

# 7 PRIVATE NONMONETARY RETURNS TO INVESTMENT IN HIGHER EDUCATION

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Numerous recent studies have provided estimates of the rate of return to higher education. A survey by the authors (Cohn and Geske 1986) indicates that estimates of the private internal rates of return (IROR) to four years of college education in the United States ranged from about 10 to 21 percent during the past 50 years, while the social IROR ranged from 9 to 14 percent. Despite fluctuations in the returns over time, the IROR have remained remarkably stable, especially over the long run. Results for other countries, summarized in Psacharopoulos (1989) and Cohn and Geske (1990, pp. 129–32), suggest that social IROR to higher education are generally higher in less developed countries and are lower in more highly developed economies. Social rates range from as low as 5 percent in Greece to as high as 23 percent in Mexico; private rates range from as low as 6 percent in Cyprus and Greece to as high as 47 percent in Malawi.

The IROR to graduate education are typically much smaller. Estimates in the United States range from negative to 23.6, with the bulk of estimates under 10 percent. Similarly, low returns to graduate education have also been observed for Canada (Dodge and Stager 1972) and Australia (Selby-Smith 1975). Moreover, substantial subsidization of students enrolled in graduate programs has resulted in private IROR that are substantially higher than their social counterpart. Although some of the very

low estimates might be questioned (see, e.g., Tomaske 1974), and although some graduate programs (e.g., law, dentistry, and medicine) appear to be quite profitable, it appears that on the whole graduate programs do not appear to be highly profitable either to the individual or to society.

The conclusion of the low returns has raised an obvious question. If certain college and university programs are not profitable to the individual, why is that the people continue to enroll in such programs? Moreover, if these programs are also not socially profitable, why do nations and states continue to subsidize them?

One answer to these questions is that college education (and education in general) bestows not only labor market benefits that are measurable in terms of earnings differentials, but also various types of nonmarket (including nonmonetary) benefits. These benefits might be sufficiently high to justify both private and social investment in college and university education.<sup>1</sup> Indeed, Haveman and Wolfe (1984) speculate that benefit-cost studies that have focused exclusively on increased earnings may have captured only 50 percent of the total value of an additional year of schooling.

The purpose of this chapter is to provide a survey of studies on the nonmarket effects of education. Although quantitative estimates are provided in some cases, the emphasis is on the type and nature of such effects. It should be pointed out at the outset that this survey is not exhaustive. Some selectivity was exercised due to time and space constraints.

### Family Life

Considerable empirical work has focused on the effects of education on family life, including marriage, family planning, and the rearing of children (Schultz 1974; Becker 1981). With regard to marriage, it goes without saying that an individual's opportunities for selecting or attracting a desirable mate (one with a higher earnings capacity) are much improved by going to college. Michael (1982) develops the argument that education appears to facilitate a more productive sorting of men and women in the marriage market by pointing out that there is a positive correlation of at least 0.4 between spouses in their education levels. In turn, this marital sorting may lead to subsequent benefits such as more stable marriages (Becker, Landes, and Michael 1977) and also positive assortative mating by intelligence, which increases the probability of parenting "bright" children. The methodological problems in examining the notion of marital

sorting are formidable, and "the measurement of non-monetary benefits of schooling here are not easily calculable, but they may be substantial both privately and socially if schooling facilitates positive assortative mating by intelligence" (Michael 1982, p. 137).

### Family Planning

Economists have increasingly applied the new theory of consumer behavior to the household production of children since the early 1970s (Michael 1973, 1975a; Michael and Willis 1976). Studies by Michael and Willis examine the effects of education on the demand for children. The basic research strategy has been to analyze the choices and decisions made jointly by husband and wife with regard to the quantity and quality of children desired. The household production model specifies that children provide a flow of services to parents and that parents attempt to maximize the satisfaction derived from these services. Thus parents exercise control over fertility behavior—the prevention or spacing of births—in order to optimize utility (satisfaction), given the cost and time constraints within the household. The decisions that couples make reflect the real costs of fertility control, which include not only the direct expenditures of time and money but also considerations such as foregone sexual pleasure, increased health risk, or conflict with religious principles.

