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ABSTRACT

This paper consists of three related lectures dealing with the application of basic economic concepts and theory to educational planning. In the first lecture, the author describes the fundamental principles involved in the study of economics and shows that educational planning is basically a process for making certain economic choices. The second lecture examines the economic concepts of savings, investment, consumption, and production, and then discusses their application to educational planning. The third lecture discusses the economic concepts of capital in general and human capital in particular and considers three possible approaches to studying returns to capital formation in education. (Author/JG)

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No. 40 ESSENTIAL ECONOMIC CONCEPTS FOR EDUCATIONAL PLANNING

by A.C.R. Wheeler

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by

A.C.R. Wheeler

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CONTENTS

PART I ECONOMICS AND PLANNING

Why does educational planning require any study of economics? Without meaning to suggest that other subjects don't have a relevance for educational planning, it must nevertheless be said that without at least some familiarity with economics it is very difficult to plan education. Certainly one can plan much better knowing something about economic concepts and techniques. So we come to the key question. Why is economics so important for planning?

Planning of any kind is basically the endeavour to work out how to achieve the maximum possible with the resources available. Fundamentally, economics is the study of how people and, perhaps more important for our purposes, society, chooses to allocate the resources at its disposal in order to achieve its chosen objectives. The important point in common between these two descriptions of planning and economics is that in both cases we talk about using limited resources to achieve certain objectives. This obviously has the implication that there is something fundamental to both, and we shall see how any kind of planning is only an especially disciplined example of economic behaviour. In order to investigate in more detail the idea of economic behaviour we can begin with a very simple example of human conduct and gradually introduce more complex situations to lead us up to talking about educational planning as an instance of economic behaviour.

Take a very simple everyday situation in, well, anywhere in the world. A woman is by a river washing clothes. As she does her washing the river is flowing past. If she was shown a new way of washing clothes which allowed her to use less water she would not be very interested because for her purposes she has an unlimited supply of water coming along whenever she needs it. But if instead she could be shown a way whereby she could wash clothes and use less soap than she does at present, or wash the clothes in another way so that they did not wear out so quickly, either of these would be very interesting to her. Why? The point here is that an unlimited resource is not economically significant. There is no point in restricting its use because there is an unrestricted supply available for any alternative use to which the amount saved could be put. Thus no benefit would occur from saving in this instance. But the two latter examples mentioned above, of saving soap or making the clothes last longer, do have an economic significance because, by extending the use of one scarce resource - the soap or the clothes - we are freeing the means to devote more attention to using other resources. If less money has to be spent on soap or clothes, more is available to spend on other things.

Thus as long as there are unsatisfied objectives it is necessary to make such choices which are economic in character in order to achieve as far as possible the desired objectives. This economic characteristic of behaviour applies not just to financial matters but to all kinds of everyday behaviour. The basic point here is that economics is about scarcity and the implications of this fact of scarcity for our everyday behaviour.

In the very primitive example just given this all sounds very simple. In any more complex economy the situations to be examined will be much more intricate, but this basic economic motivation remains the same, for example, consider the shipbuilding industry. In recent years in many countries the progress of shipbuilding has been very difficult. There have not been enough orders to keep all the workers occupied, with the consequence of heavy unemployment among shipbuilding workers. Partly this derives from the character of shipbuilding, which needs different kinds of workers at different stages in the building of a ship. Thus unless there is a steady stream of orders for new ships not all of the workers can be kept occupied all the time. So, many shipyards have taken to trying to produce other kinds of goods, of which pre-fabricated housing is a fairly common example, and in this way they can keep all their workers and their industrial plant occupied and hence they are able to achieve much more with their resources.

Another example, also from a shipping context, derives from the so-called revolution in cargo-shipping with the introduction of container-ships. Previously most cargo-ships carried many different small consignments of various goods for delivery in different places. This meant that when they arrived at a port they might have to spend as much as a week there unloading and then loading other cargo to take elsewhere. While the ship is doing this it earns no money for sitting in the port, so the obvious question is how to minimize the time the ship stays in port and maximize the time it is sailing across the ocean carrying cargo when it is earning money. The introduction of containers which allow different kinds of commodities to be put together in one container for a particular destination, where it is unloaded and the port authorities sort out all the goods, permits ships to stay in port only one day instead of six. In this way much better use is made of this particular resource - the ship - so it earns much larger returns. As we approach more sophisticated economic situations we come closer to the argument that planning is simply a more sophisticated attempt to apply particular techniques to the endeavour of achieving the maximum possible use of given resources. The next stage is to consider government policy.

