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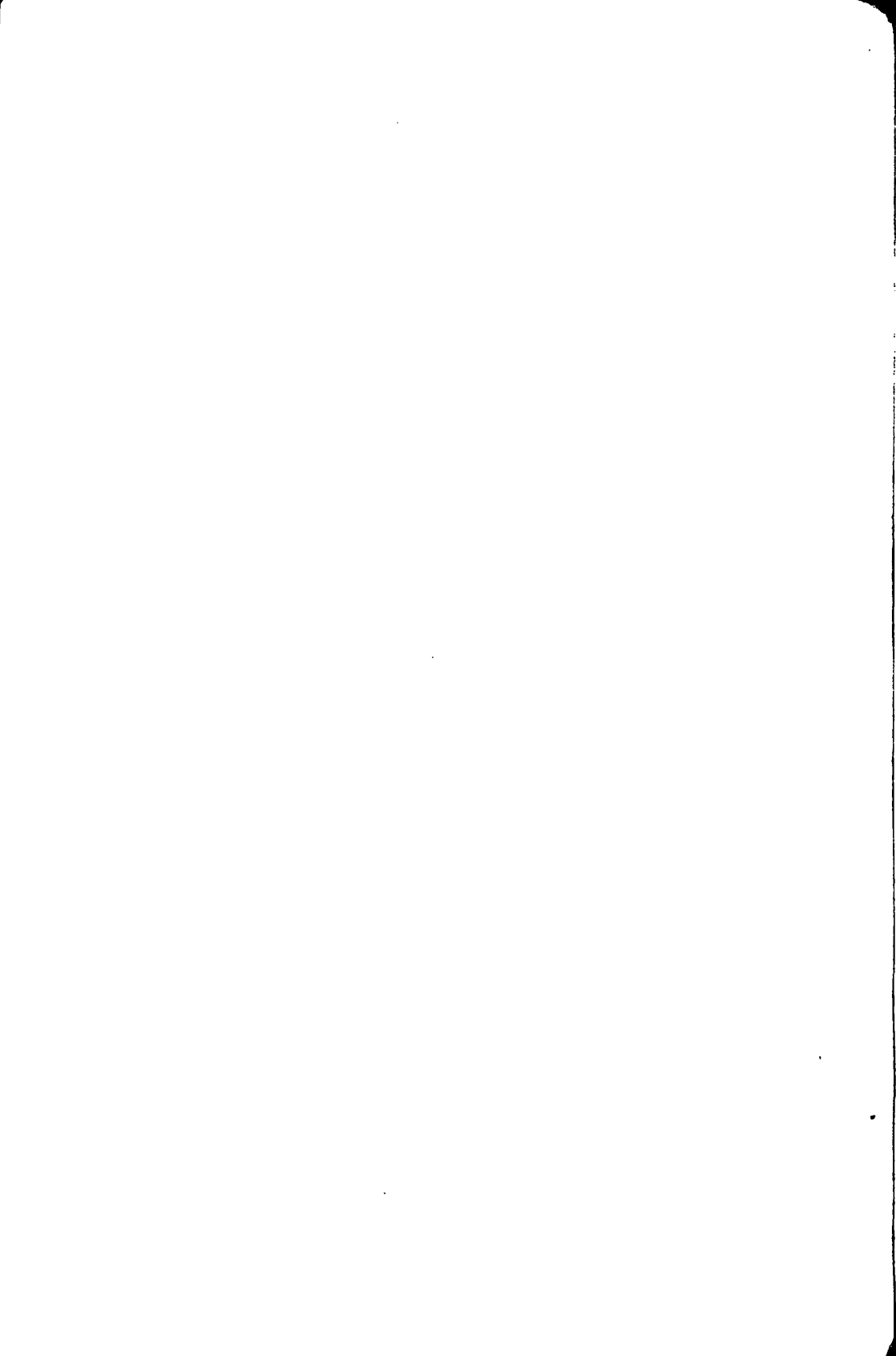
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## **CONFERENCE OVERVIEW**



# THE RECKONING OF EDUCATION AS HUMAN CAPITAL • T. W. SCHULTZ • THE UNIVERSITY OF CHICAGO

The mainstream of the analytical work on human capital pertains to the economic properties of education. My reflections on this and related work are threefold. I shall begin with a comment on the advances in economic knowledge from this work coupled with some observations on its apparent shortcomings; I shall, then, consider briefly aspects of the aggregation problem in the treatment of human capital, whatever its source, in analyzing costs and returns, economic growth, migration, educated labor in a production function, and of human capital in explaining the personal distribution of income. Thirdly, I shall direct attention to some major omissions.

