 black females aged 14 during 1968–1980 period	Outcome: ages 14–19; determinants: age 14	Out-of-wedlock birth with AFDC (in 2 years) = 1 Out-of-wedlock birth without AFDC = 1	Two-stage logit model
Lundberg and Plotnick (1995)[g,h]	NLSY: 1181 white females aged 14–16 in 1979	Outcome: 1979–86; determinants: 1979, child's age 14, 1980–85	Out-of-wedlock childbearing = 1; abortion = 1; pregnancy = 1	Nested logit model
Plotnick (1992)	NLSY: 1142 non-Hispanic white females aged 14–16 in 1979 who were never married	Outcome: 1979–84; determinants: 1979	Premarital pregnancy = 1; conditional on pregnancy: abortion = 1; prebirth marriage = 1; premarital birth = 1	Two-stage nested logit model
Hayward, Grady, and Billy (1992)	NSFG Cycle III: 1004 females less than 20 years old	Outcome: ages 14–19; determinants: age 14	Pregnancy = 1	Continuous time semi-Markov (hazard) model
An, Haveman, and Wolfe (1993)	PSID: 872 females aged 0–6 in 1968 and older than 21 in 1988	Outcome: child's ages 13–18; determinants: child's ages 6–15	Out-of-wedlock birth, ages 13–18 = 1	Bivariate probit model
Wu and Martinson (1993)[k]	NSFH: 4776 females born after 1937	Outcome: child's age < 19 years, 1987–88; determinants	Out-of-wedlock birth < 19 years	Hazard regression model
Brooks-Gunn et al. (1993)	PSID: 1132 black and 1214 white women between 14 and 19 in 1968–1985	Outcome: age 20; determinants: age 14	Out-of-wedlock birth by age 20	Logistic

Note: Abbreviations and table notes appear at foot of Table 5b.

TABLE 5b
STUDIES OF THE FAMILY AND NEIGHBORHOOD DETERMINANTS OF ADOLESCENT OUT-OF-WEDLOCK FERTILITY OUTCOMES:
RESEARCH RESULTS

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Hogan and Kitigawa (1985)	Months since exact age = 11: (+) 1% Sister who is teenage mother = 1 (+) 5%	West side = 1: (+) 10% Neighborhood quality = low: (+) ns Neighborhood quality = medium: (−) ns	Social class = middle: (+) 10% Social class = lower: (+) 5% Parents not married = 1: (+) 5% No. of siblings > 4 = 1: (+) 1%[b] Parent control of dating = high: (+) 5%[c] Parent control of dating = low: (+) 1%[c]	Career aspirations = low: (+) ns
Antel (1988)	Black = 1: (+) 1% Hispanic = 1: (+) 10%	Welfare guarantee: (+) 1% State effective welfare tax rate: (−) ns	Mother's years of schooling: (−) 1% No. of children: (+) 5% Mother < age 20 at first birth = 1: (+) 5% SMSA residence = 1: (−) ns Mother welfare recipient = 1: (+) 1%[d]	
Bumpass and McLanahan (1989)		Northeast, central city = 1: (+) ns; (−) ns (black)[e] Northeast, not central city = 1: (−) 10%; (−) 1% (black)[e] North central, not central city = 1: (+) ns; (−) ns (black)[e] South, central city = 1: (+) ns[e] South, not central city = 1: (−) ns[e] West, not central city = 1: (+) ns; (−) ns (black)[e]	Both parents = 1: (−) 1%[e] Mother's education 12 + years = 1: (−) 1%[e] Father's education 12 + years = 1: (−) 1%; (−) 10% (black)[e]	
Duncan and Hoffman (1990)[f]		Northeast = 1: (+) 1% North central = 1: (+) ns West = 1: (+) ns Medium size city = 1: (+) ns Small city/rural = 1: (+) ns Ln of max. AFDC benefits for family of 2 in state: (+) ns	Parent income $10-20,000 = 1: (−) 5% Parent income > $20,000 = 1: (−) 1% Parent income AFDC = 1: (+) 5%	Ln of earned family income at age 26: (−) 5%
Lundberg and Plotnick (1995)[g,h]		Welfare guarantee: (+) 1% Restrictiveness of abortion funding: (+) 1% Abortion availability: (−) 1% Conservative welfare and abortion policies: (+) Liberal welfare and abortion policies: (−) Conservative abortion policy climate: (+) Restrictions on contraceptives: (+) 1%	Mother only = 1: (+) 1% Mother's education: (−) 1% Mother worked = 1: (−) 1% No. of siblings (+) 5%	Baptist = 1: (+) Catholic = 1: (−)

