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ABSTRACT

If education is a form of investment, how much does it contribute to economic growth compared with other forms of investment? The first approach to answering this question was the correlation approach. But although simple correlation studies show a relationship between education and economic progress, they do not prove cause and effect. The residual approach tried unsuccessfully to show how much increase in national income was due to education. A third approach viewed education as an investment in human capital and tried to measure the economic rate of return on this investment. Recently research has shifted toward the search for strategies of educational planning and resource allocation. One such strategy is the social demand approach, which regards educational planning as the process of forecasting the demand for education. Another strategy is manpower forecasting, which tries to mold the educational system to meet the particular manpower needs of the economy. A third strategy uses cost-benefit analysis to decide how best to allocate resources among different types and levels of education. (Author/JG)

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by Maureen Woodhall

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Definition of the Problem

Economics, as a discipline, is concerned with the utilisation and distribution of scarce resources. Educational planning is concerned with the problem of how to make the best use of the scarce resources devoted to education. My lecture today is concerned with what the economist can contribute to the problem of how to allocate resources to, and within, the educational system.

I shall distinguish between three levels, or types of decision.

(a) Determination of the total amount of resources to be devoted to education.

(b) Allocation of this total between levels or types of education.

(c) Choice between specific projects.

The first thing to be decided when considering how many resources to devote to something, is why one wants it. Governments choose to spend money on education for many different reasons, and it is helpful to distinguish between two groups of reasons, making use of a familiar economic distinction: that between Consumption and Investment. Broadly speaking, we distinguish between consumption expenditure - which is incurred now for the benefits it will provide in the present and investment expenditure, which is incurred now for the benefits it will provide in the future. Another way of putting it is to say that the resources devoted to consumption are, literally, consumed in the present, but that investment is a way of increasing productive capacity, or wealth, in the future.

Most of the economic literature in the past has been concerned with investment in physical capital, and has described the production process in terms of two inputs - physical capital and labour. But gradually, in the last 20 years there has been more and more recognition and emphasis of the concept of human capital - and the idea that investment in man is just as important as investment in machines.

If we think of this distinction between consumption and investment when considering why governments spend money on education, it is obvious that education is regarded as both a type of consumption and investment. People want schools sometimes, as they want TV sets - as a status symbol. They want their children to learn to read because they will enjoy life more as a result. These are just some of the consumption benefits of education. But education is also a form of investment in human capital. Future levels of production are not dependent simply on labour and physical capital - but on technical knowledge and the skills of the labour force - and these are provided by education. So the answer to the question 'Is education consumption or investment?' is simply 'Both'.

But whether one chooses to emphasize the consumption or investment aspects of education will affect the way in which decisions are made about allocation of resources. This lecture is chiefly concerned with the investment view of education, although we never lose sight completely of the alternative view.

If education is a form of investment one of the first questions to spring to mind is how much does it contribute to economic growth, compared with other forms of investment? A few years ago this question rather dominated the economics of education. There were three main approaches adopted, and this whole question has been very well reviewed in an article, on the reading list, by W.G. Bowen.

1. The 'correlation' approach

The first attempts to demonstrate that education was investment consisted in simply correlating some index of educational progress - for instance expenditure on education, per head, or enrolment rates, with an economic index - such as GNP per head. This was done both for different countries at one point of time - or for one country in different years. In either case the correlation is positive: the more a country spends on education, the richer it is. This suggests that education does add to wealth. Unfortunately the relationship can just as easily be stated the other way: the richer a country is, the more it spends on education. So although simple correlation shows that there is a relationship between education and economic progress, it does not prove cause and effect. This is, of course, true of all correlation exercises. So although this approach is interesting - and is being developed, with more sophisticated indices of education or economic levels, and is being extended to inter-industry or inter-firm comparisons within countries, as well as international comparisons, it does not answer our basic question. Incidentally, I might add that international comparisons are often used as a basis for deciding how much a country should spend on education. But exactly the same objections can be made to this - the fact that richer countries do spend more on education is not proof that poor countries should spend more - although it may be a useful political weapon when trying to persuade the Treasury!

