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ECONOMIC GROWTH THROUGH INVESTMENT IN EDUCATION

I. The concept of investment in education

The idea of education as an investment and of education creating human capital is not a new one. It is, however, becoming increasingly fashionable. However, as with any fashion, it should be examined critically to determine to what uses it is suitable.

The notion of investment in education may be appreciated by means of an analogy. Natural resources - land, rivers and minerals - are not productive inputs in their original state. Only after the physical investment of men, materials and equipment do these natural resources become useful for further production. In a similar way human talents are developed by education. The processing which is appropriate to natural resources depends on their innate characteristics and the uses to which they are put. Analogously, different types of education make different types of contributions to the development of human resources.

The idea of education creating human capital is a helpful one. It can lead to a better appreciation of the economic significance of education and training. The concept has limitations, however, which must be kept in mind. Treating education as an investment focuses on the economic functions of education. That is an important aspect. Concentration on the economic aspect, however, should not carry the implication that it is possible in any real situation to distinguish the economic contribution of education from its other political and social effects. Because man is indivisible, education has effects on him in all of his roles: as a manager, as a worker and, more generally, as a citizen.

Human capital has other special features which limit the application of the analogy with physical capital. One of the most important of these is the inalienability of labor. Labor skills cannot be bought and sold like machine tools. Ownership is permanently vested in the individual. He, with the help of his family, is the ultimate decision-maker, the risk-taker and proprietor of his talents.

It is often the case with small investors that their business and private lives are inseparable. Their investment decisions are not based only on economic rationale and compelled only by economic forces. Private education decisions are interwoven with desires for status and security and by motives similar to consumption. They are based on inadequate knowledge and in the face of uncertainty about individual talents. All this creates an environment for private decisions about education which is quite different from the environment for decisions on investment in physical capital.

Another major difference between human capital and physical capital is in the role of government. The educational activities of governments have been justified on both economic and non-economic grounds. It has been argued that there is a special role for government because private decisions about education face so many obstacles to economic rationality. The non-economic aspects of education are also frequently cited as the most important reason for the government being given the major responsibility. An educational system is more than a set of institutions for imparting knowledge. It serves as a screening device in determining who is to be educated. Access to education is a prerequisite to individual progress. It determines, to a great extent, advancement in income and status. An educational system without bias in selection is, therefore, essential for providing the equality of opportunity which is a goal of our society.

Education is regarded as a means to the achievement of other social goals: a more effective democracy and more harmonious society. No one would claim that education alone is sufficient to achieve these objectives, but it is regarded as an essential condition.

Whatever the justifications for the overwhelming role of government in education, there can be no doubt of its existence. Education is generally compulsory to an early teen age. It is provided by government without payment of a price or at a nominal price. Certainly that is a most unusual type of capital investment procedure, and it creates another limitation to the analogy between human and physical capital formation.

Still the concept of investment in education is a helpful one. I would like to continue to use it with the understanding that I do not mean thereby to demean its other aspects. Nor do I want to be held strictly to a similarity with physical capital.

II. The contribution of education to economic growth: what has it been and what should it be?

It is a natural thing to do when one talks about investment to ask: "How much?" and, "What is its rate of return?"

Yet, as has been pointed out above, the special features of educational investment make these questions difficult, if not impossible, to answer. Most educational outlays are by state and local governments. Who can say how much of it is for the purpose of making good citizens or good workers or potential entrants to higher education? There is a lot of informal and on-the-job education and training, moreover. This type of education is particularly difficult to isolate and measure. In some cases it may have the most specific kind of economic motivation. Yet there are virtually no statistics which provide direct

and complete measurements.

Turning to the income side there are other difficulties. Although there are exceptions, there is, on the average, an association between native talents and incomes. It is difficult to determine how much of any individual's income is due to talent and how much to its development through education.

Some economists have nonetheless tried to measure human capital and its rate of return. In one such estimate investment in human capital in the U.S. was estimated by Professor Theodore Schultz of Chicago University at 42% of the total investment in physical capital in 1957.¹ The estimates of the rate of return on educational investment run about in the same range as estimates of the rate of return to physical investment in various sectors of the U.S. economy.²

What do estimates such as these tell us about the past contribution of education to economic growth in the U.S. and its potential future contribution? Should there be more or less education of specific types? I am afraid that such estimates are not useful in answering these basic questions. Their conceptual and statistical foundations are just too weak to support any policy conclusions. The results do not warrant an extremely optimistic or pessimistic view. Education, by these estimates, is important and, on the whole, seems to pay off reasonably well. But such estimates cannot tell us whether there should be more or less intensive education of particular kinds.

¹ T.W. Schultz, Rise in Capital Stock Represented by Education in the United States, 1900-57, in Economics of Higher Education, S. Mushkin, ed., Washington 1962.