Michael (1975b) examines the effects of education on fertility behavior with particular regard to the efficiency with which contraceptive techniques are used to regulate family size. Michael extends those studies that document the indirect effects of education on family size through family income and the price of parental time. In addition to these indirect effects, he argues that education may also have a direct effect on family size through the efficiency with which parents process information about contraceptive products and techniques. Michael hypothesizes that more-educated couples should be more proficient in fertility control, thus lowering both the money and psychic costs related to contraceptive use. His analysis discloses that more-educated couples tend to adopt contraceptive practices more readily and at an earlier stage in marriage, are better informed about and more receptive to new techniques, and thus engage in more effective fertility control than do less-educated couples. Using regression analysis to isolate the effects of education, he found that the education level of the husband, as well as the education level of the wife relative to that of her husband, had a significant negative association with the number of children.

Using data from the Panel Study of Income Dynamics, Calhoun (1989) shows that other things equal, the number of children born to white women decreases as mother's education increases. The results are consistent for two different versions of his model. On the other hand, education does not appear to be related (in a statistically significant manner) to desired family size.

### *Time Allocation Patterns*

Another important line of inquiry investigates the effects of education on the time parents spend with their children. Hill and Stafford (1974) found that women of high socioeconomic status (SES) spend substantially more time with preschool children than do women of low SES—between two to three and one-half times as much on a per-child basis. Benson (1982; see also Benson, Medrich, and Buckley 1980), on the other hand, using a sample of sixth graders and their parents, found that both high- and low-SES parents appeared to devote equal amounts of time in exercising control over their children and in helping them with homework, but the high-SES parents may have been using their time to better effect. Nevertheless, Benson's study did not disclose any definite relationships across SES levels between time use and student achievement.

Hill and Stafford (1980) provide a more extensive and detailed analysis on how parents spend time with their children. They use data from the Michigan Time Use Survey to analyze parental time inputs to their children, particularly in their preschool years. Their analysis disclosed that more-educated women spent more time with their children, including both more play time and teaching time. The most pronounced difference across educational levels, however, is related to mothers' time spent in child-related travel. "College-educated women spend about 30–40 minutes per week in child-related travel, high school-educated women spend about 20 minutes, and women who went to grade school spend almost no time in child-related travel" (p. 236). One explanation for this particular finding, consistent with Benson's findings, is that the child-related travel of the more-educated mothers is associated with the provision of appropriate child development experiences. The finding may also reflect suburban dwelling, which simply involves longer driving distances to the children's various activities.

Leibowitz (1975) examines the effects of education on the allocation of women's time between labor market and home production activities. She also focuses on the use of women's time in the home devoted to the care

and training of preschool and school-aged children. As expected, she found that more-educated women are more likely to spend more time in the Labor market than other women. At the same time, however, more-educated women are less likely to work when they have preschool or school-aged children in the home. In addition, although aggregate time devoted to home production is about the same for the different education levels, women with more education spend less time in home maintenance activities and considerably more time in child care activities. In short, college-educated women, as well as their husbands, spend more time with their children than do other parents.

Leibowitz (1974a; see also 1974b and 1974c) uses Ben-Porath's life cycle model to demonstrate that home production, primarily parental time inputs, serves to increase preschool and childhood stocks of human capital. She uses the 1921 Terman sample consisting of gifted children to investigate the relationship between home investments and the subsequent schooling level achieved by the now adult participants. Leibowitz found that mother's education was significantly related to child's IQ, and that preschool home investments strengthened this relationship beyond the genetic endowment factor. Furthermore, the study, after controlling for income, revealed that parental schooling levels were positively related to the schooling levels attained by their offspring. Thus Leibowitz provides evidence of a nonmonetary benefit of schooling, that is, the effect of parental education on their children's education, resulting in children's future higher earnings.

In a much more focused study, Murnane (1981) replicates a dimension of Leibowitz's work, using a very different sample consisting of low-income black families. Confirming Leibowitz's earlier observation, Murnane also documents a significant relationship between mother's education and children's cognitive skills. Similarly, he also concludes that this relationship reflects, at least in part, the positive influence of home environment, including the quality of child care.