TABLE 5b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Plotnick (1992)			Mother's education: (−) 1% (pregnancy); (+) 5% (premarital birth) Mother worked = 1: (+) ns (pregnancy); (−) 1% (premarital birth) No. of siblings: (−) ns (pregnancy; (+) 1% (premarital birth) Mother only: (+) ns (pregnancy); (+) 1% (premarital birth) Mother/stepfather: (+) 5% (pregnancy); (−) 5% (premarital birth)	Self-esteem: (+) ns (preg); (−) 1% (pre-birth) Locus of control: (−) 1% (preg); (+) 5% (prebirth) Family/gender role attitudes: (+) 1% (preg); (+) 5% (prebirth) Attitude toward school: (−) 1% (preg); (−) ns (pre-birth) Education expecta-tions: (−) 1% (preg); (−) 1% (pre-birth) Protestant: (−) 1% (preg); (+) ns (pre-birth) Catholic: (−) 1% (preg); (+) 1% (pre-birth) Jewish/other: (−) 5% (preg); (+) 1% (pre-birth) Baptist: (−) ns (preg); (+) ns (prebirth)
Hayward, Grady, and Billy (1992)	Age: (+) 1%; (+) 5% (black)[e] Age squared: (−) 1% (black) (not included in white regres-sion)	West = 1: (−) ns[e] South = 1: (−) ns[e] Central city/urban = 1: (+) ns; (+) 1% (black)[e] Noncentral/rural = 1: (+) ns; (+) 1% black)[e] Noncentral/urban = 1: (+) ns; (+) 5% (black)[e] Non-SMSA/rural = 1: (+) ns[e]	Ln mother's education: (−) 1%[e] Single-parent family at age 14 = 1: (+) 10%; (+) ns (black)[e]	Time since first sexu-ally active: (−) 5%[e] Prior sexual activity = 1: (+) ns[e] Fundamentalist = 1: (−) ns; (+) ns (black)[e,t] Catholic = 1; (−) ns; (+) ns (black)[e,t] No religion =1: (−) ns; (+) ns (black)[e,t] Contraceptive use at first intercourse = 1: (−) 1%[e] Current contracep-tive method, pill = 1: (−) 1%[e] Current contracep-tive method, con-dom = 1 (−) 5%[e] Current contracep-tive method, other = 1: (−) ns[e]

TABLE 5b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
An, Haveman, and Wolfe (1993)	Black = 1: (+) 5% Any religion = 1: (−) 5%	No. of years in SMSA, ages 6–15: (+) 10% Bad neighborhood in 1976 = 1: (−) ns County average unemployment rate, ages 6–15: (−) ns Average state welfare generosity, ages 6–15: (+) ns	No. of siblings: (+) ns Mother's age at 1st birth: (−) ns Mother high school graduate = 1: (−) 1% Mother out-of-wedlock birth = 1: (+) ns No. of household location moves, ages 6–15: (+) ns No. of parental separations, ages 6–15: (+) 1% No. of parental remarriages, ages 6–15: (−) 5% Predicted average welfare ratio, ages 6–15: (−) ns[j] Parental welfare recipiency, ages 6–15 = 1: (+) ns	
Wu and Martinson (1993)[k]			Mother-only family at birth = 1: (+) ns[e] Mother-only family at least 75% of ages 0–5 = 1: (+) ns[e] Mother-only family at least 75% of childhood = 1: (+) ns[e] Current family mother only = 1: (+) ns; (+) 5% (black)[e] Current family stepfamily = 1: (+) 5%; (−) ns (black)[e] Current family other = 1: (−) ns; (+) ns (black)[e] No. of changes in family situation: (+) 1%; (+) 5% (black)[e]	
Brooks-Gunn et al. (1993)	Calendar year at age 14 (+) 5%; black (+) 1%	% families with income < $10,000 (−) ns[n] % families with income > $30,000 (−) 1% % incomes < $10,000 × black (+) ns % income > $30,000 × black (+) 1% % income < $10,000 × Inc/needs < 1.5 (−) ns % income > $30,000 × Inc/needs < 1.5 (−) ns % black (−) ns[1] % families with children and female headed (+) ns[1] % with public assistance (+) ns[1] % males not in labor force (−) 10%[1]		

TABLE 5b *(Cont.)*

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
		40%+ poor and < 10% families with income >$30,000 (+) ns[1]		
		Managerial/professional < 5% (+) 5%		
		Managerial/professional 5%– 10% (+) ns		

Abbreviations: NLSY = National Longitudinal Survey of Youth   NSFG = National Survey of Family Growth
  PSID = Panel Study of Income Dynamics   NSFH = National Survey of Families and Households
  AFDC = Aid to Families with Dependent Children   SES = Index of Socioeconomic Status

[a] (−) (+) = negative, positive coefficient; statistical significance level indicated.
[b] When the model controls for sister who is teenage mother, the estimate is insignificant.
[c] Omitted category is daughter does not date.
[d] From a prior probit explaining mother's welfare participation.
[e] First entry is for whites; blacks shown only if sign or stat. sign differs.
[f] Other variables included were whether age-26 subsample +, age-26 subsample × AFDC +, and age-26 subsample × earned income. All the coefficient estimates were insignificant.
[g] Sample size and no reporting problem make nonwhite estimates unreliable.
[h] Results from a nested logit model including possible final outcomes: pregnancy (vs. no pregnancy), abortion (vs. carry), marital birth, out-of-wedlock birth. Unconditional probability of a teen non-marital birth is product of probabilities of getting pregnant, carrying to term, and not marrying before the child is born, all of which are part of estimation, and hence carry explicit coefficients and standard errors. The sign of the effect of a variable on the probability of a teen out-of-wedlock birth is known from simulation analysis, but there is no explicit level of statistical significance level for many of the variables.
[i] Other religions is the omitted category.
[j] Welfare ratio is defined as after tax income divided by appropriate poverty line.
[k] Variables describing SES of father, parental education, own education, number of siblings, age, religion are also included, but results are not reported for these variables.