² G. Becker, "Underinvestment in College Education," American Economic Review Vol. 50, May, 1960, pp. 346-354.

On the other hand the evidence of the 1960 Census of Population in the U.S. confirms the fact that an increasing amount of education and training is necessary for the ordinary functioning of its economy. The "professional and technical workers" category of the labor force has been the most rapidly growing group. The number of workers at the craftsman level has been growing more rapidly than the number of operatives, and the percentage of the working force which consists of relatively unskilled labor has been actually declining.

There is another approach to the evaluation of the significance of education which attempts to measure its effect on labor productivity. By means of this measurement an estimate can be made of the contribution of education to economic growth. This procedure has credited education with about 25% of the economic growth in the U.S. in the first half of this century.¹ However, this result cannot be extrapolated. There are, first of all, many arbitrary elements in the estimation procedure. Secondly, there is no reason to suppose that the benefits of increased education in the future will be the same as the benefits derived in the past. The labor force is already at a comparatively high level of education. Further changes are likely to have only marginal effects. As yet, moreover, the method has not been refined to give any information about the needs for and benefits from different types of education.

There is still another procedure which has been used in evaluating the past role of education and future needs. This approach concentrates on the direct estimation of educational requirements - how much education it has been necessary for the labor force to have in the past and how much it must have

¹ Edward F. Denison, The Sources of Economic Growth in the United States, Supplementary Paper No. 13, Committee for Economic Development, Jan, 1962, p. 148

in the future. This approach has produced results which indicate that in recent years, at least, the college educated people in the U.S. labor force have, on the whole, actually been used in jobs which require a college education for adequate performance. On the other hand a substantial percentage of the U.S. labor force with a high school education were employed in jobs in 1950 which did not require that much education for an adequate performance. The situation may have changed somewhat in the intervening years but probably not by a great deal. A substantial fraction of the labor force, about 22%, did not even require a high school education for a satisfactory job performance. There seems to be more education, particularly at the secondary level, than is justified on strictly economic grounds.¹

I must hasten to add that these estimates do not by any means constitute an argument against universal high school education. They estimate only that amount of education needed by the labor force in their jobs. Even for narrowly defined economic purposes additional education contributes mobility. It makes it easier for workers to adjust to new job conditions, new requirements and new environments.

Estimates have also been made of vocational education requirements which indicate that it is much less important than general education in the U.S. in terms of the number of years of classroom training and on-the-job training involved. I have calculated the average amount of specific vocational preparation required for a worker in the U.S. in 1950 at somewhat less than 1.5 years. This compares with an average requirement of 10.5 years of general education.

¹ R. S. Eckaus, "Education and Economic Growth," in Economics of Higher Education, S. Mushkin, ed., U.S. Department of Health, Education and Welfare, Washington, 1962.

I should stress again that this refers only to the economic requirements for education and training.

The average specific vocational training needs are, therefore, low relative to general education in the U.S. However, this is possible in part just because the level of general education in the U.S. is comparatively high. There are undoubtedly interconnections between general education and vocational training requirements. Both types of education are certainly related to worker productivity.

These studies also indicate a substantial and continuing trend in the upgrading of the labor force. Both the general education and vocational training requirements in 1950 were above those in 1940. The trend seems to have continued into the 1960's.

We have heard warnings that the advance of technology and automation destroys the need for skilled labor. The measurable effects, however, seem not to warrant blanket conclusions of this sort. It is true that between 1940 and 1950 and apparently into 1960 the proportion of jobs involving one to two years training declined in the U.S. The absolute number of such jobs, of course, increased. The proportion and absolute number of jobs requiring only as much as thirty days training increased very substantially from 1940 and 1950. On the other hand the number and proportion of jobs requiring more than two years of specific vocational preparation has also gone up very much.

The shifts in the composition of the education and training required in the labor force are as important as the overall upward shift in the average requirements. Changes in the relative importance of different industries are one cause of shifts in skill requirements. Changes in production technology are another. Both impose substantial demands for adjustment on the labor force as old skills are made obsolete and supplanted by new needs.

These conclusions indicate again that there are good reasons for giving more education at the lower levels than may be justified by simple manpower calculations. That motivation is in the mobility which general education confers. I should stress again that economic motivations are only part of the story. There is, in addition, the general political and social significance of general education: its contribution to individual self-realization and the improvement of the social fabric. These considerations, as I mentioned previously, make it impossible to form educational policy solely on economic grounds.

III. Are there likely to be spectacular benefits from increasing the intensity of education?

Up to this point I have presented such information as economists have about economic requirements for education and its economic contribution. This information is quite limited. I have also made the point that educational policy cannot be formulated solely on economic grounds. With these qualifications I would like to turn to an evaluation of the future potential contributions of education.