2. The 'residual' approach

The fact that education and economic progress are positively correlated led economists to try to say how much of the increase in a country's national income could be 'explained' by education. The first attempts, in America, to explain increases in national income by looking at the input of different factors had shown that output, or GNP, had grown much faster than the input of labour and physical capital. This was true, whether one simply compared the rates of growth of inputs and output, or tried to construct a production function showing the relationship between inputs and output. The

unexplained increase in output was termed 'the residual', and economists began to suggest the factors that contributed to this residual - such as technical knowledge, economies of scale. Denison in his now famous book 'The Sources of Economic Growth in the U.S. and the Alternatives Before Us', tried to measure the contribution of these factors to the increase in American National Income, over forty years, and came to the conclusion that increases in the formal education of the labour force - measured both in terms of increased years' of schooling of the average worker, and increases in the number of school-days in the year - accounted for an important part of the residual. The significance of this research for education was examined by a Study Group of the OECD, in a book called 'The Residual Factor and Economic Growth'. Denison's approach can be criticized on technical grounds, for instance some of the assumptions he makes about the form of the production function of the American economy - and also it is easy to see that the answer to the question 'how much does one factor contribute to the 'residual'?' depends on how carefully one specifies the other factors. For example, do you count 'education' and 'technical knowledge' as one factor or two? But nevertheless it is an interesting attempt to measure the economic contribution of education. However, without going into the technical reasons, I would say that as an attempt to show exactly how much increase in national income was due to education, it was unsuccessful, although Denison's work did help to emphasize the concept of education as an investment for economic growth.

3. The third approach to this problem was to try to measure the economic returns to education. In an important article on 'The Concept of Human Capital' Theodore Schultz argued that not only was there a problem in explaining the increases in national income which analysis of 'the residual' tried to solve - but also increases in the real earnings of workers, over the past thirty or forty years, needed explaining. He suggested that this was simply the return to investments that had been made in human beings - this investment included education, and also such items as health expenditure, and on-the-job training. He suggested in fact that increases in earnings provide a way of measuring the economic returns to investment in human capital, and looking at expenditure on education in America, compared with physical capital formation, argued that 'if we were to treat education as pure investment, the results would suggest that the returns to education were relatively more attractive than those to non-human capital'.

This encouraged a great deal of research into ways of measuring the returns to education, which is still going on today. There have been attempts to measure the returns to education in U.S.A., Britain, several Latin American countries, Israel, Kenya and Uganda, and India. Having estimated the returns to education (and this itself raises many problems which are discussed later) the next logical step is to compare the returns, or benefits of the investment with the costs, in order to measure the rate of return or yield of the investment. This would provide a useful guide

to the allocation of resources between different types of investment, if the objective of planning is to maximize the relation between economic benefits and costs. However, there are many problems about the measurement and interpretation of rates of return to education, which I shall turn to in a minute.

First, to summarize the state of research into the economic contribution of education, I would say that all three approaches have helped to emphagize the role of education as investment, but none has definitively answered the question 'how much has education contributed to growth?'. Recently, however, there has been a shift in emphasis, and this question is no longer the central one in the economics of education. Instead of trying to explain past rates of economic growth, economists are more interested in helping solve the problems of how to allocate resources in the present. The same underlying motive is there - how to maximize the contribution of education to economic growth, but the actual research has shifted away from an attempt to analyse past growth rates, to the search for strategies of educational planning, and resource allocation. Here once again it is useful to distinguish between three approaches:

The 'social demand' approach

The first approach, usually called the 'social demand' approach, although as an approach it in fact rests heavily on forecasts of the private demand for education, is more concerned with the consumption than the investment aspects of education. This approach in fact treats education as a service demanded by the community - just like any other goods and services, and regards educational planning as the process of forecasting demand, and providing sufficient places to satisfy the demand. The simplest version of such an approach has been in use for a very long time - attempting to forecast demographic trends in order to estimate the school population. But when it comes to forecasting the demand for higher education, a more sophisticated way of forecasting demand is needed. A recent example of the social demand approach to planning higher education was the Robbins Committee, in Britain.

