CHAPTER 2
COST-BENEFIT ANALYSIS OF EDUCATION

The economists were aware of the importance of human resource development from the very beginning of this century. Adam Smith in his "Wealth of Nations" stressed the importance of education at various points and included the "Acquired abilities of all members of the society" in his concept of fixed capital. Later Alfred Marshall (1930: 216) observed, "The most valuable of all capital is that invested in human being". In the beginning of present century Irving Fisher laid a firm and secure foundation for the concept of capital formation which included physical as well as the human factors of growth. The concept of capital formation has now been broadened to include investment in health, education and training of population, that is, investment in human being.

A proper understanding of the concept of human capital is made complex by what may be called the interaction of consumption and investment aspects of education. On the one hand education may be treated as a consumption good. On the other hand education may be considered as investment, if it is understood that the underlying motive of an individual in seeking education is to improve his lot through better
job opportunities and higher wages. Similarly from social point of view, expenditure on education involves an economic choice, for this means a reduction of investment in a steel plant or an automobile factory. In developing countries the capital aspect of education is more important and for that reason education should be directly linked with productivity and economic needs of the country.

The evaluation of investment in human resource projects was attempted in early 1920s by Strumilin and others. The investigation carried out by Strumilin (1929) in Russia is the first investigation in the field of cost-benefit analysis of education. The rediscovery of the importance of human resources by Schultz (1960) and others has led to the recent efforts to incorporate investment in education into the mainstream of economic analysis. From 1960 onwards economists like Schultz (1960, 61), Miller (1960), Mincer (1962), Bowman (1962), Becker (1962, 64), Lee Hansen (1963), Blaug, Layard and Woodhall (1969) began to apply cost-benefit analysis to different types and levels of education both in developed and developing countries. During the seventies and eighties attempts have been made by researchers to make more sophisticated analysis of rates of return on investment in different types and levels of education. Thias and Carnoy (1972), Taubman and Wales (1974), Eckaus (1974), Psacharopoulos (1973, 75, 80, 81, 88, 89), Blaug (1976),
Bowles (1972), Becker (1964, 74), Woodhall (1970, 80), Psacharopoulos and Woodhall (1985), Ryoo (1988), Vaillancourt (1995) and others have applied the technique to the investment in education in a number of countries.

The cost-benefit analysis provides a technique to evaluate a project in terms of its economic objectives but its use in educational investment is different from that in physical and water resource projects. In case of water resource projects cost-benefit analysis is applied before the projects are implemented to ascertain their economic efficiency and decide whether to accept or reject the projects. In case of educational projects cost-benefit analysis is used as a measure of the extent to which current supply of educated persons represent over-investment or under-investment in education industry (type and level). This gives a signal to the planners to reorient the pattern of investment in educational planning along desired lines.

Cost-benefit analysis in education is conducted on the basis of the rate of return analysis. For evaluation of educational projects most researchers have used internal rate of return. The benefit-cost ratio and the present value method are not widely used as both these methods involve the problem of selecting a proper rate of discount which is difficult to determine in developing countries.
2.1 Costs and Benefits of Education

The main problems in calculating the rates of return to education are the identification and measurement of the costs and benefits of education. Cost is divided into two components: (i) Recurring cost and (ii) Non-recurring cost. Recurring cost is incurred every year for running educational institutions. It is incurred by individual institutions and often by the government. Non-recurring cost covers expenditure on building (other than maintenance) non-recurring equipment, library books etc. Prior to 1980-81 cost was classified as direct and indirect cost instead of recurring and non-recurring cost. Both direct and indirect cost include items of recurring and non-recurring nature. Indirect cost of education is the earnings foregone by the individuals and the society. The benefits again are divided into two parts: (i) Direct benefits and (ii) Indirect benefits. Direct benefits are the earnings received from jobs by earners having different types and levels of education. Indirect benefits are the benefits that accrue to the people other than the recipients of education.