[1] This neighborhood variable was the only neighborhood variable included in the regression. The regression did control for the family-level variables.

lower educational attainments (Crane 1991).[41]

The Determinants of Teenage Non-marital Childbearing. Tables 5a and 5b summarize the primary micro-data analyses of the determinants of teen nonmarital childbearing. While all of the studies have a rather rich characterization of family background and parental choice

[41] Other studies, however, have failed to find evidence consistent with such an "epidemic" or "contagion" conjecture (Rebecca Clark 1992).

determinants of the probability of a teen nonmarital birth, few explicitly model the girl's own choice as a response to the opportunities and constraints with which she is confronted.

Greg Duncan and Hoffman (1990) contains the most explicit structural model, with variables reflecting economic opportunities (including the generosity of welfare benefits) available to black women who do and do not experience nonmarital birth as a teen. Both of these expected economic opportunity

variables have the predicted sign; the statistical significance of the variable indexing economic opportunities without a birth suggests that poor employment opportunities may encourage teen non-marital childbearing. A 25 percent increase in the income-at-age-26-without-a-nonmarital-birth variable is simulated to reduce the probability of a nonmarital birth by two percentage points (from 25 to 23 percent, or by about 10 percent; see also Lundberg and Plotnick 1990).

Few studies attempt to measure the effect of social decisions on children's attainments. However, Lundberg and Plotnick (1990, forthcoming) estimate the effect of public family planning decisions on the teen fertility outcome by constructing state-specific indicators of abortion accessibility/costs and con-traceptive availability matched to individual records. These variables have expected signs and are quantitatively important determinants of the nonmarital birth outcome. For example, for white adolescents, moving from the average level of restrictions on the public funding of abortions to the absence of public support of abortion costs increases the probability of an out-of-wedlock birth by about 15 percent.

As with the studies of educational attainment, parental economic resources and schooling are included as determinants of the teen nonmarital birth decision. The level of parental education (typically that of the mother) is negative and statistically significant in all of the studies in which it is included; parental income is negative and usually, but not always, significant. Again, there is some evidence that the source of family income matters; welfare receipt generally has a positive effect on the probability that teens will choose to give birth out of wedlock. The few reports of the quanti-tative effects of simulated changes in variables suggest that decreases in parental income and schooling and increases in the likelihood of parental welfare recipiency or the generosity of available welfare benefits will lead to small increases in the probability that teen girls will experience a nonmarital birth. A number of other determinants of the nonmarital birth outcome are often statistically significant, and have relatively large estimated coefficients, including indicators of parental attitude, expectation and personality, parental monitoring and control of children, con-traceptive practice, family structure, and a variety of family stress factors (such as family disruptions and geographic moves during childhood).

It is important to note that none of the studies of this nonmarital child-bearing outcome includes information on the male partners of the women. Surely their backgrounds, experiences, and characteristics are relevant determinants of the childbearing outcome, as pregnancy, abortion, and marriage decisions are often jointly made. No available longitudinal data contain information on mothers' male partners other than husbands—or on absent fathers—that is linked to the child whose attainments are being studied. This is an important limitation of all of these studies, and conveys the impression that only the choices of the female teenager are relevant.

The Determinants of Labor Market Outcomes. Tables 6a and 6b summarize the primary studies of the effects of social, parental, and own choices on the wages and earnings (and, in a few cases, hours worked) of young adults. The few available longitudinal micro-data sets containing information on both the effects of social and parental investments during childhood and work-related outcomes when children are in their mid-

TABLE 6a
STUDIES OF THE FAMILY AND NEIGHBORHOOD DETERMINANTS OF EARNINGS OF YOUNG ADULTS: DATA AND ESTIMATION

Study	Data	Time Period	Definition of Outcome Variables	Estimation Method
Datcher (1982)[b]	PSID: 552 male heads aged 23–32 in 1978, living with parents in SMSA in 1968	Outcome: 1978; determinants: 1968	Ln 1977 annual earnings; ln 1978 hourly earnings	OLS
Kiker and Condon (1981)	PSID: 334 males 19–32 in 1974 not living with parents	Outcome: 1974; determinants: 1968	Ln 1974 annual earnings, and (as intervening variables) education, motivation and IQ score	OLS
Hill and Duncan (1987)	PSID: 645 persons 14–16 and living at home in 1968 and who worked >500 hours for at least 1 year, ages 25–27	Outcome: ages 25–27 (1979–83); determinants: ages 14–16 (1968–72)	Ln wage in 1982$	OLS
Corcoran et al. (1992)	PSID (smaller samples in some models); 841 male heads, ages 25–32, 1983	Outcome: aged 25+ through 1983: determinants: family 1968–1982 or when son left home	Ln annual earnings; ln wage; ln hrs.	Weighted least squares
Li and Wojtkiewicz (1992)	NSFH: Persons age 25–64 in 1987–88	Outcome: 1987–88; determinants: retrospective	Ln earnings, SES score	OLS
Corcoran and Adams (1993)[h]	PSID: 1347 males age 25–35 in 1988, and head of household at least 1 year since age 24	Outcomes: age 25+ (1978–1988); determinants: ages 5–17	Annual earnings age 25+, hourly wages, age 25+, annual hours, age 25+	OLS

Note: Abbreviations and table notes are at foot of Table 6b.

20s accounts for the paucity of studies of these links.[42]

The most consistent finding of this body of research is the positive and significant effect of parental income while children are growing up on their later labor market performance. The elasticity estimates are in the range of .1 to .3.

[42] At least 20 years of panel data are necessary to estimate the effects of social and parental characteristics and choices on the labor market attainments of children. Annual wage and earnings observations are reliable estimates of permanent attainments only for individuals at or beyond their mid-20s, while the governmental and parental variables of relevance are those recorded during childhood years.