In order to predict the number of university places that would be needed in 1970, the Committee made separate estimates of the numbers of schoolchildren that would stay at school after 15, the number that would gain G.C.E. and the number that would apply for a university place. These projections were then converted into the number of places by assuming a constant proportion of qualified applicants would be successful - in other words the assumption that there should be no change in the quality of entrants - it should be neither easier nor more difficult to get a university place in the future than at present. In order to understand the mechanism more fully, the Committee carried out many surveys, to investigate the relation between education and social class background, for instance, and into universities themselves, and collected valuable information on wastage rates, costs, and so on. The Committee also calculated in detail the costs of the proposal - but basically their approach to the

question of resource allocation was very simple: it assumed - as a principle - that university places should be provided for all those who wanted and were qualified for them, and the targets were in no way based on a consideration of the job opportunities for graduates, or of whether the money that was to be devoted to higher education could have been better spent elsewhere. On the question of job opportunities it was assumed that the economy would be able to absorb all the new graduates - the only reservation was that since it was felt that more science graduates would be needed in the future, the rate of expansion of science faculties should be greater than arts faculties.

What then are the strengths and weaknesses of this approach? Well, first it does provide the educational planner with a precise target of the number of places to be provided. But only by assuming that a lot of factors remain constant - that standards of entry, for instance, remain constant - that the 'price' of education, in terms of the level of fees and scholarships, remain constant, and finally, that the level of employment remains constant and all the graduates are absorbed into the economy. In other words, the social demand approach shows how much must be allocated to a level of education if present trends continue, and if private demand is to be satisfied, but it does not claim to show that this is the 'optimum' allocation of resources. As an approach, it perhaps deserves the name 'forecasting', rather than 'planning'.

So let us turn to the two other approaches, which are concerned to seek the optimum allocation of resources, and are concerned with education as investment, rather than consumption. The first is what is known as the 'manpower forecasting' approach. I shall only briefly touch upon the technical aspects of this approach, because you will have several lectures on manpower forecasting techniques. Methods for forecasting the manpower requirements of an economy vary - and may use international comparisons of the ratio between educated manpower and output, or may be based on analysis and extrapolation of trends and manpower utilization patterns in different industries, or on mathematical models of the economy based on constant or changing coefficients between manpower and output. But the basic rationale of the approach is to forecast the manpower 'needs' of the economy - that is the number and distribution of trained people in the labour force that would be required to produce a given output in a certain year - and then to match the educational system with the manpower needs of the economy. This approach has an immediate attraction - particularly for developing countries. It is well known that a shortage of trained workers represents one of the major constraints to economic growth - and if the educational system can be planned so as to produce just the right numbers of workers, surely this can be regarded as an optimum allocation of resources? Even if it were possible to predict accurately the manpower needs of an economy, and I shall raise some doubts about this, educational planning based entirely on manpower forecasting would be optimum in only one sense - and would neglect the other aims of education such as social and political development. But concentrating for the moment only on the manpower aspects, is it in fact possible to forecast manpower needs?

The important word in that sentence is 'needs'. If it is assumed that an economy has certain 'needs' in an absolute sense, then it may be possible, though very difficult, to predict the need for physical capital, educated manpower and unskilled manpower. Such a view of absolute 'needs' implies that these three factors will be used in fixed proportions to produce a certain level of output. But if these factors are to some extent interchangeable - or in economic terms substitutable - then the same level of output could be produced with different combinations of inputs, and in this case the optimum allocation of resources depends on the price of each factor. This means that manpower forecasting becomes even more difficult - not only are there the problems of predicting technical change and new methods of production, but also the added difficulties of analysing the effect of changes in relative prices and earnings on demand for physical capital and manpower. Thus the view that education is an economic investment which produces the trained manpower needed by the economy suggests that manpower forecasting is necessary, but by no means solves the problems of how to allocate resources.