### **Health**

Research has documented the positive correlation between increased schooling and good health. Studies by Grossman (1972a, 1972b, 1976, 1982) provide solid evidence of education's contribution to better health. Grossman (1976) uses a recursive system of equations to formulate and estimate health-schooling relationships. To test his model, Grossman uses data contained in the NBER-Thorndike-Hagen sample of Army Air Corps

cadets of 1943. Thorndike and Hagen collected data for a civilian sample of these in 1955, and the NBER conducted subsequent surveys of this civilian sample in 1969 and 1971. Grossman points out that his sample represents an atypical group of white males who exhibited good health in 1943 and were characterized by above average scholastic ability, schooling, and earnings. Grossman found that schooling has a positive effect on health, and since past health is controlled for in his model, he argues that the evidence supports a causal relationship that runs from schooling to current health.

Grossman's findings indicate that a one-year increase in schooling is associated with a 3.5 percent increase in health capital when only age is held constant. This increase in health capital declines to 1.2 percent when all relevant variables are held constant (e.g., age, background characteristics, ability levels, wage rates, job satisfaction). Given an assumed demand function for health, Grossman suggests that "schooling raises productivity in the production of health by 2.4 percent at a minimum" (1976, p. 179). Grossman compares this nonmarket productivity effect of schooling on health to the market productivity effect of 5.5 percent in the hourly wage rate for his sample. "Although the nonmarket productivity effect of schooling may appear to be small in an absolute sense, it is approximately 40 percent [ $2.4 \div 5.5$ ] as large as the market productivity effect" (1976, p. 179).

Grossman also found that a wife's schooling had a strong positive effect on husband's health. "The effect of wives' schooling is striking, because the coefficient of this variable [wife's schooling] exceeds the coefficient of [husbands'] own schooling" (p. 180). Grossman argues that this finding does not simply reflect selective mating because the research controlled "for important correlates of selective mating, such as general intelligence, parents' schooling, and past health" (p. 181). Finally, Grossman examines the mortality experience of the NBER-Thorndike-Hagen sample between 1955 and 1969. As the sample members aged from approximately 32 to 46 years of age during this time interval, their mortality rate (2.8 percent) was less than the mortality rate for the general population (4.3 percent). Schooling had a positive effect on the probability of survival: A one-year increase in schooling lowered the probability of death by 0.4 percent.

Other researchers have also provided solid evidence documenting the relationship between schooling and health. Lefocowitz (1973) argues that there is a causal relationship between levels of education and individual health status and that the observed correlation between income and medical deprivation appears to be a consequence of education's relationship

with both variables. Similarly, studies have shown that parental schooling levels (after controlling for differences in earnings) are positively correlated with the health status of their children (Edwards and Grossman 1981). Finally, Orcutt and colleagues (1977) disclose that increased schooling (and higher relative income) are correlated with lower mortality rates for given age brackets.

Likewise, Lando (1975) shows that increased levels of education, while holding age constant, are associated with reduced rates of work disability and that about four-fifths of racial differences in work disability can be related to educational differences between the races. Lando concedes that this relationship may be due in part to the relationship between education and occupational choice, as well as to possible discrimination against persons with disability. On the other hand, as Becker (1964) points out, much of the educational effect is through occupation, so that there is no reason to be too agnostic about the empirical relationship found between education and health.

A more sophisticated study of the relation between education and health was conducted by Berger and Leigh (1989). Using data from the Health and Nutrition Examination Survey and the National Longitudinal Survey of Young Men, and employing Garen's (1984) technique for self-selection correction, the authors find a direct causation between increased education and improved health (measured by blood pressure). "Taken together, the results ... strongly suggest that the observed schooling-health correlation ... is due primarily to the direct effect of schooling on the production of health rather than due to the effect of unobservables such as differences in the rate of time discount" (Berger and Leigh 1989, p. 447).

Behrman and Wolfe (1989) employ data from Nicaragua and conclude that estimates from both random and fixed-effects models "reinforce the relationships found in standard estimates—that women's schooling affects their health and nutrient intakes; the latter result is particularly robust" (pp. 644–645). They concur with Berger and Leigh that "the estimated positive health impact of the women's schooling is largely representing schooling per se rather than unobserved fixed endowments" (p. 660). In addition, their "results provide strong support for the proposition that women's schooling increases nutrient intakes" (p. 661).

