ECONOMIC BENEFITS OF COLLEGE EDUCATION

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In 1928 Walter S. Gifford read three reports on the economic benefits of college education; he then wrote an article for *Harper's Magazine* (Gifford, 1928a) in which he said, the more education you have, the more money you make. His article created a sensation (Hutchins, 1936). Gifford, president of AT&T, was an important man on the national scene from the late 1920s through the early 1940s. In announcing that business wants the scholar, he was speaking for many men of affairs and verbalizing a major shift in the American folklore of values and a momentous change in higher education.

Early Attitudes

A century earlier the Yale faculty reported (Day et al., 1963),

> The public are undoubtedly right, in demanding that there should be appropriate courses of education, accessible to all classes of youth . . . (But) there are many things important to be known which are not taught in colleges, because they may be learned anywhere . . . (However) if suitable arrangements were made, the details of mercantile, mechanical, and agricultural education might be taught at the college . . . Practical skill would then be grounded upon scientific information . . . whatever a young man undertakes to learn, however little it may be, he ought to learn it so effectually that it may be of some practical use to him [p. 85].

Since the time of Benjamin Franklin (1761), Americans have valued a practical education. In 1828, applied arts at the college level were generally still matters contemplated for the future; by 1928 they had become a widespread reality. Whether the object of education is "to lay a disciplined and furnished foundation" as envisioned by the Yale faculty, the "growth" described by John Dewey, or something else, education is something of value. That value is subject to measurement.

The American penchant for measuring education in economic terms can be traced to the early days of the Republic. "If the children of the poor were forced to attend school, they would not be free to work. In fact, *Nile's Weekly Register*, published for businessmen, reported how much wealth could be made for American manufacturers if all the children could be employed in the mills [Rippa, 1957, p. 106]." For 40 years prior to 1928, the National Association of Manufacturers and other business groups, under the influence of writers like Leonard P. Ayres (1909), had criticized the schools and depreciated the value of a college education. Gifford's article signaled a turning point.

American educators, since Horace Mann (1949, 1952) in the 1840s, have vigorously defended the monetary value of education to society and the individual. The increased earning power of the educated individual, as reflected in the market, has been one of the most frequently used arguments. Economists have also been strong supporters of education. Adam Smith (1937), the founder of classical, liberal (laissez faire) economics, condoned government expenditures for education. His contemporary ideological heir is Milton Friedman. Under the constraints of a greatly changed political economy, Friedman (1954, 1962) also condones the employment of tax resources for education, though he advocates a different system of support. Marshall (1961) observed that it would "be profitable as a mere investment, to give the masses of people much greater opportunities . . . (for education) [p. 216]." More recently, Galbraith (1958) called for a massive shift in spending from the private to the public sector for purposes specifically including education. The list of economists could be expanded. Interest in the economics of education has been avid. Ellis (1917) listed more than 125 books and articles published since 1885 on the relationship between schooling and income. Clark (1940) claimed that by 1940 the total was more than 500. Since 1940 the annual rate of publication on this and closely related subjects has increased dramatically.

Pioneering Studies

William Petty (1899), the father of modern economics, estimated by capitalizing the wage bill that the value of an Englishman in 1687 was £69-90. Farr (1853) calculated the value of a human being by capitalizing future lifetime earnings. Although there are occasional slips into the use of cost of production approaches, Farr's procedure is widely followed by modern economists in measuring the value of education.

As a follow-up to his reading, Gifford (1928b) directed the AT&T Personnel Department and Bridgman to investigate the matter more meticulously. Gifford's early impressions were corroborated. Not only did education correlate positively with income, but students with high grades earned incomes far above the median for college graduates as a whole, while those with low grades fell moderately below. Using retrospective as well as contemporary data from questionnaires returned in 1928 by