Growing up in a poor family appears to have a particularly negative effect on later work and earnings, while parental schooling has no consistent effect on youth earnings. However, estimates of the effect of parental educational choices on children's labor market attainments are difficult to interpret because of inconsistency among the studies in modeling the effects of parental choices on children's own education choices and, through this link, on their work and earnings. When the youth's own educational decisions are included in models, parental education has an important impact on children's labor market attain-

TABLE 6b
STUDIES OF THE FAMILY AND NEIGHBORHOOD DETERMINANTS OF EARNINGS OF YOUNG ADULTS: RESEARCH RESULTS

Study	Background Characteristics[a]	Social Investment Choice[a]	Parental Investment Choice[a]	Own Choice Determinants[a]
Datcher (1982)[b]	Age: (+) 5%; (−) ns (black)[c]	Average neighborhood income: (+) ns[c] Parent neighborhood white: (+) 1%; (+) 5% (black)[c] Rural origin = 1: (+) ns[c] City origin = 1: (+) 1%; (−) ns (black)[c] Southern origin = 1: (+) 5%; (+) 10% (black)[c]	Father's education: (−) ns; (−) 1% (black)[c] Mother's education: (+) ns; (−) ns (black)[c] No. of siblings: (−) ns; (−) 5% (black)[c] Parental family income: (−) ns; (+) 1% (black)[c] Family receives transfer income = 1: (−) 10%; (+) ns (black)[c] Parents usually carry out plans = 1: (+) ns; (+) 1% (black)[c]	Years of education: (+) 1%c Union member = 1: (+) 1%[c] Employed in durable goods industry = 1: (+) 1%[c] Self-employed = 1: (−) ns; (+) ns (black)[c] Ln nonlabor income: (−) ns; (−) 5% (black)[c] Married = 1: (+) 1%c No. of children: (+) ns; (−) ns (black)[c]
Kiker and Condon (1981)			Average (5-year) parental income: (+) 5%[c] Father's motivation score: (−) ns[c] Father's intelligence score: (+) ns[c] Father's schooling: (−) ns[c] Father's SES: (+) ns[c]	Years of schooling: (+) 1%; (−) ns (black)[c] Motivation score: (+) 5%[c] Intelligence test score: (+) 5%[c] Years worked full-time: (+) 1%[c] Years of job tenure: (+) 1%[c] Professional = 1: (+) 1%[c] Manager = 1: (+) 10%[c] Clerical = 1: (+) 5%[c] Craft = 1: (+) 5%[c] Operator = 1: (+) 5%[c]
Hill and Duncan (1987)	Black = 1: (−) 5%; (−) ns (women)[d]	South = 1: (−) 1%; (−) ns (women)[d] City size: (+) 1%[d] County unemployment rate: (−) ns[d]	Father's education: (−) ns; (−) 1% (women)[d] Father's SES: (−) ns; (+) 1% (women)[d] Head self-employed = 1: (−) 1%; (−) 5% (women)[d] Mother's education: (+) 1%[d] No. of siblings: (0) ns; (−) ns (women)[d] Father's labor income: (+) 1%; (+) 10% (women)[d] Other income: (+) ns[d] Father present = 1: (+) 5%; (+) ns (women) (controlling income)[d]	Catholic = 1: (−) ns; (+) ns (women)[d]

TABLE 6b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choice[a]	Parental Investment Choice[a]	Own Choice Determinants[a]
Hill and Duncan (1987)			Father present: (+) ns (not controlling income)[d] Mother's labor income: (−) 5%; (−) ns (women)[d] Mother's work hours: (−) 5%; (−) ns (women)[d] Total family income: (+) 1%; (+) 5% (women)[d] Any father's labor income = 1: (−) ns; (+) ns (women)[d] Any mother's labor income = 1: (−) 10%; (−) ns (women)[d] Any asset income = 1: (−) ns; (+) ns (women)[d] Any welfare income = 1: (−) ns; (+) ns (women)[d] Any other income = 1: (+) ns; (−) ns (women)[d] Add'l dollars father's labor income: (+) 1%; (+) 10% (women)[d] Add'l dollars mother's labor income: (−) ns; (+) ns (women)[d] Add'l dollars asset income: (+) ns[d] Add'l dollars welfare income: (+) ns; (−) ns (women)[d] Add'l dollars other income: (+) ns; (+) 10% (women)[d]	
Corcoran et al. (1992)	Black = 1: (−) 1%	Percent on welfare in neighborhood: (−) ns Percent on welfare in neighborhood × welfare income: (+) 5% Ln median family income in neighborhood: (+) ns Male unemployment rate in neighborhood: (−) ns Percent female-headed families with children in neighborhood: (+) ns	Ln family income: (+) 1% Ln family needs: (−) ns[e] Family income/needs: (+) 1%[e] Father's earnings: (+) ns Mother/wife's earnings: (+) ns Mother/female head's earnings: (−) ns Other family income: (+) ns[f] Nonwelfare income: (+) 10% Proportion of years in poverty: (−) 5% Families welfare income: (−) 1% Welfare income/family income: (−) 5% Dummy for welfare income: (+) ns Father's hours of work: (+) ns Mother/wife's hours of work: (−) 10%	