In any country today the government has a very wide variety of activities and among these is that of controlling the economic progress of the country. Also government is interested in different social services, of which education is generally said to be one, in defence, and some countries have foreign aid interests, or nationalized industries which the government runs, while elsewhere the government may be especially concerned with subsidizing agriculture, and so on. In order to pay for all of these different activities in which it may be interested, the government has revenue from various sources, mostly different kinds of taxes and duties on goods, services, etc. (Theoretically, of course, if it wanted to spend more money, the government could always do so by printing more since it owns the printing press for money. But in practice governments do not usually do this because

it is a very inflationary way of proceeding). Instead the government usually regards its incomes as limited to the receipts from its various taxes, etc. It treats this income as the amount of money it has to spend in providing the services, etc., that it offers the people. Thus the government also has an expenditure limit and hence faces the problem of limited resources with which to achieve its different objectives. Now it is necessary to consider our special interests, education, in the light of this basic fact of scarcity of resources.

The various reasons why government is interested in spending money on education are well-known. There is public demand to be satisfied, there is the need of the economy for skilled and qualified manpower, and there is a built-in momentum of the educational system itself, such that once it is established it has to be maintained. All of this is true and it provides a powerful set of reasons for spending money on education. But equally there are very good reasons for the government to spend money on other directions. People have to be provided with housing. Agricultural development must be fostered especially in a predominantly agricultural country.

So the government has to make a basic decision in the first place whether to spend money on education or whether to spend it on other activities. Beyond this we come to all the details of what must be the exact content of such an educational policy. Here again, it is necessary to choose between different alternatives, since invariably people want to do more than they can. However, notice that already a wider ranging decision has been taken than simply the one to spend money on education, because by deciding to spend money on education we also decide not to spend money on certain other things on which it could have been spent. So although it seems a very simple decision just to spend on education, actually it is a whole lot of decisions.

Within the educational system choices have to be made in the first place say, between spending more on primary education and less on secondary or perhaps more on higher education. This is an economic choice because, for example, it is more expensive to expand secondary education by a given amount than it is to similarly expand primary education. Secondary education needs better qualified teachers so they have to be paid higher wages, or, since more equipment is needed in a secondary school than in a primary school, the school becomes more expensive. Also the educational system itself has certain built-in limitations. Thus secondary education can only be expanded as fast as additional teachers can be provided for it and of course there is limited capacity for teacher training. Here again another economic element comes into decision-making.

However, it is not only economic factors which affect this decision-making. There is very strong public interest in education and the public may want certain kinds of education and be perhaps less interested in others, so this has to be taken into account in making decisions on how to develop the educational system. Similarly, once educational facilities are in operation they usually have to be kept in operation and this necessitates restricting part of the resources allowed for education to maintaining what already exists. Therefore there is less available for future expansion and this in turn is another limitation on the freedom of decision, on the economic choices.

This comes down to recognizing that although it is not only economic influences which affect our educational choices, all these decisions on education, these planning decisions, partake of the basic characteristic of economics, namely, the need to make choices within the limitations of scarce resources. Thus it can be said that planning is only a specially disciplined type of economic decision where we have particular objectives in mind.

PART II SAVINGS, INVESTMENT, CONSUMPTION AND PRODUCTION

A. The concepts

The basic point of the first lecture was to show how economics is primarily interested in studying the question how we can make better use of the resources available to us and also to recognize that planning is a particular technique for carrying this out. In this lecture we begin to examine some of the fundamental economic concepts which are relevant to the problem of making choices when we try to behave economically. In particular we are going to look at savings and investment and also we shall have occasion to refer to the concepts of production and consumption.