A third approach to this problem is to use the techniques of cost-benefit analysis. When a firm is considering whether to invest in a certain machine, the usual way is to estimate the income that will be produced by the machine over its whole life, discount the expected income stream to allow for the fact that money in the future is of less value than money today - and compare the present value of the income with the cost of the machine. The rate of return, or benefit/cost ratio is an indication of how profitable it would be to invest in that machine rather than undertake some other project. The firm will normally invest in the project promising the highest rate of return. Turning now to education, if it is possible to measure the economic returns to investment in education - that is the additional income generated by the education - then they can be compared with costs by means of the rate of return, and presumably the government should spend most on those types of education with the highest rate of return. I mentioned earlier that estimates of rates of return are now available for many different countries. These rates of return look at education both as an investment for the whole community - by means of social rate of return, and as investment for the individual - by using the private rate of return. It is easy to see how to calculate the private rate of return, and to understand what it means for the individual. By choosing to go to school, or college, the individual incurs certain costs - both fees, expenditure on books, and the earnings he foregoes while in school instead of working - on the other hand he can expect to be paid more throughout his life as a result of his education. If the extra earnings he receives - less the tax he will have to pay - are related to the costs he has had to incur - this gives the private rate of return to schooling.

Therefore, in order to calculate the rate of return it is necessary to have information about the relative earnings of workers with different levels of education, together with estimates of private expenditure on fees, books and so on, and the average earnings foregone by students. The best way to obtain this information is to collect, by means of a sample survey, data on the

age, educational qualifications, and earnings of a representive sample of workers. Such surveys usually show that there is a positive relationship between education and level of earnings. The data can then be used to construct age-education-earnings profiles, which will show the average earnings-differentials associated with additional education, and the average earnings foregone by students in education. The age-education-earnings profiles, together with estimates of tuition costs, therefore provide everything that is needed to calculate a rate of return; all this information can be shown simply on one diagram: the diagram shows actual age-earnings profiles of workers of four different educational levels derived from a survey of urban India. The diagram also shows, in the negative part of the graph (below the line) the tuition costs of each type of education. The two shaded parts show the costs and benefits of a university degree, compared with matriculation.

Since the information about age-earnings profiles is derived from a large sample, it shows what are the costs and benefits for an <u>average</u> worker. Of course some individuals will earn more than this, and others will earn less, but Figure 1 shows what costs and benefits and therefore what rate of return the <u>average</u> individual can expect for a university degree.