30,949 male matriculants of the 12 classes of 1889-92, 1899-02, 1909-12, and 1919-22 at 50 land grant colleges and universities, Bridgman (1931) and his associates worked out the following significant conclusions: (a) Between 1904 and 1928 beginning annual median earnings of college graduates increased 100% while the cost of living went up 105% and industrial wages climbed 175%. (b) Annual median earnings described a smooth, upward curve which increased 260% between the first and tenth, 367% between the first and twentieth, and 413% between the first and thirtieth year following college graduation (B.A.). (c) Though the range of annual median earnings during the first year following graduation was narrow ($1300-1600 in 1928), men in professional (excluding teaching) occupations earned median incomes of about $5,900 annually in the fifteenth year after graduation while those in business, teaching, and farming earned, respectively, approximately $1,000, $2,000, and $3,000 less. By the thirtieth year following graduation the range had widened even more. (d) During the fifteenth year after graduation, median earnings of college graduates in the industrial northeast were about $900 or 20% higher than those in the south and west. The $900 gap persisted through the thirtieth year following graduation. (e) Though they started at the same level, graduates in arts and sciences earned $600 more ($5,600 vs. $5,000) 15 years after graduation than graduates prepared in engineering; engineering students earned $1,000 ($6,900 vs. $5,900) more than arts and science majors 30 years after graduation.

Bridgman recognized the contributions of education to citizenship and the enrichment of life, as well as the economic benefits of college and university education. His study was carefully organized and skillfully executed. He was aware that native ability, motivation, personality, and family connections, as well as general education and major program of study, largely determined occupational choice, earnings, and success. Postulating that age on entry to college was a measure of native ability, he uncovered a pattern which indicated that the younger the individual (i.e., the higher his ability) as a member of his graduating class, the higher were his earnings. While this evidence of the effect of ability is not compelling, it was the best he could do with his data.

Gorseline (1932) published the results of a questionnaire-based study of 370 white, American-born, blood brothers who had attended school in Indiana. Dividing brothers into two groups according to amount of schooling (i.e., the brother who had attained the higher level of schooling was placed in one group, the brother who had attained the lower level of schooling was placed in the other), Gorseline found no significant difference between the two groups in terms of age (36.90 years vs. 36.21 years), place of residence, inheritance, marital status, number of children, "luck," or "money losses due to bad health." Claiming that the group with more schooling had "slightly higher marks and slightly higher test scores," he asserted that a mean difference in schooling of 3.45 years or 35% (13.31 — 9.86 = 3.45 / 9.86 = 35%) resulted in a difference of 34% or $515 ($2,015 — $1,500 = $515 / $1,500 = 34%) in income, at the median, in 1927.

The economic importance of higher education was investigated by the Harvard economist Walsh (1935). Drawing data on the pecuniary benefits of education from five other studies covering the years 1926-32 and on the costs of higher education from the *Survey of Land Grant Colleges and Universities* and *School and Society*, he found, even after discounting benefits at the rate of 4% per year and implicitly including the cost of earnings foregone during schooling, that the benefits of four years of college education over those of high school exceeded the costs by $2,632 ($9,030 — $6,398) for women and $28,611 ($35,009 — $6,398) for men. For some five year or longer college programs, however, he found that the extra costs exceeded the extra private monetary benefits.

Walsh believed, with respect to investment in college education, that individuals behave in a manner explainable in rational terms whether or not they consciously included economic considerations in their decision making. The differences between cost and benefit remained wide despite flaws in Walsh's study: his costs were too high because he included the full cost of subsistence instead of only the extra cost of subsistence in college over the cost of room, board, etc., outside of college, and his discount rate may have been too low. The differences, he explained, were due to imperfections in the market, the effects of marriage, the unmeasured services of wives and mothers, unaccounted for social benefits such as improved citizenship, variance in the desirability of different occupations (travel, vacation, pleasantness, stimulation, "the good life"), prestige, altruism, humanitarianism, and "prizes" (i.e., the possibility of earning exceedingly high incomes in some professions), the "artificial protection of some occupations" (i.e., restrictionism), custom, sentiment, "the natural affectionate propensity of parents to pay for the college education of their children," etc. Walsh did not attempt to quantify the effects of any of these factors. Since Walsh's work, few concepts have been added to the subject field, and important points have too often been ignored.

Friedman and Kuznets (1946), studying the incomes of doctors and dentists in independent practice, found that doctors earn much more than dentists. The authors partially explained the difference by noting that entry to medical training was institutionally restricted, e.g., by specific action of medical schools and practitioners. Though Friedman and Kuznets's explanation raised a storm of protest, the storm passed. Harris (1949) wrote of restrictionism in the field of medical education as though it were a universally recognized fact.