To introduce this subject we begin with a very simple illustration which will help to bring out some of the particular characteristics of these concepts. Consider a society of the most primitive kind which exists only by hunting, so that life is basically the hunt for animals which provide food. Suppose for some reason that hunting becomes more difficult as there are fewer animals around. The hunter decides to develop some simple aid to help him, such as a primitive spear. Hitherto, his whole time was devoted only to consumption but now he has to pause from hunting in order to make the spear. For economists the act of making the spear represents both a process of saving and also of investment. It is saving because while the hunter is making the tool he has to stop hunting, which means that for that period he is forgoing potential consumption, although of course with the objective of being able to consume more later. However this is also considered to be investment because by making the tool the hunter increases his hunting capacity, and therefore his future productivity in terms of the numbers of animals he can hope to catch, which in turn implies increased future consumption. The principle to be brought out from this example is that for economists there is an identity between savings and investment.

One important point needs to be made at the beginning of this discussion of savings which is that for economists saving is not just hoarding. It is not simply a case of holding money and keeping it under the bed, but something more positive. Saving is the decision to abstain from consumption now with the expectation of being able to consume more later, whereas of course keeping money under the bed is simply postponing spending it. This can be seen more clearly, for example, by considering again the illustration used above. We saw that making the tool was both saving and investment, but in the context of this example hoarding would simply be deciding not to hunt one day, i.e. postponing the possibility of consumption for a day. So there is an important difference between saving and hoarding in economics.

The identity of savings and investment was very obvious in the above example, but of course in modern economic life which is far more complex, it is not always so clear that there is this identity between savings and investment, especially when we recognize that the two activities of saving and investment are frequently carried on by different people who have quite different motivations.

1. Investment

In economics investment refers only to net capital formation, i.e. the act of increasing of the community's stock of productive capacity. Thus an important aspect of investment is that it always involves some kind of innovation. That does not mean that every time a factory is built it has to be a new kind of factory, because simply building an existing type of factory in a new location is an investment since it creates a new situation for economic behaviour. A further corollary of this concept of investment is that we exclude the simple replacement or maintenance of the existing productive capacity. In economics the terminology that is commonly used to describe such replacement is provision for depreciation.

Thus investment is undertaken by the producers in society, which means enterprises of different kinds in agriculture, industry, etc., and also of course the government. In the case of enterprises their motivation in undertaking investment is clear enough. They expect to make a new product, or sell an old product more widely, and so to make higher profits. In the case of government the motives for investment may be somewhat more obscure and diverse. For example, much of government investment is in developing social services. These do not produce a physical product to be sold in the market, but they can contribute to the productive capacity of the community, e.g. education expenditure potentially increases the skill of the labour force. This can help the economic policies of the government and in turn improve its political position, so we can see that there is a wide variety of possible motives for the government to choose to invest in its different activities.

2. Saving

The concept of saving has a restricted meaning in economics by which it excludes hoarding and simply postponing consumption. We only count as saving that which involves withholding from current consumption in order to have more future consumption. In terms of everyday life this distinction may sound a little artificial but in economics it is an important one. Some saving in the modern economy, in fact a fairly rapidly increasing proportion, is done by enterprises out of their own profits, but of course there is also a considerable amount done by individuals.

In the case of enterprises there is an obvious motive for such saving relating to the motives we have referred to in their choosing to invest for increased future profits. In the case of individuals, however, motives for saving can be extremely varied, e.g. they may wish to buy a car or take a long vacation or perhaps they have a longer-term aim such as wanting to ensure a more confortable old age. But in each case the point which characterizes this activity is the desire to increase future income rather than simply to retain the existing income for use at some later time.

This point is a complex one to make clear because the economic use of the term saving is decidely narrower than the everyday use of the term. For example, to the economist much that is habitually spoken of as saving, such as purchasing industrial securities, is not saving in the economic sense because there is no real capital creation involved but only a transfer payment, transferring a source of income from one recipient to another, without creating any new source of income. There is no certainty that the man who sold the securities is then going to use the proceeds of the sale for any capital creation.