## AS ECONOMIC KNOWLEDGE

THE advances are mainly a joint product of theoretical and empirical analysis. Those that stem from theoretical analysis are predominantly the work of Gary S. Becker. Beginning in the area of investment in human capital, Becker distinguished between specific and general human-capital forms. Next he recognized the importance of earnings foregone in an array of economic activities and developed a theory for the allocation of time to cope with such earnings, and recently, he rediscovered the production activities of the household,<sup>1</sup> for example, in the formation of a substantial part of human capital.

<sup>1</sup> See Margaret G. Reid, *Economics of Household Production*, New York, 1934.

Clearly, in economic thinking and measuring, the concept of human capital is a source of many new analytical insights with respect to particular classes of economic behavior. Seminal economic properties are being attributed to human capital. Mark Blaug in his *Economics of Education*,<sup>2</sup> reviews the progress in this area<sup>3</sup> and then presents the major papers that have been published. His annotated bibliography lists literally several hundred contributions.<sup>4</sup> In determining the role of human capital in the comparative advantage of nations, we turn to Kenen.<sup>5</sup> Human capital has received even more attention in analyzing international migration as is clear from the survey by Scott.<sup>6</sup> The findings of Krueger,<sup>7</sup> in her pioneering paper on factor endowments and per capita income, attributes an important new dimension to human capital. Her conclusion is "that the difference in human resources between the United States and the less-developed countries accounts for more of the difference in *per capita* income than all of the other factors combined."<sup>8</sup> While we await confirmation of her findings, it behooves us to begin thinking through the radical economic implications of her conclusions for economic development. In explaining the personal distribution of income, first Mincer,<sup>9</sup> and more recently, Becker<sup>10</sup> and Chiswick<sup>11</sup> have turned to human capital. Advances in economic knowledge pertaining to internal migration keyed to education and to costs of migrating as a form of human capital are

<sup>2</sup> M. Blaug, editor, *Economics of Education*, Baltimore, Maryland, 1968.

<sup>3</sup> *Ibid.*, "Introduction," pp. 7-9.

<sup>4</sup> M. Blaug, *Economics of Education: A Selected Annotated Bibliography*, Oxford and New York, 1966. Also, see, more recent mimeographed supplements by Blaug, bringing this bibliography up to date.

<sup>5</sup> See paper by Peter B. Kenen in this volume.

<sup>6</sup> See paper by Anthony Scott in this volume.

<sup>7</sup> A. O. Krueger, "Factor Endowments and *Per Capita* Income Differences Among Countries," *The Economic Journal*, 78, September 1968, 641-59.

<sup>8</sup> *Ibid.*, p. 658.

<sup>9</sup> Jacob Mincer, "Investment in Human Capital and Personal Income Distribution," *Journal of Political Economy*, 66, August 1958, 281-302.

<sup>10</sup> Gary S. Becker, *Human Capital and the Personal Distribution of Income*, W. S. Woytinsky Lecture No. 1, Department of Economics, Institute of Public Administration, University of Michigan, 1967.

<sup>11</sup> Barry R. Chiswick, "Human Capital and the Distribution of Personal Income," unpublished doctoral dissertation, Department of Economics, Columbia University, 1967.

also impressive (Sjaastad,<sup>12</sup> Bowman and Myers,<sup>13</sup> Schwartz,<sup>14</sup> and others). Needless to say, there are also other classes of economic behavior and approaches that stem from human capital.

But when we turn to the other side of the coin of these discoveries, there are growing pains, omissions, and a generation gap between those who espouse human capital and those who guard the establishment. Although the guardians of capital theory and economic growth theory may be defending a weak fort, the walls have not come tumbling down.

The beauty of accounting and discounting is that we can take the cost of education or we can transform the earnings from education and call it human capital. But this acquired beauty only conceals the difference between them where there is economic growth. Then, too, the fine art of capital aggregation hides the key to the economic information that makes for economic growth. The aggregation of human capital from education is no exception. As an input, it is well behaved in a production function and it contributes to the output, thus adding to our confidence that educated labor matters in production. But it does not tell us whether all or only a part of this education is worthwhile. Studies of international migration have not been designed to determine whether a well behaved international market for particular high skills is emerging. The going prices for high skills are not made explicit. Nor has the introduction of human capital in analyzing international trade revealed the effects that trade has upon the prices of high skills. Then, too, we consider only a part of education and find it convenient to neglect other parts, notably the large investment in the education of women. By concentrating on education, we are in danger of losing sight of other sources of human capital and, not seeing their contributions, credit some of them to education.