Harris later committed the incredible error of predicting that the monetary value of college education was going to decline drastically relative to the value of high school education. The income of college graduates is, of course, affected by the supply of college graduates, but demand for college graduates, which also has its effects, has been rising. Costs can be expected to drift slowly downward (relative to costs of elementary and secondary schooling, and in constant dollars) due to economies of scale. Nonetheless, one can expect the (constant dollar) monetary value of college education to fall gradually relative to costs as the percentage of the population graduating from college increases. The percentage of talented high school graduates going on for higher education has been growing so rapidly that Americans seem to be in a transition to college-for-the masses comparable to the transition to high-school-for-the-masses in the first quarter of this century. On completion of the transition, say by the year 2000, the college degree will be required at the threshold to the same good employment as is the high school diploma now. The income gap between high school and college graduates can then be expected to be larger than it is today. Needless to say, Harris has abandoned his previous position.

Using data from the 1950 census, Anderson (1955) and Zeman (1955) showed that the effect of education on income is substantially different for whites and non-whites in the United States. Miller (1962) corroborated their findings and went on to claim that veterans of World War II who did not receive scholarship aid under the GI Bill had only slightly lower average incomes than those who did, despite their substantially lower average educational attainments.

Contemporary Concepts

Additional lifetime income. Miller, in collaboration with Glick (1956), had previously published the widely cited study of census data which indicated that a man with a college degree received about $100,000 more income during his lifetime than a man with only a high school diploma. Although the authors failed to discount income benefits in recognition of time preference, they did subtract the cost of college education ($8,200) and the lifetime interest that the investment could earn in US Government bonds ($24,000). They found dispersion around the averages to be so great that even at the period of peak earnings, age 45-54, when college graduates averaged $7,907 per year and high school graduates only $4,519 per year, one-fourth of the college graduates made less than the average high school graduate of similar age who did not go on to college. (This may be due to difference in the quality of education; also, perhaps too many individuals with relatively low intelligence get more schooling than they should.) Glick and Miller noted further that graduation yields a bonus of about twice the increment realized by the average individual who starts college but does not finish. This, they suggested, indicates that persistence in school reflects a complex of capabilities and motivational factors which are conducive to success in the world of work as well as in college.

Present value. Using the same cross-sectional data that Miller and Glick studied, Houthakker (1959) applied slightly different techniques (including an adjustment for mortality) and calculated the present value of lifetime income, before and after federal income taxes, at four different discount rates. He suggested that from the private point of view the discount rate should be the cost of borrowing to pay for schooling, and from a social point of view, the rate should be the rate of return on alternate investments. Houthakker also pointed out the appropriateness, in a growing economy, of superimposing an upward trend on cross sectional patterns of earnings.

Internal rate of return. Schultz (1959, 1960, 1961a, 1961b, 1961c, 1962), the father of the modern human capital concept, identified education as a component of human capital and suggested that schooling pays, on the average, a better return than most other investments. He then measured (in constant dollars) the stock of education acquired via schooling as of 1957 as the sum of the costs from 1900 to 1957, and found that college and university schooling accounted for 22% of a total educational stock in labor force members 14 years and older ($118 billion of $535 billion). Cost is a questionable indicator of value, and as Schultz readily admitted, he did not make distinctions on the basis of age, nor did he allow for the obsolescence of education. Nonetheless, his work had a wide impact on educators and on economists. Specifically addressing himself to educators, Schultz calculated the rate of return on total investment in college education as about 11% per year. Finally, he calculated the effect of education on the national growth rate as accounting for 20% of the observed increase during the period 1919-57.

The year 1962 was an active one for students of the economics of education. Research scholars made a number of contributions to understanding the benefits of college education. Denison (1962, 1967) addressed the problem of explaining the sources of economic growth in the United States, an issue growing out of the prior work of Fabricant (1959) and others. Boldly measuring factors which had been considered nonquantifiable (a practice which causes some physical scientists to view economists with incredulity and other social scientists to look on in envy), he ascribed 23% of the growth rate of total real national income in the period 1929-57 to education, and another 20% to the "advance of knowledge" and "change in lag in application of knowledge." He subsequently made similar computations for the period 1957-62 and found that 15% of the growth rate could be accounted for by changes in education. This essentially confirmed Schultz's findings and has great implications for those engaged in the explicit valuation of college education.