The costs of education can be split into private cost and public cost. Direct private costs of education are (i) tuition fees and other fees paid by the students, (ii) incidental school related costs incurred by individuals,
for example, books and travels, stationery and other miscellaneous expenditures minus the average value of scholarship received by the student during his education. Indirect private costs are earnings foregone by the student during his period of study minus the tax-liability, if any, on such earnings. Public costs include teachers' salaries, salaries of non-teaching staff, other expenditures on educational administration, cost of teaching materials and library services, cost of other supporting services and consumable stores, cost of student welfare, cost of broadcasting of lessons to the students through radio or television and the imputed rent. Imputed rent is the annual amortisation of building over its expected life. Total resource costs of education or social costs include both private costs and public costs of education.

The benefits of education can be divided into private and social benefits. Direct private benefits are the life-time earnings of the educated people after payment of income-tax and profession tax. Social benefits (direct) are the life-time earnings of the educated persons before payment of income-tax and profession tax.

Most of the indirect benefits are in the form of intangibles. Increase in social status, shaping the personality of a person, the enhancement of the enjoyment
of leisure by widening the intellectual horizon of the educated and so forth are some intangible benefits. Other indirect benefits are residence-related benefits, employment-related benefits, job-related benefits etc.

The objective of cost-benefit analysis is to measure net benefits of different types and levels of education for formulating optimum educational plan. For calculating the social and private rates of return the direct financial benefits of education are measured with the help of life-time income differential between workers with different levels of education, e.g., graduates and under-graduates. The costs incurred for that particular level of education will also have to be calculated.

2.2 Types of Rates of Return

There are three kinds of rates of return estimates, whether adjusted or unadjusted: Marginal and Average Rates of Return; Private and Social Rates of Return; ex-ante and ex-post Rates of Return.

Marginal and Average Rates of Return

Marginal rates of return are estimated by using marginal benefits, i.e., differences in earnings of people with two successive levels of education and marginal costs i.e. differences in costs of two successive levels of education.
Generally the age-earnings profiles and costs of people having k-th level of education is compared with (k-1)th level of education.

The margin of investment, in normal economic usage, lies where investors consider small increments in their total outlay on a particular line of investment. In the rate-of-return literature in Economics of Education, however, the marginal increment in outlay refers to the amount necessary at a given level of education to buy an additional quantum of schooling (measured in length of time). This is meant to take the individual to the next higher level of education.

Sometimes average rates of return are estimated. Average rates of return are the returns to blocks of education as a whole. Here the age-education earnings profiles and costs of k-th level of education are compared with the earnings-profiles for people with no education at all.

The marginal rates indicate the directions for investment in the marginal level of education from the private and social point of view. Average rates just provide information on the average contribution of education.

Private and Social Rates of Return

Rates of return are estimated from private as well as social point of view. The private rate of return is
estimated by considering the costs of education incurred by
the recipient of education and the benefits measured by
after-tax income of the same individual.

At the time of estimating social rates of return,
private and public costs of education are taken together in
the cost side, and social benefits, net of transfers, are
considered in benefit side. Generally earnings before-
taxation are used as social benefits.

The private rate of return is useful to decision
making process of individuals while the social rate is
useful for public planning of investment in education.

**Ex-ante and Ex-post Rates of Return**

Ex-post returns refer to realised rates of return from
an educational project and are estimated on the basis of
actual earnings and costs. This helps us to know whether
the investment decisions made in the past were rational. On
the other hand ex-ante rates refer to expected rates of
return to investments proposed to be made.

Ex-post returns can be estimated only if we have data
on earnings of individual throughout their working life.
Since such data are rarely available even in developed
countries, few studies have been done on ex-post rates. In
estimating ex-ante rates from cross-section age-earnings
profiles, it is invariably assumed that the economy is on a balanced growth path and the earnings of an average person with a given level of education 't' years later would be the same as earnings of an average person who is at present 't' years older with the same level of education. But practically all of the estimated rates of return are neither ex-ante nor ex-post, simply because cross-section earnings profiles are generally used.

The rates of return calculated in this study are marginal rates of return.