However, to show how complicated this definition of saving can prove to be in practice, consider the case of buying stock in the new capital issue of an enterprise. This would be a form of economic saving because the enterprise is going to use this capital supplied to it in the creation of a larger capital stock for increasing its own production. But simply buying and selling shares between people on the stock exchange is not regarded in economics as saving because it does not bring about immediate capital formation, increase of the community's capital stock. Nevertheless, despite these complications just touched on, the fundamental point to recognize in economics is that by definition, because both savings and investment refer to the increase in the community's capital stock, saving must equal investment.

3. Consumption and production

We go on to speak briefly on the concepts of consumption and production since these also have some importance in educational planning. Consumption is a term about which not much needs to be said because economists use the term consumption in much the same way as it is used in everyday conversation. Consumption simply represents the disposal of the rest of income apart from that which is saved. It is important to note that hoarding is included in consumption since hoarding is only delaying the purchase of goods and services for current satisfaction, as explained earlier.

Production in the economic sense is the total output of goods and services resulting from previous investment. This is an obvious statement but it contains a complication. Part of the output of one enterprise very often represents part of the investment input into another enterprise. Thus one factory makes bricks, and these are the output of the brick factory. But of course the bricks are also a very important input into the rest of the building industry, in making houses, schools, etc. Taking another example of this complexity from education, one of the objectives of the educational system is to produce trained teachers who can hence be regarded as part of the output of the educational system. But trained teachers are also a very important input in the educational system because they help in the production of the qualified school leavers who are another important output of the educational system. The point to be made here is that it is comparatively easy to assess the gross production of a country but it is much more difficult to calculate the net production, since this involves excluding all products which are used in further production as investments, because to establish net production it is only necessary to count the value added at each stage of production. This problem is considered further in a later lecture on national income.

B. Applications of the concepts to educational planning

In the second part of this lecture we consider the application of the above concepts for educational planning, beginning again with consumption and investment.

Education can be treated as both consumption and investment if considered from the individual's point of view. When someone receives education it fits him in a wide variety of ways for what can be called - to use the simplest term - a better life. He has greater access to culture, he can read newspapers and so on, and this represents an increase in his consumption possibilities. But also from this individual's point of view such education is an investment in that it provides him with better qualifications for employment or better capacity to absorb further training. In this way he can develop his future earning capacity and potentially his living standards as well. This is considering education only from the individual recipient's viewpoint, but investment in educational development is also very important from the national point of view for economic growth, mainly because of the possibility offered of increasing the supply of qualified manpower.

These general comments on investment and consumption in relation to education are fairly self-evident, but in going beyond them it is necessary to recognize that the detailed application of these concepts in educational planning has not been entirely successful so far. It has created a great many problems for educational planners which are still far from solved. We will refer to a few of these in order to indicate some of the complexities.

These concepts are difficult to measure when used in relation to education. Thus although education has both investment significance and a consumption significance it is very difficult in practice to identify one part of education as having primarily the investment effect and another part primarily the consumption effect. If we said that a history lesson is a consumption aspect of education and a mathematics lesson an investment aspect this is obviously a very over-simplified and unrealistic way of trying to approach the problem of separating the consumption and investment effects. Although the different effects of education can be distinguished, they cannot be linked to particular types of education, so it is difficult to be specific in trying to allocate resources to education say for its investment effect or for its consumption effect.

There is also the question of trying to identify the rate of return to expenditure on education. In the case of physical investment, a monetary value can be given to the resultant output, but what value can be given to the output of education, educated people, especially when we take into account the consumption aspects of the education received? The differential earnings of the better educated are a limited guide in this instance.

When we go a little more deeply into educational planning these questions become much more complex. Thus, in making a choice between developing different types of education we might ask what are the relative contributions to economic growth of emphasizing technical and vocational education or emphasizing general secondary education. To put emphasis on technical and vocational education may mean immediately a better supply of certain types of skilled workers. But emphasizing general secondary education may improve pupils' capacity for and their receptivity to further training. In this way it may be possible to create a greater flexibility in the future labour force than if we only endeavour to train people very specifically for certain technical positions. This indicates a fundamental difficulty in human resource development. Do we only try to educate people to fit them into some preconceived employment pattern, which might be regarded as a strict manpower approach, or alternatively are we trying to educate people so that they can bring to future society their particular abilities and offer their full capacities for the continuing development of society?