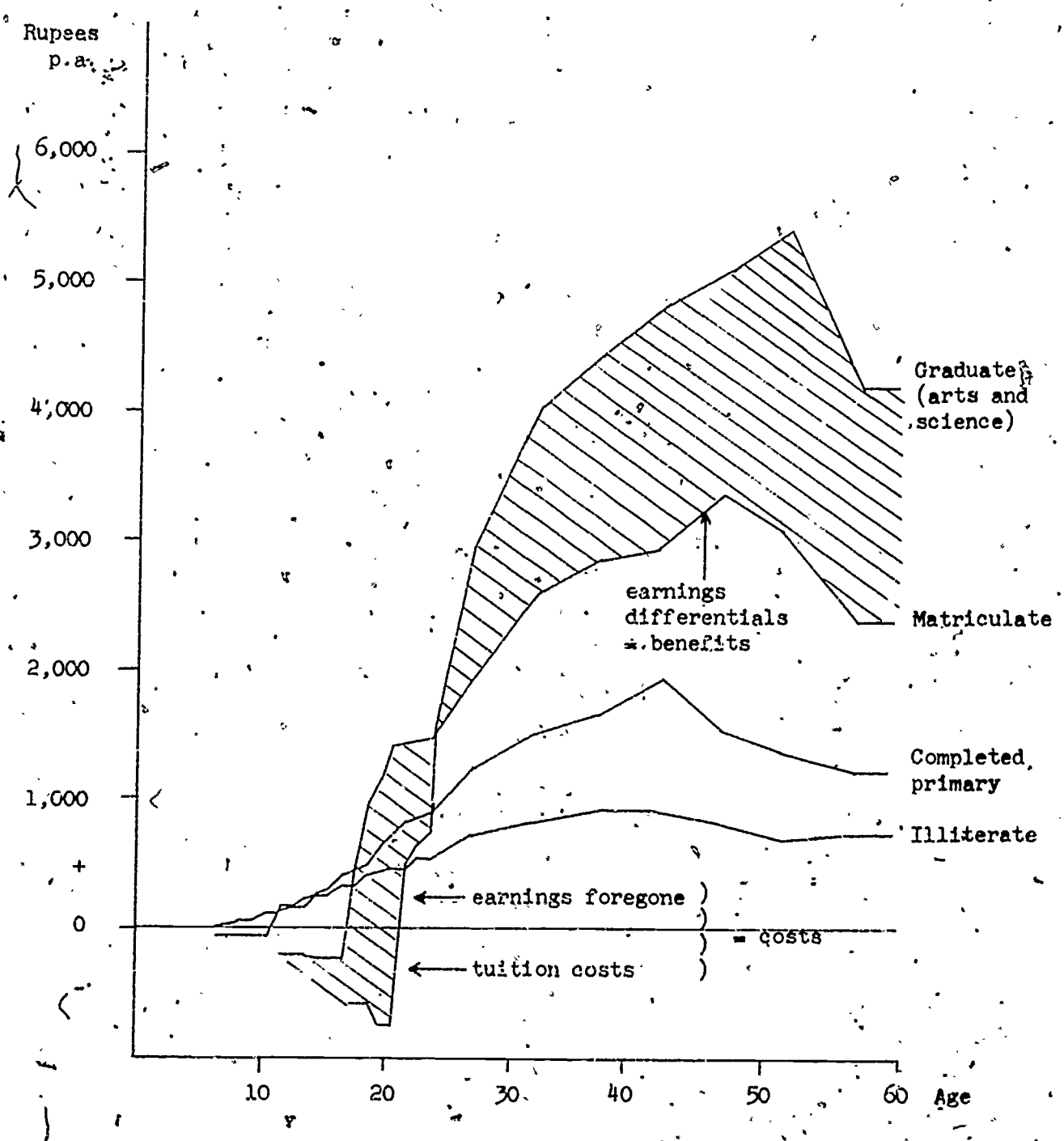
The information contained in such an estimate of the private rate of return may help to explain the private demand for education - which we have already discussed under the 'social demand' approach - it may also be used to show the effects of the government's policy on subsidies and scholarships - the higher the degree of subsidy, the higher the <u>private</u> rate of return to education. But can the rate of return be used as any sort of a guide to allocation policy?

For this the relevant concept is the <u>social</u> rate of return. The way this is usually calculated is to compare the earnings differentials of educated people, inclusive of tax, (because the tax that is paid is a benefit to the community) with the total <u>social</u> costs of education (including the value of production foregone by having people in school instead of in the labour market, as well as all the costs of tuition).

Does this calculation really reflect the economic value - to the community - of education? There are a number of difficulties which may be raised as possible objections to the use of cost-benefit in educational planning, and which you will find recurring throughout the literature: briefly

(a) earnings are related to many other factors besides education - innate ability, family background, motivation, to name just a few - so that extra earnings represent returns to all these factors, not just education;

Diagram 1: Age-earnings profiles: by level of education, urban India



Source: M. Blaug, P.R.G. Layard, M. Woodhall, The Causes of Educated Unemployment in India.