With two grants from the Carnegie Corporation and a mandate from the National Bureau of Economic Research to perform a definitive analysis of the money rates of return on investment in education, Becker (1960, 1964) labored from 1957 to 1964. His results included a unified, comprehensive theory of human capital investment and the conclusion that investment in college education results in an annual private return of about 9% to 11% and a social (total, including private) return of from 8% to 20%. Lest this be too quickly dismissed as the mouse-sized issue of mountainous labor, it should be noted that Becker (a) made downward adjustments of from about 12% to 23% to account for the effects of native ability, motivation, and father's occupation; (b) covered all college students —women, dropouts, nonwhites, and rural—not just white male, urban students; (c) adjusted lifetime income profiles to reflect secular growth patterns, and (d) ignored nothing of significance that had been done previously. His publication *Human Capital* is quite properly considered a textbook.

Using the 1950 census data for the year 1949 that Miller and Houthakker had used, but refining the analysis, Hansen (1963) demonstrated the superiority for realistic decision making of the internal rate of return over the additional lifetime income and present value approaches to measuring returns on investment in schooling. The annual return to total investment, in college over high school, was 10.2% while the return to private investment was 11.6% before and 10.1% after federal income taxes. The private return after taxes (10.1%) was lower than the return on total costs (10.2%). Since society reaps other social benefits, as well as substantial state taxes, it is obvious that "the student pays more than his own way at the college level."

Market analysis. Hansen (1961, 1963, 1967), continuing his research by comparing the rates of return from investment in alternative types of professional education, found that the shortage of physicians and dentists has been decreasing since 1949. This is undoubtedly related to the substitution of drugs and paramedical personnel for physicians and dentists. Hansen's work is particularly noteworthy as a demonstration of (a) the use of rigorous economic analysis in place of manpower planning (e.g., the use of professional population ratios); (b) the indeterminateness of manpower projections; and (c) the variations in definitions of "shortage."

Indirect, External, and Social Benefits

Blaug (1965, 1966), in his thorough comparisons of the rate of return and manpower planning approaches to policy formation for higher education, concluded that the two methods are complementary but "by its failure to pay any attention to money costs and earnings, manpower planning stands condemned as a brand of technological determinism." Blaug also provided a comprehensive compilation of the indirect benefits of education: (a) the current spillover income gains to persons other than those who have received extra education; (b) the spillover income gains to subsequent generations from a better educated present generation; (c) the supply of a convenient mechanism for discovering and cultivating potential talents; (d) the means for assuring occupational flexibility of the labor force and, thus, to furnish the skilled manpower requirements of a growing economy; (e) the provision of an environment that stimulates research in science and technology; (f) the tendency to encourage lawful behavior and to promote voluntary responsibility for welfare activities, both of which reduce the demand on social services; (g) the tendency to foster political stability by developing an informed electorate and competent political leadership; (h) the supply of a certain measure of "social control" by the transmission of a common cultural heritage; and (i) the enhancement of the enjoyment of leisure by widening the intellectual horizons of both the educated and the uneducated.

Though it contains little that is new, *Economics of Higher Education* (Mushkin, 1962) published by the US Office of Education in 1962 is still the most widely read book on the subject. *Economics of Higher Education* introduced the prolific, comprehensive, and complex writings of Bowman (1962a, 1962b, 1962c) to a wide American audience. Effectively bridging the gap between educators and economists, Bowman proposed a better method for estimating the active current stock of education capital and a more adequate formula for measuring total social returns to education. Calling for more attention to education's role in facilitating external economies, she defined private, nonmonetary returns to include (a) the additional things an educated person can produce for himself (e.g., repairs to his house) because of increased skill or more leisure; (b) psychic returns (from job preference, etc.); (c) added enjoyments (reading, music appreciation, etc.); (d) nonmarket production that his education forestalls; and (e) enjoyments for which his education disqualifies him—(d) and (e), of course, are negative effects. In her view, nonprivate monetary returns are those general increases in national income attributable to education; nonprivate, nonmonetary returns are such things as (a) voluntary services to the community by the educated, who draw on skills acquired in school or on leisure which results from positions traceable to schooling; (b) reduced delinquency rates; (c) psychic income attributable to having educated neighbors; and (d) a negative psychic dissatisfaction flowing from awareness of socio-economic failure or negative status. Though she eschewed empirical work, the eventual, practical effects of her rigorous theorizing cannot be overestimated.