TABLE 6b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choices[a]	Parental Investment Choices[a]	Own Choice Determinants[a]
Corcoran et al. (1992)			Mother/female head's hours of work: (−) ns Father's education: (−) ns Mother's education: (−) ns	
Li and Wojtkiewicz (1992)	Black = 1: (+) ns[g] Hispanics = 1: (−) ns[g] Other = 1: (−) ns[g] Female = 1: (−) 5%[g] Age 25–34 = 1: (−) 5% Age 35–44 = 1: (+) 5% Age 45–54 = 1: (+) 5%		Mother high school = 1: (+) 5% Mother college = 1: (−) ns Parents receive public assistance = 1: (−) ns Mother-only family at age 15 = 1: (−) ns Mother/stepfather family at age 15 = 1: (+) 10% Other family type at age 15 = 1: (−) 5% Years in mother-only family: (+) ns Years in mother/stepfather family: (−) ns Years in other family: (−) 5% Change to mother-only family = 1: (+) ns Mother-only to mother/stepfather family = 1: (−) ns Mother/stepfather to mother-only = 1: (−) ns Change during preschool years = 1: (+) ns Change during elementary years = 1: (+) ns Change during high school years = 1: (+) ns	Years of education (+) 5% SES of occupation: (+) 5%
Corcoran and Adams (1993)[h]		Percent poor in neighborhood >30 = 1: (−) 5%; (+) ns (black)[c] Percent of households in neighborhood with income >$30,000 = 1: (+) 10%; (+) ns (black)[c,i] Percent of men in area unemployed when a child: (−) ns; (−) ns (black)[c] Percent men in area unemployed when an adult: (−) ns; (−) 5% (black)[c]	Income/needs ratio = 0–1.25 = 1: (−) 5%[c] Income/needs ratio = 1.25–2.00 = 1: (−) ns[c] Income/needs ratio =3 or more = 1: (+) ns; (−) ns (black)[c] Average welfare income = 1: (+) ns (white)[j] Welfare income = 1–5000 = 1: (−) ns (black)[j] Welfare income = 5000–7500 = 1: (−) ns (black)[j,c] Welfare income = 7500 or more = 1: (−) 5% (black)[j] Head's education: (+) ns[c] Head's average work hours: (−) ns; (+) ns (black)[c]	Years of education: (+) 10%; (+) 5% (black)c

TABLE 6b (*Cont.*)

Study	Background Characteristics[a]	Social Investment Choice[a]	Parental Investment Choice[a]	Own Choice Determinants[a]
Corcoran and Adams (1993)[h]			Ever lived in female-headed family = 1: (−) 5%; (−) ns (black)[c] Percentage years lived in female-headed family: (+) 5%; (+) ns (black)[c]	

Abbreviations   SES = Index of Socioeconomic Status
　　　　　　　PSID = Michigan Panel Study of Income Dynamics
　　　　　　　NSFH = National Survey of Families and Households
　　　　　　　AFDC = Aid to Families with Dependent Children
　　　　　　　OLS = Ordinary Least Squares

[a] (-), (+) = negative, positive coefficient, statistical significance level indicated.
[b] Reported results are for earnings study, which also does a similiar estimate using wage ratio as the dependent variable.
[c] First entry is for whites; black shown only if sign or stats sign differs.
[d] First entry is for males; females shown only if sign or stat. sign differs.
[e] It is (-) 1% when the only other control variable is % on welfare in zipcode area. When other controls are added, it becomes insignificant.
[f] If proportion of years in poverty is included, then estimate is + but insignificant.
[g] The four sets of family structure variables and the three dependent variables resulted in 72 interaction terms for the gender and black/white contrasts of family structure effects. In statistical tests not shown, only two of the gender interactions and four of the race interactions were significant. In general, the effects of family structure are the same for males and females and for blacks and whites.
[h] The reported results are for earnings. Similar estimation done for hourly earnings.
[i] Data uses $15,000 for 1970 and $30,000 for 1980.
[j] Specification of welfare income variable(s) differ by race.

ments through their own educational choices (see Section V.A).

In a thorough exploration of the effects of parental choices and neighborhood circumstances on children's earnings, Corcoran et al. (1992) include a very extensive set of parental and community variables and find that the coefficients on parental income and welfare receipt variables are significantly related to son's earnings and wages, both with and without inclusion of son's own education choice in the model. Their results are consistent with Bowles' (1972) demonstration that the coefficients on parental choice variables (e.g., family economic resources) are reduced when son's own education choice is included in the

model. However, they interpret the finding that such parental choices remain significant determinants of son's earnings even with this "own" choice variable included (a result which is at some variance from the findings of earlier studies) as indicating that parental choices and background characteristics do not operate primarily through children's own education choices (p. 72).[43]

The Determinants of Welfare Recipiency. Much of the research on the determinants of daughter's welfare recipiency derives from the hypothesis that welfare dependency is intergenerationally trans-

[43] They note that their finding on this important issue is consistent with that of Sewell and Hauser (1975).

mitted. Early studies generally found a small positive and significant link between the probability that a daughter will receive welfare and parental welfare receipt.[44]

Recent studies of the link between the mother's and daughter's welfare receipt have added three dimensions to the earlier research. The first concerns the potential bias in the earlier estimates due to the inability to observe parental choices or characteristics that may be related to parental welfare receipt and causal to daughter's receipt. Using PSID data on a sample of sister pairs, Solon et al. (1991) estimate sibling models designed to control more completely for unobserved common parental characteristics and find a higher degree of welfare receipt resemblance among sisters than is estimated in the earlier studies. Second, the early studies are estimated using all daughters as sample observations, whether or not their characteristics (e.g., marital status) would allow them to be benefit recipients. As Peter Gottschalk (1992a, 1992b) demonstrates, estimation of this link over a sample that includes daughters whose characteristics exclude them from being categorically

eligible for benefits may result in an estimate which is biased downward.[45] Both of these recent advances suggest a larger degree of welfare dependence than was found in the earlier studies. In another more recent study (Gottschalk 1994) unobserved tendencies toward AFDC participation are modeled using AFDC participation after a daughter has left home. Finally, other recent contributions analyze the intergenerational welfare transmission process for a particular population—teen girls who give birth out of wedlock—and find the probability that an unmarried teen would receive welfare subsequent to an out-of-wedlock birth to be greater if the girl's mother is a recipient (see Greg Duncan and Hoffman 1990 and Chong Bum An, Haveman, and Wolfe 1993).