Regression analysis performed by Ng (1989), using data from the National Medical Care Expenditure Survey, indicates that increased education is a statistically significant predictor of expenditures on physician care—but not of days spent in a hospital—for both men and women. The regressions include a large number of other variables, such as age and its

square, race, wage rate, family size, number of young children, marital status, health condition, location of residence, type of insurance coverage, and a risk factor.

Of related interest is the study on Haiti by Easton and Fass (1989). They list a number of nonmarket benefits of schooling, including employment from emigration and "social insurance services and feeding programs provided by foster child sponsorship schemes" (p. 188). Evidently, in Haiti and in other countries enrolling a child in school entitles the family to various health and nutritional benefits that might be worth a great deal to the student and the family. In regard to primary schooling in Haiti, Easton and Fass calculate that "by paying 7.2 percent of income (about \$0.35 per adult) for tuition each month, [the families] were not only able to raise income by a net value of \$0.50, or 12.5 percent more than the sums received from all other sources, but also to obtain insurance for risk at the same time" (p. 189). To the extent that enrollment in higher education provides students and their families free or reduced-cost meals, insurance, and other amenities, such benefits would also constitute nonmarket benefits of education. Indeed, subsidized food and medical services in colleges and universities are quite common in many countries. Moreover, since subsidized meals, medical services, housing, and other amenities provided by colleges and universities enter into the calculus of the social costs of education—but not the *benefits*—the tendency is then to underestimate the social rate of return to schooling.

### Consumption Behavior

Michael (1972, 1975a) compares the effect of education on consumer behavior in the home or nonmarket sector with the effect of education on earnings in the labor market. He uses a household production model to examine how education affects or alters consumer expenditure patterns. Viewing the household unit as a small multiproduct firm, Michael points out that members of each household combine purchased market goods (capital) with their own time (labor) to produce those commodities desired. Thus Michael postulates that education may enhance the efficiency with which households convert these goods and time into commodities. He argues that if education raises the productivity of time used in one activity (labor market activities), it should also have a similar effect on the productivity of time in other activities (household and nonlabor market activities). In addition, households with more education "have relatively more access to knowledge, concepts, facts, and ideas that may enable the household to arrange nonmarket production more efficiently" (1975a, p. 239).

If more-educated persons are more productive in nonmarket activities, families with more education should produce a higher level of output (commodities) for a given quantity of inputs (time and money). Accordingly, Michael reasons that more-educated households will have more real wealth (in terms of commodities) and that these households will, in effect, behave as if they have more real income (the equivalent of greater money income). Michael labels this effect of schooling on real income through nonmarket productivity the "consumption income effect." To verify and estimate this consumption income effect, Michael structures an empirical test to determine if differences in education levels influence consumer behavior in the same manner that they influence money income. Michael tests this hypothesis by correlating educational elasticities with income elasticities based on data drawn from the Consumer Expenditure Surveys of 1950 and 1960–1961 by the Bureau of Labor Statistics. Michael found a positive association between the two elasticities, indicating that increases in education resulted in consumption patterns similar to those produced by increases in money income. Michael concludes that education produces a positive effect on the efficiency of consumption, and he estimates that the effect of schooling is approximately 60 percent as great in nonmarket activities as in the labor market.

In addition to Michael's work, several other studies have focused on the effect of schooling on specific consumption activities. There is substantial evidence, for example, that individuals with more education seek out, and are better informed, about consumer goods markets. Thus these consumers are more likely than others to adopt new products more quickly (Stigler 1961). Similarly, individuals with more education are more likely than others to use credit cards. Mandell (1972) found that credit card use increased steadily with level of schooling, from 28 percent for those with a grade school education to 81 percent for those with a college degree. Finally, Hettich (1972) conducted an empirical exercise to illustrate the potential savings attributable to education that could be realized by the "informed" consumer. His estimates suggest that the potential savings generated through more efficient purchasing behavior increase rates of return to college education from 14.5 percent to about 16.0 percent.