2.3 Estimation of Rates of Return

The first practical problem of calculating rate of return, particularly in developing countries, is one of data collection. Since it is difficult to foresee the future and no country has life-time data on projected earnings of educated and uneducated workers one has to depend on cross-section data to estimate the average age-education-earnings profiles for earners having different levels and types of education to estimate the rate of return. The average age-earnings profiles show the earnings at each age of people with various levels and types of education. For an ideal cost-benefit analysis of education the following list represents data requirements:

(a) Data on the before/and after-tax earnings of a representative sample of workers classified by age,
sex, educational level including type and length of schooling, occupation, starting salaries, location of employment, distribution of fringe benefits in both public sector and private sector and some measures of natural ability;

(b) Data on current expenditure of educational institution by level;

(c) Estimates of capital value of educational buildings and equipments by level;

(d) Estimates of private expenditure on fees, books, stationery, private tuition cost etc. by level of education;

(e) Public expenditure on scholarships, stipends by level of education;

(f) Average income-tax-rates;

(g) Data on labour market conditions including rate of unemployment and labour force participation by age, sex and educational level. ¹

This list excludes the intangible benefits and spillovers of education due to difficulties of quantifying these benefits.

Having dealt with the problem of data collection, we shall now examine the successive stages of estimation for

calculating social and private rates of return. Data on earnings by education and age provide average age-earnings profiles which in turn provide estimates of annual earnings differentials associated with successive levels of education and also the earnings foregone during the period of study. For calculating social rates of return the pre-tax earnings differentials are sufficient to provide a measure of benefits of education after adjustment for other factors affecting earnings and after allowing for unemployment. The social rates of return measure the relationship between pre-tax earnings differentials (after adjustment) and social costs of the concerned level of education.

For calculating the private rates of return we need the post-tax earnings differentials between successive levels of education after making the above-mentioned adjustments. The private rates of return measure the relationship between post-tax earnings differentials (after adjustment) and private cost of the particular type and level of education.

If we want to calculate unadjusted rates of return no adjustment in the benefit-side is necessary.

The following formula is used for finding out the private or social rates of return for the particular
educational type or level:

$$\sum_{t=s}^{n} \frac{(B_t - C_t)}{(1+r^*)^t} = 0 \quad \ldots \ldots \ldots (1)$$

where \(B\) represents benefits, \(C\) the cost of education, \(t\) the time period ranging from \(s\) (the age at which the education of the concerned level commences) to \(n\) (the age of retirement), \((n-s)\) being the working life of the individual including schooling years and \(r^*\) is the internal rate of return.

The internal rate of return (IRR) is the rate of interest at which the present value of expected benefits,

$$\sum_{t=s}^{n} \frac{B_t}{(1+r^*)^t}$$

and the present value of cost are equal. In other words, the internal rate of return is the rate of interest at which the difference between discounted benefits\(^2\) and discounted costs is zero. The IRR \((r^*)\) is determined by equation (1).

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2. All cost-benefit calculations involve the discounting of future flow of income, since the purpose of calculation is to compare the present value of expected future benefits with the cost of investment which must be incurred at present. If costs of the project is spread over years these costs must also be discounted. This technique of measuring future streams of income in terms of its present value is called the discounted cash flow technique.
The IRR method is extensively used to evaluate educational investment. The widespread use of IRR may be due to two reasons: (1) It is a pure number and so it is more useful for comparing projects of different sizes directly. (2) It bypasses the problem of choosing appropriate social rate of discount and the problems associated with it.

Internal rate of return is that rate of discount at which Benefit-cost ratio is equal to one and at which Net present value becomes zero.

2.4 A Critique of Internal Rate of Return Approach

In early '60s the use of the concepts of 'Investment' and 'Capital' in the field of education were widely debated. But now it is widely accepted among the economists that education is an investment and educated people do constitute human capital. Several criticisms are made against the rate of return analysis:

(1) Education is not the only factor that determines earnings differential. Endowed ability, individual motivation, social background, sex, occupation, on-the-job training, educational attainment are so highly intercorrelated that the pure effect of education cannot be satisfactorily isolated.
(2) Rate of return studies measure only the direct economic benefits reflected in the extra life-time earnings created by additional education. This is only part of total educational benefits. The indirect benefits of education and non-economic benefits (for example increased personal satisfactions, improved family welfare, cultural advancement etc.) are explicitly ignored. Direct benefits of education are quantitatively less important than the indirect spillover benefits. Due to measurement difficulty spillover benefits are excluded from calculation of social rate of return.