Finally we must refer briefly to the concepts of saving and production and their significance in educational planning. We spoke of saving as being an identity with investment. Thus from the individual's viewpoint whenever he continues his education beyond any compulsory level he has to make some kind of saving to support this. This might be through the form of income he forgoes in not starting work earlier, or through using personal resources which he could otherwise consume. If he is supported by some kind of government grant in that case the government undertakes the saving in order to make the investment of providing more education. Thus when government undertakes a programme of educational investment it also has to make a saving decision since in choosing to invest certain resources it thereby precludes the possibility of allowing those resources to go into consumption, for example, through making a reduction in taxes.

The significance of the production concept in educational planning refers to our earlier example of the characteristics of teachers in the educational programme, in that they are both an input and an output. This can be extended to a further level if we consider the need to produce people who will staff teacher training colleges. They are an output of the educational system but then they are also an input which in turn will help create something else, teachers, which is again both an input and an output of the system. Thus the question of gross and net production can become quite complex even within the educational system.

This concludes our illustration of the applicability of some basic economic concepts to the study of educational planning problems.

PART III THE CAPITAL STOCK

We begin by discussing the concept of capital in economics and then go on to consider the development of this concept in relation to human capital. Finally we shall examine various methods of evaluating rates of return to investment in education and some of the difficulties attaching to these different methods.

A. The concept of capital

In traditional economics capital has been treated as one of three factors of production along with land and labour. Within this division capital could be defined as the stock of goods produced by the economic system which are to be used as productive inputs for further production of consumption and other goods or services.

In this definition land is excluded. The reason for this is that land already exists as part of our natural resources, hence it does not have to be produced. However the characteristic of the definition is that capital is produced. Labour is also excluded, for when this theory was being developed production was generally far simpler than it is today and hence most labour was relatively unskilled and uneducated. Thus labour was treated as a much more homogeneous commodity than today, and something which could simply be separated from machinery, etc. Perhaps another reason why earlier economists chose not to talk about labour as a form of capital was a certain distaste for putting men and machines together under one term, in conflict with prevailing humanistic attitudes.

The capital stock is the result of investment and the previous lecture explored how an act of investment involves a parallel act of saving. Thus it becomes evident that an important determinant to the country's ability to increase its capital stock must be its ability to save more. However, in developing countries the majority of people have a very low income scarcely sufficient to satisfy their daily needs. Then it is comparatively much more difficult to make a temporary reduction of consumption in order to save more for an expanded future consumption, even though such a reduction is only intended to be temporary. Since increasing the capital stock is a prerequisite for raising the living standard, it is very evident that the difficulty in increasing savings is a potential bottleneck for development in the developing countries.

A variety of ways have been suggested in which savings can be increased, such as taxation, foreign aid, private foreign investment, finally inflation. These are discussed in turn, taking particular note of their disadvantages.

1. Taxation

The basic difficulty with taxation in many countries is its inefficiency. Evasion is prevalent and collection inefficient. Thus an extra 10 per cent tax on imports may result in an increase in smuggling, so that although the price of imports is increased, the amount of legal imports may decrease, along with the yield from the tax. Even when there is no evasion of tax the result may be only that an increase in tax deters people from whatever saving they may have been carrying out, in order to be able to pay the higher taxes. Then all that changes is the method of saving, not the amount saved.

2. Foreign aid

Virtually all developing countries already receive foreign aid, in some cases a considerable amount. But it is increasingly coming to be recognized that this has its limitations. Most foreign aid, hitherto, has been in the form of loans, which usually must be repaid with interest, frequently in a foreign convertible currency. By making extensive use of foreign aid in this form a country creates an extra future burden on its balance of payments, breaking into its limited foreign exchange reserves to make such repayments. Already several developing countries face a serious problem of servicing their foreign debt. In such countries the continued possibilities for using foreign aid in this form are becoming more limited, and grants are increasingly preferred, though probably more difficult to obtain.