### Asset Management

Solmon (1975) analyzes the relationship between education and savings behavior and hypothesizes that more-educated individuals will save a higher proportion of income and will also tend to exercise different savings alternatives. To examine savings behavior, Solmon first employs a

conventional definition of savings concerned with the change in financial and nonhousing property assets minus the change in nonhousing debt. His second definition of "full savings" includes net additions to business assets (of proprietors and independent professionals), postschool investment in human capital (on-the-job training), and the value of consumer durable goods purchased. Solmon conducts a number of empirical tests using data from a 1959 Consumers Union survey, a sample of over 3300 families that was composed of a relatively high-income, highly educated subgroup of the population as a whole. Overall, his various analyses supported the basic proposition that more-educated individuals have a higher propensity to save and that they are also more efficient at managing their savings portfolios.

Based on responses to a series of questions in the Consumers Union survey with regard to different aspects of savings, Solmon was also able to examine relationships between schooling and individuals' attitudes with respect to portfolio management, savings objectives, and risk preference. The respondents, for example, were asked a question that could be used to assess their knowledge about protecting themselves against the effects of inflation. Solmon concludes that "at least with respect to inflation, the more educated are more sophisticated (or efficient) investors" (pp. 279-280). While controlling for income and age, Solmon found that the most popular hedges against inflation for the more-educated respondents included common stock, real estate, and mutual fund investments. Respondents with less education, on the other hand, were much more likely to invest in fixed-income securities such as savings accounts and savings bonds. "In an economy with a continually changing price level, the more educated are better able to cope with these fluctuations; that is, they are more likely to minimize the costs associated with changes in the price level" (p. 283).

With regard to families' objectives for savings, respondents were asked, "In planning to save, what are your goals in building up your savings?" Solmon found, after controlling for other relevant variables, that families with more education were more likely to indicate that the primary purpose of savings was to provide children with education and to help children establish households. At the same time, there was a highly significant negative relationship between educational attainment and stated savings objectives such as building up a business or providing for emergencies. One interpretation of these results is that the more educated are more prone to invest in their children's future and that the more educated possess a longer time horizon. Solmon infers from these findings that the more highly educated are more likely to accept risk, to be more informed

and rational in investment decision making, and to plan ahead with a longer time horizon.

Michael (1982) points out that it is difficult to isolate the effects of education or document a real productivity effect in this research area. With regard to the effect of schooling on investment knowledge in the capital market, "one has the impression that a rather low burden of proof is imposed on the evidence" (p. 131). For the most part, the assessed effects of education do not operate directly from schooling to savings, but rather indirectly from educational differences to savings through other important determinants such as household level of income and individual time preferences.

### Migration

Several studies have examined the effects of education on migration behavior. Research on the determinants of migration has documented that more-educated persons are much more likely to be involved in long-distance moves than are less-educated persons (Schwartz 1971; Greenwood 1975). A few explanations have been offered for this observed phenomenon, including both the search efficiency hypothesis and the psychic costs hypothesis. The efficiency hypothesis suggests that schooling serves to reduce the costs associated with job searching or job switching. The argument asserts that the more educated are better skilled at gathering needed information about employment opportunities, the economic attractiveness of new locations, and the moving process itself. The latter hypothesis suggests that there are psychic costs associated with migration, e.g., uncertainties inherent in change, regional cultural differences, or impact on family unit, that increase with distance moved. Nonetheless, education permits individuals to identify and address these costs and consequently serves to diminish the influence of these costs.

Schwartz (1976) uses net and gross migration flows from the 1960 census to investigate the interrelationships between migration, age, and education. To conduct his analysis, Schwartz develops a model based on the tenets of human capital theory, particularly with regard to what is known about the earnings function. Schwartz contends that "the shape of the earnings-age function and the way education affects it can explain all the empirically observed relations of migration measures . . . and education" (p. 718). Schwartz points out that human capital arguments essentially explain his findings and that while alternative explanations about the relationship between migration and education—for example, job search

efficiency or reduction of psychic costs—may not be wrong, they do not contribute to an understanding of his results.

In a more recent study Da Vanzo (1983; also Da Vanzo 1976, Da Vanzo and Morrison 1981, 1982) argues that analyses of migration behavior based on overall migration flows suffer from considerable aggregation bias. She investigates repeat migration by using an eight-year panel (1968–1975) from the Panel Study of Income Dynamics. DaVanzo distinguishes among those migrants who, after an initial move, relocate to a new location, return to a previous location, or remain at the existing location. To test several hypotheses about repeat migration, DaVanzo uses a polytomous model that holds constant a number of key variables—unemployment, house ownership, and distance of initial move.