In the fall of 1962 the *Journal of Political Economy* (Investment, 1962) published, as a supplement to the October edition, a collection of papers on "Investment in Human Beings" which had been presented at a conference of the Universities-National Bureau Committee for Economic Research. In this publication, Schultz (1962) and Weisbrod (1962) both mentioned redistribution of personal income as an equity serving benefit of education, and Weisbrod discussed external benefits in sufficient detail to illustrate that they are not all in a broad, amorphous form equally affecting everyone.

Weisbrod (1964, 1966a, 1966b) devoted considerable effort to the identification and quantification of the external benefits of education. Although there is disagreement over whether they can be systematically identified and measured, the following external benefits flow from higher education and ought to be considered by any prudent decision maker: higher levels of political participation, higher levels of tax revenue, higher levels of mobility, intergenerational gains through the informal education the children of college graduates receive at home, lower levels of unemployment, and leadership in maintaining political democracy and a free market system.

Aptitude, Motivation, and Schooling

Wolfle and Smith (1956) found that rank in class (presumably reflecting aptitude and motivation) was a better predictor of higher income than intelligence test scores (aptitude alone), and that father's occupation had little predictive value. They also reaffirmed the common opinion that "many high school graduates who are intellectually qualified do not undertake college work [p. 232]" and "it is of some financial advantage for a mediocre student to attend college, but it is of greater financial advantage for a highly superior student to do so [Wolfle, 1960, p. 179]."

On a related point, Denison (1964, 1967) assumed that 60% of the income differentials that appear when men of similar age are classified by years of education results from the investment, productivity increasing effect of education, and 40% from native ability, intelligence, diligence, motivation, energy, race, inherited wealth, family status, etc. Later, on the basis of his analysis of the Wolfle-Smith data and in response to doubts expressed by Malinvaud, Sandee, and others, he raised his estimate of the effect of education as opposed to native ability, motivation, etc., to a range of from 67% to 81% of the differential earnings of college graduates and high school graduates.

Hunt (1963) applied multiple regression analysis to data from the 1947 *Time* magazine study. Reflecting on the results of nine iterations, he concluded that about 50% of income differentials was attributable to education and 50% to ability, quasi-rents (caused by unforseen shifts in supply and demand), differences in nonmonetary income, restrictionism, work experience, returns to sapital, and motivation. Hunt's research revealed that the degree of self-support while attending college, the prestige level of the college, participation in extracurricular activities, and the educational attainment of the student's family all had negligible influence on postcollege income.

Using data on about 7,000 male college graduate employees of AT&T, Weisbrod and Karpoff (1967) re-examined questions concerning the *Monetary Returns to College Education, Student Ability, and College Quality.* With class rank as a proxy for ability and motivation, they compared a number of subgroups under a variety of assumptions and concluded that from 69% to 82% of the earnings differentials between high school and college graduates are attributable to advanced schooling. Although they could not determine whether variations were due to differences in the quality of the college or to the characteristics of the students, they found that earnings increased consistently with increases in class rank and college quality (the latter subjectively estimated). Finally, explaining that investment in higher education provides better returns to individuals who are capable of achieving high class rank, which in turn depends on the quality of college attended, they provided guides to help students improve on the traditional rule-of-thumb, i.e., enroll in the best (most difficult) college which will accept you and within which you can rank in the upper third of the graduating class. Whether students can estimate their future performance levels at colleges of various qualities with any reasonable degree of accuracy is questionable. Nonetheless, this paper is worth noting for its contribution to the "schooling vs. other factors" issue.

In this survey of the literature on the benefits of college education, those studies which illustrate the development and application of theory which will be useful in further study have been cited, summarized and commented on, while indulging a bias toward pioneering efforts and away from simple reiterations. One question (namely, what share of income differentials should be assigned to college education) has been so intractable, however, that it has seemed advisable to include reference to every major study that has touched on it.

The standard bibliography in this field is *Economics of Education* by Blaug (1966). For continuing reports on major advances in this and related topics see *The Journal of Human Resources: Education, Manpower and Welfare Policies,* published by the University of Wisconsin Press, Journals Department, Box 1379, Madison, Wisconsin.

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