3. Private foreign investment

This is a subject on which there are perhaps more political than economic comments to be heard, bearing in mind the history of most developing countries which at some time have been colonies, and also the fact that a great part of such investment comes from countries which were previously the imperial powers. However there are also economic difficulties because private investment is generally looking for profits as its first objective, rather than specifically endeavouring to assist the development of the country. Often this involves putting money into the foreign trade sector of the developing economy, e.g. investment in plantation agriculture. For the country in which the investment takes place, this has the adverse effect that it does not help to diversify the economy. In general, the objection to private foreign investment as a means of increasing savings lies in the difficulty involved in fitting it into planned national development, since the criteria of choice of the investors are most unlikely to accord with those of the national policy-makers.

4. Inflation

The last of the alternatives mentioned is inflation. To take a simple example, this might begin with the government undertaking capital projects for which it does not have the immediate financial resources and then creating money in order to pay for them. Thus through the government's capital creation there is a flow of money into the economy. Thus wage earners, working on these projects, have more money to spend on consumption, as do suppliers of raw materials and equipment for their completion. If the goods they want to buy cannot readily be expanded in supply this means certain increases in prices, pushing an extra flow of money into the economy again. The general result is to set off a chain reaction of this inflationary effect throughout the economy. While this brings an immediate benefit in some capital projects, over the longer period, through the inflation, subsequent capacity for carrying out further capital formation is reduced, because the general price increase also raises investment costs. The increased prices may also make it more difficult to sell export products abroad. Hence this is essentially a short-term palliative, to be used with discretion.

We have shown above that there are difficulties to the various ways of trying to increase the capital stock, but in virtually every country some capital formation is taking place and in some cases at an appreciable rate through all or most of these techniques. But while earlier economists fel that increasing the capital stock was the important key to development, there is a trend of opinion to consider this as no longer the only important factor influencing development. It is now considered that the impact of continued technical progress and the processes of invention, together with the effects of education, may on the one hand, by informing people better, increase their willingness to undergo sacrifices for development and on the other hand increase their skills and also their possible direct working contribution to development. Thus it is not only the quantity of capital but also its productiveness which contribute to development.

B. Human capital

We now consider the concept of capital in relation to education in more detail. One element of the educational system obviously is part of the stock of physical capital which we have been talking about hitherto. This is the physical plant of the various schools and colleges which make up an educational system in a country and all the equipment which is contained in those buildings. But for our purposes this is not the most important part of capital stock when we talk about education. Much more important is the stock of educated people in the economy. This brings us to talk about the idea of human capital already mentioned.

When capital was referred to as one of the factors of production we distinguished it from labour. More recently economists have come around to talking about human as well as physical capital which implies that they have come to consider the labour force and particularly the educated labour force as part of the country's productive equipment and hence as part of its capital. This is largely the recognition of the earlier excess emphasis on the accumulation of physical capital and the appreciation that a deficiency of skills in an economy is also an impediment to development. It is evident that the effective use of additional physical capital largely depends on the availability of the appropriate human skills. Thus human capital formation involves not only investment by society (public expenditure on education), but also investment by employers in training activities as well as the investment by individuals of their own time and money in developing their capacities.

In this variety of approaches to human capital formation there can be seen parallels developing in relation to our earlier discussion of physical capital formation. There is a variety of possible techniques for making the appropriate investments and savings and of course there are also difficulties in making these different investments. We are concerned with not only the stock of capital but also with its rate of accumulation. But although the concept of human capital is parallel to that of physical capital it is as well to recognize that the parallel has its limitations and some of these must now be considered.

In the first place even in the case of physical capital there is no mechanical relationship between the amount of resources invested and the value of the capital formation that results, i.e. an investment of $1 million does not necessarily produce a $1 million return, but maybe $100,000, or even $5 million. This can happen even though most physical capital investments are comparatively specific, e.g. equipment for making bricks can be used for little else. By comparison investment in human capital is much less specific. However specialized their education, people have a great variety of jobs open to them, assuming the existence of suitable vacancies. Thus the relationship between the input and the output is rather more complex in the case of human capital than it is in the case of physical capital.