VI. *What Have We Learned? A Heroic Summary*

Our review of recent research on the determinants of children's attainments has yielded numerous, though not always consistent, results. Moreover, because of both specification limitations and data constraints, they vary widely in their reliability. Here we summarize the most salient and robust findings they have revealed in a series of brief propositions that may not always do justice to their subtleties.

Our review of recent studies rests on a large earlier body of research on social mobility and status attainment, primarily by quantitative demographers, sociologists, and economists. These earlier studies established the links between family

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[44] See Martin Rein and Lee Rainwater (1978), Hill and Michael Ponza (1984), Greg Duncan, Hill, and Hoffman (1988), Rainwater (1987), Antel (1988), and McLanahan (1988). The more reliable studies of this set observe the receipt of welfare by mothers at the beginning of a panel of longitudinal data and relate this outcome to the daughter's receipt later in the panel. Because the primary data set used for these studies (PSID) does not readily reveal information on the sources of income of adult children who live with their parents, the results may reflect relationships observed for daughters living independently, and hence may be biased. While this problem for daughters living dependently can be reduced by careful case by case exploration of family composition for families receiving AFDC, errors may remain. This problem also afflicts some of the early studies of the determinants of wages and earnings described above, including those by Kiker and Carol Condon (1981) and Datcher (1982), which rely on observations of young males living apart from their parents.

[45] Gottschalk's estimates of this link, using a sample of daughters whose characteristics make them potentially eligible for benefits given program rules, suggest substantial intergenerational transmission of welfare participation. However, because categorical eligibility is not a strictly exogenous characteristic of these daughters, this result too is open to challenge.

background and children's later occupational and labor market statuses as mediated by the child's characteristics (e.g., ability) and choices (e.g., education). In Section V.A we summarized the main findings of this research. Recent research on the extent of intergenerational earnings correlations are summarized in Table 2, above. These studies correct several data and statistical problems that affected earlier mobility research and find much less mobility across generations. They call into question the earlier conclusions that the nation is a highly mobile society, and leave far less room for "luck."

The research on the determinants of children's attainments is described in Tables 3–6. It has several characteristics that distinguish it from the earlier literature. First, research by economists, often relying on Becker-type models of family behavior, has been far more prevalent. Second, additional measures of attainment—for example, dependence on public transfers and nonmarital childbearing—have been introduced, both as surrogates for ultimate "success" and as of interest in their own right. Third, a far more extensive list of variables describing specific social and parental investments in children (e.g., family structure, mother's work time, parental welfare recipiency, and neighborhood characteristics) has been studied as potential determinants of children's attainments. Finally, recent research is characterized by a heavy reliance on panel data, longer-term and more accurate measures of potential determinants of children's success, and more advanced statistical methods.

The primary findings of these studies are these:

1. Children who grow up in a poor or low-income family tend to have lower educational and labor market attainments than children from more affluent families, suggesting that parental choices or attributes that result in reduced access by children to economic resources or opportunities increase the chances of low attainment. Being poor as a child also has an independent and negative effect on the probability of giving birth as a teen and of becoming a welfare recipient.

2. Growing up in a family in which the mother chooses to work appears to have a modest adverse effect on educational attainment, suggesting a negative effect of the loss of child care time. However, mother's work choices do not appear to have an effect on the probability that a girl will experience an out-of-wedlock birth in her teens, or be a welfare recipient, nor on educational attainment if the mother's work occurs during a child's teen years. In the last case, the role model or additional income effect appears to dominate.

3. Growing up in a family that has received welfare increases the probability that a girl, if she becomes a single mother, will choose welfare recipiency. The level of family income as well as its source appears to affect this indicator of children's success. Growing up in a welfare family does not appear to influence the probability that a teenaged girl will give birth out of wedlock.

4. Economic incentives and opportunities are often created by society through government decisions (e.g., available income support if not working, and contraception and abortion availability). These, together with market incentives and opportunities, appear to influence a variety of behaviors and attainments, including earnings, welfare

recipiency, and the probability of a teen nonmarital birth. While variables reflecting these incentives and opportunities typically have the expected sign and are statistically significant, the magnitude of their quantitative effect tends to be small relative to that of several forms of parental investment in children.

5. Growing up in a single-parent or stepparent family (or experiencing a parental separation or divorce) has a negative effect on educational attainment, and larger effects are recorded for African Americans than for whites. Adverse effects of single-parent or stepparent living arrangements on the probability that a girl will experience a nonmarital birth or a dissolved marriage are also recorded. There is some evidence that change in parental living arrangements, rather than growing up in a single-parent family, plays a more significant role as a determinant of the probability of a teen nonmarital birth.