(b) earnings are also determined by habit and custom, and thus do not reflect the real economic value of different jobs - in other words earnings differentials are no measure of relative productivity;

(c) education generates 'spillover benefits' - that is it may raise the productivity of people other than the educated worker himself, and these indirect benefits are not shown up in earnings differentials;

(d) age-education-earnings profiles, which are the basis of rate of return calculations, reflect past and present supply and demand conditions rather than future conditions - which is what interests the planner;

(e) and finally looking only at the earnings of workers and the costs of educating a successful graduate, is to ignore the facts of unemployment, and wastage, and the fact that not all educated people enter the labour force.

All these objections must be admitted at the outset - but they are not necessarily fatal to the cost-benefit approach. To take each in turn.

(a) Ability: There have been some attempts in U.S.A. to analyse the determinants of income, by looking at income differences in a large sample standardizing for age, sex, race, education, social background, etc. - and these show that age and education, together, account for more of the differences in income than any other factors. But the other factors are significant, so the solution is to use only a proportion of earnings differentials as attributable to education. What the proportion is is still uncertain, but different studies have used 50 per cent, 66 per cent, or some other proportion for rate of return calculations and some studies have now been done which standardize for other factors - such as ethnic origins, fathers' occupation - even measures of intelligence - and found that the general conclusions of cost-benefit analysis remain the same.

(b) Marginal productivity: This objection must be admitted, particularly in developing countries, but what we have to ask is do relative earnings reflect - though they obviously do not perfectly measure - relative scarcities? If they do, then rates of return provide useful information on the earnings of educated people in relation to the costs of producing them. And a low rate of return means that a country is spending a lot of resources producing people already in plentiful supply; if relative earnings do not even reflect scarcities - in other words if the labour market has ceased to operate as a market - then the whole approach must be abandoned - but so too, must the use of any prices, because the whole price mechanism is too distorted to give any indication of opportunity costs. While everyone admits that labour markets are imperfect, most economists argue that relative prices do reflect relative

scarcities. A shortage of one type of manpower tends to push the wages up, and a surplus to reduce wages. In a recent study of unemployment among educated people in India, we certainly found this was the case. So earnings differentials can, I think, be taken as a first approximation of the economic benefits of education to the community. If, on the other hand, the distortions in the labour market seem so great, that it is assumed that relative earnings hardly reflect differences in productivity at all, then one solution is to calculate 'shadow' rates of return, based on earnings that have been adjusted in some way to take account of this. If, for example, we suppose that in a particular developing country, civil servants (who often comprise a major proportion of graduates) are paid twice their real economic worth, then a rate of return can be calculated using half the observed earnings of graduates. In this way, it is possible to see how sensitive rates of return would be to changes in salary structures.

(c) Spillover benefits: They are only a first approximation because most people are agreed that education does generate indirect, or spillover benefits, though no one has yet succeeded in quantifying them. But to the extent that they exist, earnings differentials underestimate the social returns to education. One possible spillover benefit, for example, might be a decline in the birth-rate in an over-populated country. It has been observed that educated women tend to produce smaller families than women with no education, so that one of the indirect economic benefits of educating women in a developing country may be to reduce the birth-rate, and thus increase national income per head, in the next generation.

(d) The past and the future: The question of whether the future is going to be like the present and past is of course not unique to cost-benefit analysis, but it is vulnerable, because rates of return are usually based on cross-section data - a survey at one point of time. What this means is that whenever possible time series data needs to be collected, to estimate the effects over time of changes in supply. Data like this are available now in USA, and show that earnings differentials have not narrowed very much in the past 20 years despite the increase in the supply of educated people - because new opportunities have been created for using them - and demand has kept pace with supply. But more evidence is needed on trends in rates of return. What we can do - and many studies now do this - is to adjust rates of return to allow for expected long-term growth in real earnings - but even so, it is true that rates of return are based on the present and past. However, most people would agree that a sound understanding of the present is at least a help in predicting the future.

(e) Finally, a number of other adjustments need to be made to rates of return to allow for unemployment, wastage and drop-out, labour force participation rates, etc. But all of these are possible, and many of the most recent studies do incorporate them.