<sup>12</sup> Larry A. Sjaastad, "Income and Migration in the United States," unpublished doctoral dissertation, Department of Economics, The University of Chicago, 1961. Also, "The Costs and Returns of Human Migration," *Journal of Political Economy*, October 1962, Supplement, 70, No. 5, part 2, 80-93.

<sup>13</sup> Mary J. Bowman and Robert Myers, "Schooling Experience and Gain and Losses in Human Capital Through Migration," *Journal of the American Statistical Association*, 62, September 1967, 875-98.

<sup>14</sup> Aba Schwartz, "Migration and Life Time Earnings in the U.S.," unpublished doctoral dissertation, Department of Economics, The University of Chicago, 1968.

## AGGREGATION AMBIGUITIES

IT will not do to continue to bypass the ambiguities of capital theory or of capital in economic growth models because human capital as a part of it is subject to the same ambiguities. The different faces of capital, both theoretically and empirically, lack analytical integrity. What they tell us about economic growth, which is a dynamic process, are inconsistent stories. As the alternative investment opportunities change over time, it alters the difference between the factor cost of a particular form of capital and the discounted value of the stream of services that it renders. But worse still is the capital homogeneity assumption underlying capital theory and the aggregation of capital in economic growth models. As Hicks<sup>15</sup> would have it, capital homogeneity is the disaster of capital theory. This assumption is demonstrably inappropriate in analyzing economic growth in a dynamic world that is afloat on capital inequalities, whether the capital aggregation is in terms of factor costs or in terms of the discounted value of the lifetime services of its many parts. Nor would a catalogue of all existing models prove that these inequalities are equals. But why try to square the circle? If we were unable to observe these inequalities, we would have to invent them because they are the mainspring of economic growth. They are the mainspring because they are the compelling economic force of growth. Thus, what is interesting and what matters in economic growth is concealed by capital aggregation.

One of the major advances of recent years in economic knowledge is the approximate solution of the problem of the residual. Jorgenson and Griliches have shown us a way of explaining productivity change.<sup>16</sup> The improvements in the quality of labor is an important part of the explanation and this part is a consequence of investment in human agents, restricted in their empirical work to education. A decade ago the then growing awareness of investment in human capital followed the observed rise in the quality of labor, and now we have fortified the quality approach in explaining productivity change. The improvements in the

<sup>15</sup> John Hicks, *Capital and Growth*, Oxford, 1965, Chapter III, see page 35.

<sup>16</sup> D. W. Jorgenson and Z. Griliches, "The Explanation of Productivity Change," *The Review of Economic Studies*, 34, (3), No. 99, July 1967. The references listed in this paper cover the recent relevant literature.

quality of nonhuman capital have, also, been large, perhaps a good deal larger than the best available estimates indicate. But the investment activities that account for this part of the additional quality have not been adequately clarified. In large measure, these activities pertain to advances in scientific and technological knowledge, advances which are truly, in some ultimate sense, a consequence of investment in the scientific skills of man.

Now that we have disposed of the residual, where do we go from here? Clearly, so it seems to me, the real unfinished business is to reckon the costs of and returns to each of these quality components along with the traditional components. But it cannot be done with the family of growth models that presently dominate the literature in economics. These models, including capital theory, begin with the wrong questions for the purpose at hand. What we want to know is the relative rates of return to investment opportunities and what determines the change in the pattern of these rates over time. To get on with this analytical task we must build models that will reveal the very inequalities that we now conceal and proceed to an explanation of why they occur and why they persist under particular dynamic conditions. The solution obviously is not in the art of producing ever larger capital aggregates.

The growth problem, thinking in terms of economic decisions, requires an investment approach to determine the allocation of investment resources in accordance with the priorities set by the relative rates of return on alternative investment opportunities. It is applicable not only to private decisions but, also, to public decisions guided by economic planning. The production and distribution of public goods (services) are a necessary part of the process, for example, the investment in research where the fruits of it do not accrue to the researcher or his financial sponsor but are captured by many producers and consumers. Thus, we move toward Harry Johnson's "generalized capital accumulation approach."<sup>17</sup>

While this approach may be paved with good economic logic, it is in fact a rough road with many detours. For particular investments, and

<sup>17</sup> H. G. Johnson, "Towards a Generalized Capital Accumulation Approach to Economic Development," *The Residual Factor and Economic Growth*. Paris: OECD, 1964, pp. 219-25.



there are many such in the domain of human capital, the value of the resource added (services rendered) is exceedingly hard to come by. It is all too convenient to leave the hard ones out, yet each and every omission falsifies the true picture of the full range of alternative investment opportunities. In analyzing education, we cling to differential earnings and leave aside differential satisfactions with no more than a pious acknowledgment that they exist. Another rough feature of this road is the determination of the investment sources and the price of each. The facile assumption of a well behaved capital market serving the formation of human capital is, I am sure, far from true. When it comes to private investment in human capital, poor people are subject to a great deal of capital rationing. Bruce Gardner's analysis of farm family income inequalities in the United States suggests that neither schooling nor migration has been a solution because of the inability of those poor people to respond to shifts in the structure of demand for skills by migrating or acquiring additional skills.<sup>18</sup> The explanation is to be found in capital rationing.