DaVanzo reports that educational attainment is a critical variable for repeat migrants who move after a brief one-year interval, stating that “the more educated the migrant, the less likely he is to return, compared with both the alternative of not moving again and that of moving onward” (p. 556). She concludes that “the less educated are the likeliest to return quickly,” whereas “the most highly educated are the likeliest to move quickly onward” (p. 558). In an attempt to interpret this education effect, DaVanzo speculates that “the less educated may base their initial moves on more limited information, lowering the success rate of their moves and hence increasing the likelihood of ‘corrective’ return moves” (p. 556). In contrast, for those migrants who sustained a longer tenure in their new residence after the initial move, that is, from two to six years, there was no significant education effect on future migration alternatives.

### Option Values

Weisbrod (1962) points out that there is a financial option open to students. This option refers to the fact that the completion of one level of schooling (e.g., level  $a$ ) enables one to pursue additional levels of schooling ( $a + 1, a + 2, \dots$ ). The returns that one might expect to receive for a higher educational investment (say,  $a + 1$ ) might induce him or her to invest in a lower educational level (e.g.,  $a$ ), even if the expected return on the latter ( $a$ ) would not be sufficient to justify the necessary expenditure. (According to Mincer, 1962, increased amount of schooling is also associated with the option of securing increasing amounts of on-the-job training).

Weisbrod (1962) goes further, arguing that the returns to elementary education are actually higher than customarily estimated because a portion of the returns to higher levels of schooling are due to the completion of

primary schooling. This notion is worthy of consideration, especially in cases where a consideration of two or more consecutive educational levels is at stake. For example, a study by Hu, Lee and Stromsdorfer (1969, 1971) shows much higher returns to students completing a vocational rather than a comprehensive secondary program. The results are intuitively sound for those secondary students who do not contemplate going on to college. On the other hand, if a student has an aptitude for occupations for which a college diploma is required, a choice of a secondary academic or secondary comprehensive program might be more profitable, taking into account both the private returns to the high school program and the expected returns to college (adjusted by the probability that the student will be accepted by a college).

An empirical study of the returns to education, using Canadian data, by Comay, Melnik, and Pollatschek (1976) is a case in point. They show that when option values are explicitly considered, the profitabilities of various early educational investments are strongly affected by the probability of completion of higher educational levels, so that one's decision regarding an educational investment is critically affected by the option value.

A second class of options is Weisbrod's nonfinancial options. For instance, college professors have some nonfinancial advantages associated with their position. These include not only the degree of freedom and flexibility in work but also the daily contact with students and the joy of teaching and research. It is not surprising that a large number of individuals who have the capacity for both teaching and industrial work (research, management) choose teaching in a college or university despite its generally lower salaries (i.e., financial return). The monetary value of these non-financial options could conceptually be measured by the difference between the wage that the individual could have earned and the actual wage earned.

Other nonfinancial options include the “hedging option” (i.e., the flexibility of educated individuals in adapting to new job opportunities) and the “nonmarket option” (i.e., the fact that with education an individual can perform a variety of activities that could not be done without it). Cipriani (1967) and Melnik (1969) provide a further discussion of hedging. Cipriani argues that the principal benefit of the hedging option is to reduce risk from job obsolescence, and that primary benefits would arise for individuals with relatively low educational backgrounds. He does argue, however, that a general education is likely to provide workers with increased flexibility in handling changes in the requirement for jobs. Melnik extends Cipriani's work for the case in which job obsolescence

occurs gradually rather than suddenly. He concludes that the need for labor market hedging is lessened when obsolescence occurs gradually.

Weisbrod's example of the nonmarket option is the filing of income tax returns, for which sufficient competence in arithmetic and other skills is required. Weisbrod (1962, p. 114) performed some interesting calculations indicating that the savings to the total population in the United States realized in this manner amounted to at least \$250 million in 1956, suggesting "a current year return of 3.2 percent of current investment" in elementary school. Other activities falling within the nonmarket category include typewriting and driving.