What sort of use is this sort of cost-benefit analysis, in making the three sorts of allocation decision I mentioned at the beginning? First - the over-all decision of how much to allocate to education? Some writers have suggested that the rate of return to education can be compared with the rate of return or other types of social investment as a guide for government policy - this is the implication of the title of one study - 'Investment in Man Versus Investment in Machines'. But at this level of decision the problem of indirect benefits and of non-economic benefits is crucial, and I do not think that cost-benefit analysis yet provides a useful guide - although clearly all such decisions should be made in a cost-benefit framework of ideas.

The use of cost-benefit analysis is, I think, more valuable in deciding how to allocate resources within education. The fact that in India the social rate of return to university education is so much lower than to primary education suggests - as does the existence of graduate unemployment - that primary education needs to be expanded faster than universities. At this level of decision, rates of return provide direction indicators rather than actual targets. A high rate of return can be interpreted as 'invest some more in this type of education' not 'build x schools' - and the decision to build more schools should be followed by a new cost-benefit analysis, since the increase in supply of educated people will undoubtedly affect their price.

At a third level of decision, cost-benefit analysis can play an important part. For instance should technicians be trained in special technical schools, or by means of general schooling plus on-the-job training? An important piece of evidence is the relative earnings and the costs of producing each type. In a small case study in Jordan, it was found that although the costs of special technical education were very high, the technicians so trained did not earn any more than those with two years of general education, followed by one year special training. So that the labour market did not value the lengthy training, despite its expense. In this sort of exercise cost-benefit considerations should clearly play an important part - and the problems of spill-over benefits or marginal productivities are not so important, because we are comparing the costs of producing a specific benefit: employed technicians.

These remarks suggest a few practical uses of cost-benefit analysis - certainly other possible uses could be suggested. I would now like to sum up, briefly, the three 'approaches' to educational planning. First - are they alternatives? Although this is sometimes suggested, in the literature, I do not think they should be regarded as alternatives, for each approach is tackling a different problem. The social demand approach provides useful projections of the demand for education, and forces the planner to think about some of the factors determining that demand. The manpower forecasting approach recognizes the role of education in providing trained manpower, although it is extremely difficult to forecast accurately. The cost-benefit approach emphasizes the relation between expected economic benefits and costs - and reminds the planner that production of high-level manpower may promise large returns, but it also demands a large output of resources (a fact that some manpower forecasts forget).

The three approaches also do not attempt to provide the same type of guidance for the planner. While the social demand and the manpower forecasting approach aim to provide actual targets for enrolment, the rate of return approach provides a 'direction-indicator'. The policy prescription from a rate of return calculation is 'invest a little more, or a little less' in a particular type of education, rather than 'build a certain number of new schools'. For rates of return provide an estimate of the effects of a marginal change in investment allocation. And after a change has been made, it becomes necessary to make a new calculation of the rate of return, given the new supply and demand conditions.

If I turn once again to the question 'how can the economist help in the problem of allocating resources?', I think the answer is 'by emphasizing the investment aspects of education, and by demanding that every benefit of education - whether economic, social, political or cultural, be thought of in terms of its cost.' If educational planning is able to take account of the private demand for education, the job opportunities for educated manpower, the effects of changes in supply and demand on relative wage levels, and the total costs, to society, of different types of education, then we will not need to talk in terms of 'alternative approaches'. What I think is important is not whether a plan is based on manpower forecasts, international comparisons, rates of return, or any other technique, but that resource allocation decisions should be made in a framework which includes consideration of both costs and benefits.

Suggested Additional Reading

Bowen W.G. Assessing the Economic Contribution of Education (reprinted in Robbins Report, and in M. Blaug 'Economics of Education : Selected Readings').

Blaug M. Alternative Approaches to Educational Planning 'Economic Journal', June 1967, pp. 262-287.

Blaug M. A Cost-Benefit Approach to Educational Planning in Developing Countries IBRD, 1967.

Schultz T.W. The Rate of Return in Allocating Investment Resources to Education 'Journal of Human Resources', Summer 1967.