#### SOME OMISSIONS

Let me turn to some major omissions in the work on education, thinking in terms of the formation of human capital. If one were to judge from the work that is being done, the conclusion would be that human capital is the unique property of the male population, that the only services rendered by it are earnings, that the instructional activities of the educational enterprise are the only source of the educational capital produced by formal education, that the response to changes in educational investment opportunities is restricted to the private decisions of students or their parents, and that advances in knowledge are not altering the quality and value of instruction. There is enough substance to this image of what is being done for us to be troubled by the implications.

If it is true that investment in human beings is only for males, we would do well to drop the term "human capital" and replace it with

<sup>18</sup> Bruce L. Gardner, "An Analysis of U.S. Farm Family Income Inequality, 1950-1960," unpublished doctoral dissertation, Department of Economics, The University of Chicago, 1968.

“male capital.” It would serve notice that human capital is sex-specific! Despite all of the schooling of females and other expenditures on them, they appear to be of no account in the accounting of human capital. If females are capital-free, in view of all that is spent on them, we are in real trouble analytically, unless we can show that it is purely for current consumption. There is no way of hiding the fact that females attend elementary and high school to the same extent as males and probably perform a bit better than males. In college attendance they fall behind somewhat; of the 4.9 million enrolled, October, 1966, about two-fifths were women. Even so, in terms of median years of school completed, of all persons twenty-five years and older in the United States, females are ahead of males slightly and the difference in favor of females has been increasing over time.<sup>19</sup> Surely, it cannot be denied that the factor costs of all this schooling of females is real and large. Nor is it plausible that all of these direct and indirect costs are only for current consumption. The investment component must be large. But if there is little to show for it, how do we patch-up the economic behavioral assumption underlying the investment in education?

Mincer<sup>20</sup> and Becker<sup>21</sup> have each devoted a couple of pages to women. Mincer found that on-the-job training is not for women. Becker observes that the rate of return to female college graduates may not be lower than for males “because direct costs are somewhat lower and opportunity costs are much lower for women.”<sup>22</sup> But differential earnings are a small part of the story. The two main reasons for the failure to get at the returns to schooling of women are, it seems to me, (1) concealment by aggregation and (2) the lack of any accounting of the differential satisfactions that correspond with the differentials in schooling.

There are many puzzles about the economic behavior of women that can be resolved once their human capital is taken into account. Young females leave the better parts of agriculture more readily than young males; these females have a schooling advantage and they are not

<sup>19</sup> U. S. Bureau of the Census, *Statistical Abstract of the United States, 1965*, Table 147, p. 112.

<sup>20</sup> Jacob Mincer, “On-the-Job Training: Costs, Returns and Some Implications,” *Journal of Political Economy*, 70, October 1962, Supplement, see pp. 66–68.

<sup>21</sup> Gary S. Becker, *Human Capital*, New York, 1964, pp. 100–102.

<sup>22</sup> *Ibid.*, pp. 100–102.

held back by any specific on-the-farm training as are males. The explanation of the preponderance of women in most Negro colleges before school integration is to be found in the differences between the job opportunities open to Negro women and Negro men graduates. At a more general level, there is the slow, yet real, economic emancipation of women. It may be viewed as a consequence of growth and affluence. But it is also true that a part of this growth and increase in family income is some function of the rise in the education of women, much more than is revealed by the increasing participation of women in the labor force. At the micro level of the household, there is the shift from household work to work for pay; while a part of the explanation is undoubtedly the relative decline in the price of the services rendered by consumer durables, an important part is a consequence of the rise in the value of the time of women which in turn is in large measure the result of the education of women.