### Intergenerational Effects

In addition to the previous nonmonetary benefits described, one must also consider possible educational benefits that won't accrue until a generation later. The alleged intergenerational effects of education stem mainly from studies showing that persons are more likely to complete a given level of education if their parents are (or were) more highly educated. The intergenerational effect is the increment in a person's education that can be ascribed to the incremental education of the parent. Hence, we could trace some of the higher expected earnings of the children back to their origin in the increased educational investment by the parents. Therefore, if we confine our investigation of the benefits of education to the parents only, some (perhaps serious) underestimation of benefits would result. One needs to guard, however, against the possibility that double counting of a person's educational benefits will take place—once in the calculation of one's own educational investment and then once more in calculating intergenerational benefits.

A study by Swift and Weisbrod (1965) shows that the returns to elementary and secondary education would be increased substantially when intergenerational benefits are taken into account. On the other hand, they did not find positive intergenerational benefits to college education of the parent. Some methodological refinements of the Swift and Weisbrod method are discussed by Ribich (1968), who provides additional data on the returns to compensatory education.

Another study in which the intergenerational effect was estimated was Spiegelman (1968). He considered two types of benefits: (1) the social benefits of increased income and productivity in the future and (2) the private benefits—namely, the satisfaction that the first generation obtains from knowing that the second generation will be better educated. The

intergenerational effects in the Spiegelman study appear to be a great deal stronger than those suggested either by Swift and Weisbrod or by Ribich. For example, the sum of social and private intergenerational benefits amounts to more than one-half of the direct benefits estimated for the Title I program of the Elementary and Secondary Education Act in California.

### Other Nonmarket Benefits

A number of additional nonmonetary and nonmarket benefits have been identified in the literature, including the effect of education on culture and values, job amenities and fringe benefits, and adoption of new technologies. We will discuss these in turn.

#### *Culture and Values*

Feldman and Newcomb (1969) offer a comprehensive analysis of the impact of college on student behavior and beliefs. Their summary of various studies suggests "that students going through college increase their interest in aesthetic and cultural values, decrease their adherence to traditional religion and other traditional values, [and] become more realistic and less moralistic in their ethical judgments. They also take an increasingly liberal rather than conservative position on political and socioeconomic issues and become more open minded as measured by scales on authoritarianism, dogmatism, ethnocentrism, and prejudice" (Gurin 1971, pp. 27–28). Work by Trent and Medsker (1968), moreover, suggests that whereas both college students and those of similar age who were employed during the four years showed improvement in social maturity, "the increase was much greater for the college group" (Gurin, p. 35).

Strumpel (1971) reports that college graduates appear to have a more optimistic view of their past and future personal progress and are more likely to agree that it is a good idea that their wives would obtain a paying job. College graduates also appear to be more risk averse, one aspect of which is the greater likelihood of using seatbelts.

Finally, Withey (1971) discusses results of "a study of 87 cities around San Francisco" (p. 83). Although the most highly educated persons in these cities were not represented on city councils, college education is highly related to the probability of being represented on a council: "In

the population of these cities, 57 percent have more than a high school diploma, but 95 percent of councilmen are educated above that level" (p. 83).

#### *Job Amenities and Fringe Benefits*

Strumpel (1971) utilized a variety of studies to describe the effect of higher education on economic behavior. He shows that more-educated persons are much less likely to be unemployed or to be on strike and to lose work time due to illness, unemployment, or strike. Individuals with higher education are less likely to have many different jobs and occupations, but they are more likely to have few jobs in the same occupations. They are much more likely to receive a vacation, especially vacations of three weeks or more, and are much more likely to assign a high rank to their chance for promotion. College graduates are far more likely than others to find their job enjoyable and to believe that automation is a good thing.

Kiker and Rhine (1987) use the National Medical Care Expenditure Survey to study the impact of fringe benefits on the returns to schooling. Their results indicate that, for males, earnings "are statistically significantly higher [for college graduates] in the presence of fringe benefits . . . , albeit the magnitude is small" (p. 134). For females, they find that "the return to college graduation . . . is biased downward by about 20 percent in the absence of fringe benefits" (p. 134).