6. Stressful events during childhood (e.g., changes in geographic location) appear to have large and independent negative effects on a variety of indicators of children's attainments.

7. Growing up in a neighborhood with "good" characteristics (e.g., residents with more education and income, and less unemployment and welfare recipiency) has a positive effect on a child's choices regarding schooling and earnings, while reducing the likelihood that a child will choose to have an out-of-wedlock birth. There is some evidence of increasing negative marginal effects of poor neighborhood quality.

8. When family background and parental choices are controlled for, being a racial minority does not appear to

have a negative effect on schooling, but is positively related to welfare recipiency and the probability of a nonmarital birth.

VII. *A Critique of Research on the Determinants of Children's Attainments*

Research over the past quarter century, reflecting important advances in both data and methods, has substantially increased our understanding of the determinants of children's attainments. Cross-sectional survey data have included increasingly detailed information on parental choices and family circumstances, and a growing number of continuing panel data sets with ever-longer observation periods have become available.[46] These rich and extended longitudinal data sets enable both early-in-life experiences and circumstances, and outcomes during young adulthood to be observed directly for the same individual, yielding more accurate information than the retrospective reports available in earlier cross-sectional surveys. However, the relatively short history of national longitudinal data collection efforts limits individual observations to a maximum of about 25 years. In addition to constrain-

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[46] For example, the Michigan Panel Study of Income Dynamics (PSID) now contains detailed information on a common set of about 5,000 families and the splits from these families over a 25-year period. These panel data on children's family environment and experiences early in life have permitted tests of a wide variety of hypotheses that researchers were unable to explore with cross-sectional survey data. Recently, data on neighborhood characteristics have been merged with the basic family data in the PSID, permitting researchers to examine the linkages of peer-group and neighborhood characteristics to children's attainments. Similarly, the National Longitudinal Survey of Youth (NLSY) now has 12 years of information on about 12,700 youths and their families; in many dimensions this information is more extensive than that available on the PSID. However, the NLSY data has little information on youth's living arrangements and family characteristics prior to age 14.

ing the accuracy of measures of both childhood experiences and environments and life-cycle accomplishments, this short time span restricts the ability to distinguish individual from cohort effects.

Recent studies have also employed a variety of advanced econometric methods designed to capture the effects of simultaneous relationships among the social, parental, and own choice variables affecting children's attainment and to permit more confidence that the relationships observed reflect true causal links rather than simple correlations. These methods have also enabled researchers to work reliably with longitudinal data afflicted with censoring problems and missing information.

Yet our review of recent research on the determinants of children's success reveals a number of shortcomings involving research strategy, data, and methods. Our brief mention of them here can serve as a road map for future research.

A. *Modeling Issues and Hypothesis Testing*

Although the several studies summarized in our tables are nested in one or another social science "perspective," there is no common framework that has guided researchers regarding the choice of model specification and relevant variables. While exogenous individual and family background effects appear on every researcher's list, choice among the large constellation of remaining variables is largely ad hoc.

Some of the studies have been designed to test a specific hypothesis; for example, growing up in a single-parent household adversely affects children's attainments. In these studies, the sign and statistical significance of the coefficient on the variable of interest is estimated, controlling for a variety of other variables. However, interpretation of results

is difficult, as the definition of the variable and the selection of control variables differ across the studies. As our brief summary of findings (Section VI) has indicated, there is empirical support for several of the hypotheses or conjectures that have motivated research in this area. Family structure (e.g., single-parent families), stress, role model, and welfare culture hypotheses can all claim some empirical support from the available evidence. The economic deprivation perspective is supported in nearly all of the studies, though the marginal impact of income relative to needs does not appear to be large. And the verdict is still out on the "working-mother" hypothesis. However, as we have emphasized above (Sections II and IV), the empirical implications of the various social and psychological perspectives overlap those of the economic models, making definitive tests of the various hypotheses impossible.

Other studies use a wide variety of parental and community variables available in a particular data set, and attempt to identify which among them appear to be significantly related to a particular attainment, holding constant the others. While researchers presume that the criticism of unobserved variables often levied at this body of research will be blunted by so restricting the domain of unobserved factors, these concerns remain.

Even more important, there are but few studies that attempt to account systematically for the interdependence among determinant variables so necessary for establishing true causal links. For example, variables measuring parental education, employment, and marital status, number of siblings, and family receipt of welfare benefits are often introduced into empirical models without recognition that the parental choices they reflect may be jointly determined or causally related. Or again, both parental income and neighborhood quality indica-

tors are often introduced into regression estimates without explicit recognition that the latter variables may represent choices determined by the former. Moreover, the studies we have reviewed are primarily reduced-form estimates, with little attempt to characterize the choices made as responses to economic incentives; there are few structural models to be found. The wide variety of specifications and this neglect of potential endogeneity problems makes any overall summary of findings less confident and robust than desirable (see Section VI) and generalizations regarding the absolute and relative effects of potential determinants on attainment virtually impossible (see Section V.B). Researchers in this field are not unaware of these problems, many of which are a direct result of serious constraints on the data and information necessary to make clean tests of alternative hypotheses and to reliably account for potential interdependencies and endogeneity.