Turning now to another major component that is omitted in our work, there is the human capital represented by human agents without any education or by children before they enter upon schooling. The distinction between people with some schooling and those with none, educated labor versus raw labor, is useful for some analytical purposes as Welch has shown.<sup>23</sup> But children before they are old enough to attend school are also a form of human capital. I find it hard to believe that there is no economic rationality in the acquisition of this form of human capital. Surely parents derive satisfactions from their children; in traditional societies children provide old age security for their parents, a substitute for retirement "bonds." But the acquisition of children has its price. An approach that treats the production of children, viewed as human capital, in all probability will tell us a great deal about the economics of family planning.<sup>24</sup> In determining the costs of children, it is already clear that the level of schooling of women and changes in job

<sup>23</sup> Finis Welch, "The Determinants of the Return to Schooling in Rural Farm Areas, 1959," unpublished doctoral dissertation, Department of Economics, The University of Chicago, 1966.

<sup>24</sup> T. Paul Schultz, *An Economic Model of Family Planning and Fertility*, The Rand Corporation, P-3862-1, Santa Monica, California, July, 1968; also, *A Family Planning Hypothesis and Some Empirical Evidence from Puerto Rico*, The Rand Corporation, M-5405, Santa Monica, California, November, 1967.

opportunities for women—or more generally, the economic emancipation of women—and the required school attendance of children, whether cultural or legal, are among the important cost factors.

My conclusions are in two parts. First, there is a class of research, which I have not discussed, in which the very idea of reckoning priorities violates the essence of the process of discovery. It is not possible to reckon priorities for this class because the problem to be solved is one of the unknowns awaiting to be discovered. Consider the original theoretical analysis of investment in human capital by Becker.<sup>25</sup> I think it is fair to say that he started with the aim of estimating the returns to college and high school education in the United States. In pursuing this aim, he discovered that the investment activities associated with education were akin to other investments in people and that all these activities had basic attributes in common for which received theory, tailored to investment in structures and equipment, required reformulation.<sup>26</sup> Then, later in pursuing the many implications of earnings foregone, he discovered the problem that could be solved by a theory of the allocation of time.<sup>27</sup> I find it intuitively plausible that advances pertaining to this part will come largely from microanalysis, mainly, in response to puzzles and paradoxes revealed by economic data, for example, Telser's modification of specific human capital and its formation by firms in his search for the determinants of the differences in the rates of return in manufacturing.<sup>28</sup> Thinking in terms of the activities of the household, it may prove especially rewarding in coping with human-capital formation by the family to approach it as a part of the production activities of the household and, also, in getting at the satisfactions that it renders to the family in consumption.<sup>29</sup> The differences in the motivation of students

<sup>25</sup> Gary S. Becker, "Investment in Human Capital: A Theoretical Analysis," *Journal of Political Economy*, 70, October, 1962, Supplement, pp. 9–49.

<sup>26</sup> Here I have drawn upon my "Reflections on Investment in Man," *Journal of Political Economy*, 70, October, 1962, Supplement, p. 2.

<sup>27</sup> Gary S. Becker, "A Theory of the Allocation of Time," *Economic Journal*, 75, September, 1965, pp. 493–517.

<sup>28</sup> L. G. Telser, "Some Determinants of the Rates of Return in Manufacturing," unpublished paper, Department of Economics, University of Chicago, September, 1968.

<sup>29</sup> My reading of an unpublished paper by Gary S. Becker modifying consumption theory is an approach along these lines.

in their school work associated with the differences in job-market discrimination, following the approach of Welch, is another case in point.<sup>80</sup>

Turning to the second part of my conclusions; a good deal can be said for a reckoning of priorities. Specifically, from this limited endeavor at reckoning priorities, my conclusions are as follows: (1) As a device for preliminary exploration, it is not wrong to use national aggregates whether it be to determine the costs and returns to higher education or to secondary schooling, or to ascertain the amount of human capital in commodities entering into international trade or that which highly skilled people who migrate possess or as a quality input in a national production function, *provided that such use is viewed as exploratory*. In fact, it has been a necessary first step in discovering whether or not there is any economic value in education or in other forms of human capital. (2) Now that it is established that human capital is both real and important, the question becomes: where does it stand within the full range of alternative investment opportunities? In entering upon this analytical task, we are beset by the ambiguities of capital theory and of capital, including human capital aggregates, in economic growth models and in national accounting of change in the quality of labor. It is, also, true that the art of capital aggregation conceals a critical part of the information that we must have to understand and explain the dynamics of economic growth. (3) An investment approach, not only to the many different forms of human capital but also to research activities and to traditional nonhuman forms, is in principle the next analytical step. (4) In the work that has been done, the omission of human capital in females and in children before they enter upon schooling should give us pause. But this troublesome omission, so it seems to me, can be taken on, and the rewards in terms of additional knowledge are likely to be large.

<sup>80</sup> Finis Welch, "Labor-Market Discrimination: An Interpretation of Income Differences in Rural South," *Journal of Political Economy*, 75, June, 1967, pp. 225-40.