In a recent study Mathios (1989) provides evidence that nonmonetary benefits are especially important for more-educated individuals. Using the NAS-NRC Twin Offspring sample, Mathios measured nonmonetary benefits "from answers given to a group of questions introduced with 'As best as you can remember, was the following a reason for your entering the present occupation?'" (p. 459). Respondents were asked questions concerning "(1) pay offered including fringes, (2) prospects for eventual financial success, (3) chance to help others, (4) represented a challenge, (5) job security, (6) provided much free time, (7) liked that kind of work, (8) status, (9) convenient hours, (10) convenient location" (p. 459). Other factors included "interesting work, . . . person to person contact, . . . and chance for independent work" (pp. 459-460). Mathios estimated earnings equations for low- and high-education groups, alternatively excluding and including the above-listed "compensation factors." He concludes that "the inclusion of the occupational factor variables explains an additional 9 percent of the earnings variation in [the high education] group . . . but only an additional 2 percent of the earnings variation in the [low education]

group" (p. 464). Moreover, the results show that people are willing to substitute certain nonmonetary benefits for a pay increase. For example, individuals who indicate that leisure time is the most important occupational factor are estimated to earn (in 1980) \$2800 less than those for whom leisure time is not important. Similar findings (in qualitative terms) are reported for 15 out of 18 factors studied. The author concludes that issues such as sex discrimination in employment must consider nonmonetary benefits because "estimated earnings differences may overstate the magnitude of discrimination if nonmonetary rewards are a more important part of total compensation for female workers" (p. 457). Similarly, rates of return to college education may be understated, or differences in rates of return by race and sex that rely exclusively on earnings might mask differences in nonmonetary benefits.

#### *Adoption of New Technologies*

Several studies provide some evidence that education is related to improvement in research and development (e.g., Nelson 1973; Mansfield 1982). Other studies have shown that educated farmers are more productive and are more likely to adopt new technologies. Early work on the latter subject was completed by Huffman (1974, 1977). Mook (1981) and Phillips and Marble (1986) also have shown that education is related to farmer productivity. More recently, Wozniak (1987) concludes "that education and information reduce adoption costs and uncertainty, and thereby raise the probability of early adoption" (p. 101). He explains that farmers tend to resist early adoption because of "uncertainty and fixed costs of adoption" (p. 104) but that education helps overcome this resistance by providing information as well as the ability to process that information. Using data from the Iowa Family Farm Research Project Survey, and employing probit and logit models, Wozniak obtained results indicating that "increases in education enhance the innovative ability and increase the probability of early adoption, and that the positive marginal effect is diminishing" (p. 107).

#### **Concluding Comments**

The foregoing survey leaves us convinced that nonmonetary and nonmarket benefits of education are considerable. Whether the IROR to college education is underestimated by more or less than 50 percent is not clear;

what is clear is that attention must be paid to benefits of this type. Indeed, in many instances investment in higher education is justified almost exclusively in terms of expected nonmarket benefits, rather than increased income for graduates. The difficult task is to provide a comprehensive list of nonmarket and nonmonetary benefits and to estimate the magnitude and distribution of such benefits.

On the other hand, West (1988) is quite leery about the policy implications of consumption benefits:

The subject is more complex than appears at first sight. As Blaug (1970) observes, since tastes are directly affected by schooling, assertions about consumption benefits from education involve the use of a yardstick that is itself constantly changing. "It is perfectly true that there is an extraordinary consensus in most societies on the positive psychic benefits of education but, of course, it is a consensus of educated people whose taste for learning has been affected by the learning process itself" (p. 21). For policy purposes, moreover, it is important to know whether the electorate wants more education for consumption or investment purposes, or, if both, in what particular proportions. Without such quantitative information economists must either make and state an arbitrary estimate of the size of the consumption benefits, or simply announce that their calculated rates are under-estimates because they are based on monetary earnings exclusively. [P. 61].

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### Endnote

1. The existence of external benefits such as the effect of education on crime prevention (see e.g., Ehrlich 1975 and Webb 1977), or the effect of education on political participation (see, e.g., Taylor and Wolfe 1971 or Stapleton 1976), might further justify social investment; external benefits will be ignored in this chapter.

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