This critique notwithstanding, it must be recognized that difficult estimation problems arise as information describing social (governmental), parental, and "own" choices affecting children's attainments becomes increasingly extensive. While each of these factors may enter a correctly specified model, there is little theoretical guidance for model specification. Moreover, within any modeling framework, specifying the potential causal links among and between them and indicators of attainment increases exponentially as the domain of relevant determinant variables expands. While skilled draftsmen may be able to draw the spaghetti-like lines of exogenous effects and causal and simultaneous interdependencies in such complex models, the constraints imposed by sample sizes, data reliability, correlation among the variables, and available econometric techniques for causal modeling make es-

timation of the magnitude of these relationships problematic. Given available sample sizes, statistical indicators of determinants often fail to have the required degree of orthogonality with respect to each other to enable reliable estimation of the independent effects. In the face of this problem, perhaps the case for reporting—and emphasizing—results that are statistically significant at lower than conventional levels (say, .25 rather than .01 or .05) becomes more compelling.

B. Data Constraints

While the data available to researchers have constrained studies of the determinants of children's attainments, researchers have also failed either to appropriately use or to exploit available information. For example, the limited number and questionable reliability of variables measuring the effects of social (governmental) choices available in most micro-data sets has constrained the ability of researchers to study the role of these choices in influencing parental choices and children's attainments. While a few researchers have creatively or effectively merged data reflecting these choices onto existing micro-data bases, such efforts are rare.

In part because of the limited number of years of longitudinal information recorded for a specific child, few of the studies attempt to measure the differential impact of social and parental decisions made at different times during childhood. For example, while family breakups may adversely affect a child's later attainments, there is little evidence indicating whether the effect is more or less negative if it occurs during adolescence or in early childhood. Because of the same constraint, a number of the studies have violated the requirement that variables describing potential determinants of children's attainments (e.g.,

parental income) reflect circumstances or parental choices that are prior to the child's choices.

The lack of available data has also limited the ability of researchers to sort out the life-cycle patterns of attainment. Indeed, individuals appear to follow quite different trajectories as they move toward their ultimate attainments in life. Reliance on outcomes measured during young adulthood (at best) may suggest misleading conclusions if, in fact, attainments by middle age or over the life course are ill-proxied by outcomes measured during the mid-20s.[47]

While improvements in some of these dimensions seem feasible given existing data, major advances in our understanding of the determinants of children's attainments require improvements in data available to researchers. As we have indicated, longitudinal data, tracing large and national samples of children and their families over time, have become the cornerstone of research in this area. Yet few data sets contain information covering a sufficiently long sweep of time to enable *both* parental and social (governmental) choices during childhood *and* an assessment of attainments and performance over the life course—or even to middle age—to be recorded. As a result, studies have often had to rely on observations of circumstances and events in late adolescence as proxies for the full range of childhood

experience or outcomes during young adulthood as proxies for lifetime attainments (see Haveman et al. 1995). Continuation of existing panel data collection efforts seems a high priority.

While longitudinal data on children and their families have improved in many dimensions over time, important problems remain. Some of these have already been mentioned—the limited period of observation on individuals, the interviewing protocols restricting observations to independent youths, the lack of information on unmarried male partners and absent fathers. In addition, the information which is collected on individuals could be enriched in several dimensions. Most of the data sets are not explicitly intergenerational, focusing primarily on either parents or children; studies of the determinants of attainment could be improved with more extensive and more balanced information on both parents and offspring. Such an intergenerational focus would also include information on the interactions between parents and children—monitoring of activities, joint projects, or "nurturing time."

Although substantial progress has been made in extending the richness of information collected on both parents and children there is still a serious problem of "variable scarcity." The following list of information on parents, neighborhoods, children, and the relationships among them, forms our assessment of the most pressing data needs in this area:[48]

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[47] The sampling properties and interviewing protocols of some of the longitudinal studies also prejudice the reliability and generalizability of estimation results. For example, in some of the studies, detailed observations on attainment are available only for young adults who are not living with their parents. If independent young adults differ systematically from those who have not left their parental home, basing conclusions on estimated relationships between the backgrounds and attainments of only the former group could be misleading. This problem will become less severe over time as longitudinal data sets add waves of information, thus permitting observations of attainments of children beyond young adulthood years.

[48] An implicit gain from the addition of individual-specific information on these items is the improved potential for estimating statistical models that attempt to address the host of potential endogeneity problems in this area. Such estimation requires identification, often in the form of constructed instrumental variables that reflect, say, parental choices (e.g., welfare participation) that are potentially endogenous to children's outcomes, which variables are unrelated to children's attainments. Data sets with extensive parent, child, and environment variables increase the possibility of constructing such instruments.

- Parental self-perceptions and self-esteem, parental expectations for and monitoring of children, parental involvement with children's school(s), and parental time spent with children for both mother and father.
- The health status of both parents and children.
- Behavioral and attitudinal attributes of parents, such as criminal activities (often resulting in incarceration), drug and alcohol abuse, and religious commitment.
- The interaction of children with both school authorities (e.g., truancy) and the criminal justice system (e.g., arrests, convictions, incarceration).
- The behavior and attainments of the siblings of children (e.g., their marital, crime, substance abuse, fertility, and labor market experiences).
- Contemporaneous information on the neighborhood and peer group characteristics of children as well as ties to and distance from other family members.
- The characteristics and qualities of the schools that children attend, and indicators of their school performance.
- Information enabling researchers accurately to characterize the opportunities available (and implicit "prices" reflected) in organized labor markets, informal labor markets, marriage markets, and public program "markets" relevant to alternative opportunities facing children, youths, and young adults regarding schooling and other choices.

Major gains in our understanding of the determinants of children's attainment could be obtained from relatively low-cost investments designed to secure individual-specific information on a variety of these potentially important factors.

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