I believe that on the basis of the evidence before us it cannot be claimed that there would be spectacular economic effects in the U.S. from more intensive educational programs. They would contribute to economic growth in roughly the same way as education has in the past. There is one guess which has been made that some reasonable changes in educational patterns would increase the U.S. growth rate by about 0.1%.¹ This is just an informed guess. The potential contribution of moderate increases in the average period of schooling may be substantially less. They would probably not be substantially more important than this in contributing to future growth. Programs to improve and

¹ E. Denison, op.cit.

intensify the educational process would also have an impact on the economic contribution of education but it is difficult to believe that they could change its effect in a spectacular manner.

I do not wish to deprecate the efforts of those persons who are trying hard to improve our educational system. Even 0.1% added to our growth is important in absolute terms. I do want to emphasize that there is little evidence to suggest that education is a cheap and easy road to national economic prosperity in the U.S. It undoubtedly contributes and by large amounts. More and better education would continue to make substantial contributions but it is certainly no panacea for all economic problems.

IV. Are there major problem areas in education which may retard growth?

With respect to improvements in educational practice certainly one of the major motives should be the elimination of inefficient and ineffective techniques and curricula. There is never any point in being wasteful. It has been shown in a number of cases that some of the methods, organization and subject matter in education have been just that.

An increase in the average number of years of schooling would permit a better education. Perhaps more important is the need to raise drastically the standards of the less effective school units. The differences between the best and worst educational systems are very great at all levels. It is not easy to compare the quality of educational systems and it is sometimes thought not to be in good taste. But among professional educators everyone knows that there are differences in quality at the elementary level and at the intermediate and university levels. Improvement of the quality of the less effective schools would reach a larger number of persons than concentration on improving still further the best schools. They should continue to improve, but the most pressing

needs and the greatest obstacles to more effective education and training are now in the school units which are second class or worse.

It must also be conceded that we in the U.S. are far from achieving equity in educational opportunities. Equity, in this case, clearly does not imply equality of education but it does imply, I believe, equality of opportunity. Inequities in education, which are socially undesirable in themselves, also have economic costs. There are the well-known racial discriminations which restrict the potential development and contribution of a significant portion of our population. While economic qualifications for education have been eliminated at the elementary and secondary levels, they still have effect in higher education. They are inconsistent with our social ideals and that is sufficient justification for their elimination. It is also likely there will be general economic benefits from broadening educational opportunities.

There are other aspects of our educational system which directly or indirectly have effects which hinder economic growth which I do not want to pursue. For example, I shall only mention in passing that in the U.S. the major burden of educational finance at the local level is on property taxes. It is by no means clear that it is equitable and economically efficient to pay the costs of education in this way.

The recent surge of enthusiasm for education has had its greatest impact at the college and university levels and in improvements of college preparatory courses in high school. There are certainly extremely important changes to be made in these areas. I would like to suggest, however, that there has been a profound neglect of the non-college preparatory curricula and that this neglect has important economic and social costs.

Remember that even in the U.S. roughly ninety per cent of the labor force are not college trained. Consider for a moment how they arrived in their jobs.

A small fraction have had some vocational training in high schools - craft training or clerical. This high school training with a few notable exceptions is based on antiquated technologies and equipment. Still, through it, some young people find types of work which they like and for which they are adapted. They go on to apprenticeship programs, trade-schools or company training programs by which they continue to advance their skills and general competence. These are workers who move in a reasonably direct way through organized training programs without waste of time and effort and are productive at each stage. They are, I believe, a minority of the labor force.

Most members of the labor force find their way into their jobs in industry in a rather aimless, searching procedure. They pick up a few skills along the way. For the most part they learn by doing or by taking speeded-up specialized training. By accumulation of experience they may develop substantial amounts of expertise. But their training will be uneven; certain basic skills may be lacking and higher level jobs as a consequence will be closed to them.

There is much job and geographical mobility in the U.S. and many opportunities exist for workers to get ahead. Eventually the "square pegs" may be fitted fairly well into the "square holes" and the "round pegs" to the "round holes." The job training and worker selection process is inefficient and slow, however, and therefore costly. Some of these costs are borne by business firms; they take the form of higher labor costs due to excessive turnover rates, inadequate training and low productivity. The economic costs borne by workers take the form of unemployment and lower incomes. There are also psychological costs in the uncertainty and delayed social adjustment of the individual. These sometimes become acute social costs.

There are many benefits accruing to the country from the increased emphasis on education and the fresh outlook towards standards of quality. Most of the

emphasis and revision has been directed toward professional and semi-professional training. These are, no doubt, important areas. Yet the bulk of the labor force falls in other categories and for these workers the need is just as pressing for reform and upgrading of their education and training. That has hardly started and remains as one of the major educational problems of the nineteen-sixties.