Also, when we invest in physical capital we may be endeavouring on the one hand to rectify certain short comings in our natural resources and existing stock of capital or we may be trying to exploit more fully certain particular advantages we have. But we cannot make exactly this kind of parallel when considering investment in human capital because while we certainly want to exploit individuals' natural advantages we do not educate them only to exploit those advantages, there are other more humanistic aspects as well. A further objection made to the concept of human capital is as follows. Imagine a mistaken physical investment, such as a railway

located in a certain river valley when it subsequently appeared that a much better route could have been used. It is possible to decide simply to discard the first railway and build a new one, assuming of course that the resources are available for the purpose. However, if a lot of people are educated in one way and then they cannot find employment very easily they cannot be discarded. People cannot in this respect be treated like material investments - human capital cannot be scrapped in the same way as physical.

C. Return to capital formation in education

In concluding we must examine one or two of the approaches which have been used in studying returns to capital formation in education, and in particular objections to these approaches.

(a) A fairly simple endeavour of this kind involves relating the gross national product of countries to their educational enrolments. But the basic difficulty with doing this is that even if a very good correlation is discovered, this does not indicate whether a high enrolment in education is the reason for a high level of GNP or whether, because a country has a high level of GNP, it can afford to put a lot of money into education. Thus the causal relationship here does not come out very clearly since this is only a simple correlation approach.

(b) The next approach used is frequently referred to as the residual approach. One of the best-known exponents of this approach(1) attempted to show that an appreciable part of the economic growth of the United States over the last century could not be related to the increase of physical capital during this period, but was due to something else called a 'residual'. In the course of this exercise an attempt was made to establish returns to education by taking certain groups of the population and from census data relating different age groups to different earnings in order to show how these earnings were a function of the education people had received. However, in the process an assumption was made which casts serious doubt on the whole exercise. It was assumed that three-fifths of the reported income differential represented differences due to education as distinguished from associated characteristics such as differences in ability and so on. But this assumption appears to be assuming what is to be proved, which is tantamount to invalidating the approach.

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(1) Edward F. Denison. 'The Sources of Economic Growth in the United States and the Alternatives before us'.

(c) The third of these attempts to measure returns to educational investment is to some extent a variation of the previous one and is called by the general name of the returns to education approach. The endeavour here is to compare life time earnings with the amount of education that people have received and then relate differences in these earnings to their education. However, there are a great many difficulties in doing this. In the first place, there is the problem of how to measure the amount of education received, since different countries have different educational systems. For example, the length of the school year differs quite widely in different countries, so it is comparatively difficult to find a common measure of the amount of education that people have received. Secondly, there is the question of the differing abilities and motivations of individuals. A highly intelligent person may make far more use of three years' education than a less intelligent person who receives six years' education, and this of course says nothing about the comparative quality of the education in each instance. In any case, people do not select their education, to the extent that it is not compulsory, only in relation to the earnings they hope will result subsequently.

There is another type of difficulty to be considered also. Some types of human capital formation, particularly on-the-job training, are provided by employers who obviously expect to obtain some return from the provision of these training opportunities. That means of course that they expect to receive some profit which will be directly attributable to this expenditure. Thus in turn they will not want to pay all of the increase in their profits to the people who have received the training, so that the earnings the trained workers receive will not entirely reflect the amount of training they have had. Finally there is another motivational type of objection, the fact that we do not always choose a job just because of the level of earnings it provides. A sense of vocation enters into choosing certain jobs and there is the question how to take that into account in trying to make this type of calculation.

D. Conclusion

This lecture has tried to examine critically, how the capital concept used in economics can be made use of in educational matters. Thus it perhaps gives more attention than is necessary to the difficulties involved. However, having recognized that there are considerable difficulties, this is not to say that this type of approach should not be made use of in educational planning. It can be so used, but this must be done with a proper sense of caution.

Suggested additional reading

Paul A. Samuelson, Economics: An Introductory Analysis, New York, McGraw Hill, 1964. (Especially Chapters 1, 11, 28).

Gerald M. Meier, Leading Issues in Development Economics, New York, Oxford University Press, 1964. (Pages 266-283).