(3) The use of current age-education-earnings differentials to project future benefits is logically unsound. This method, the critics say, treats current wage differential as if they are constant. But they will change over time in response to changes in man-power supply-demand conditions.

(4) Rate of return approach assumes that wages of workers are equal to their marginal productivity. But this may not be true due to the imperfections of the labour market in the economy. Existing earnings differentials in favour of educated people reflect not difference in their contribution to productive capacity, but long-established social convention.
(5) The calculation of unadjusted rate of return assumes full employment in labour market. But this assumption does not fit in developing countries where unemployment rate is high.

(6) For interpreting rates of return for policy purposes we need a measure of life-time productivity increases resulting directly for marginal increments in educational investment. The nearest we can get from it is earnings differentials derived from cross-section data of the existing work force. The procedure of using cross-section data means that a picture of labour market is provided which reflects the current experience of a particular education level, say graduates, of all ages. It does not necessarily reflect the prospective experience of current new graduates. It is more unlikely to be an assessment of the experience of graduates entering the labour market several years later as a result of investment decision made to-day. The age-earnings profiles based on cross-section data underestimate the earnings of workers in future because the workers will be employed in a developing economy with rising level of real income. If no allowance is made for future growth of incomes, estimates of rates of return will underestimate the financial returns from education in future.
(7) There is an unidentified component of unearned income remaining entangled with earnings in the income profile. Since there is likely to be a positive association between greater wealth and higher levels of education, the rate of return measured by income will over-estimate the contribution of education alone.

(8) Another objection to rate of return analysis is that marginal analysis can only suggest the direction but not the appropriate magnitude of change. It merely provides a signal of direction: Invest more or less. But how much more or less? To this question the approach gives no answer.

The criticism is centred round two major points. A large part of the criticisms relates to inaccuracies in the calculation of benefits, costs and rates of return to education. The second part of the criticism challenges the validity of certain assumptions made in estimation procedure.

With regard to the problem of accuracy Blaug (1967) clearly admitted that these calculations represent "something close to maximum likelihood estimates of average yields of additional expenditure on education".

Schultz (1963), Blaug (1967) and Woodhall (1970) came forward for a sophisticated defence of the IRR approach.
The adjustments that are generally being made these days provide a satisfactory answer to most of the criticisms. In the next subsection the answers to the criticisms are mentioned.

2.5 Adjustment Procedure

It is true that rates of return approach suffers from certain limitations. Economists have suggested some methods to overcome the limitations.

It is true that education is not the only factor that determines earnings of the individual. A substantial part of individual earnings may be due to several other attributes of the individuals such as ability, motivation, social background etc. which are grouped together as "Ability". The residual part attributable to education is termed as "$\beta$-coefficient". Denison's contentions that two third of earnings can be attributed to education has been widely accepted by the economists. The rates of return can be calculated by isolating the effect of education from other socio-economic factors.

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Blaug, Layard and Woodhall\(^4\) (1969) have assumed \(\alpha\)-coefficient as 0.65 at the time of calculating exact rates of return to education in India. The value of \(\alpha\)-coefficient depends on the impact of socio-economic variables on education and it may vary from country to country. Some economists have used multiple regression analysis to isolate the effect of education on earnings. Hunt (1963), Hanoch (1967), Thias and Carnoy (1972), Blaug (1971) and several other researchers have used this technique both in developed and developing countries. This is possible if we have large samples to deal with.

Psacharopoulos (1975) and Griliches (1979) came to the highly counter-intuitive finding that ability differentials do not account for much of the variations in earnings. Blaug's (1976 : 845) observation on the impact of the

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4. Blaug, Layard and Woodhall ("69) - "Causes of Graduate Unemployment in India"—Blaug et.al. calculated rates of return to education in India under three different assumptions: (1) all earnings differentials are attributable to education, (2) 65% of differentials are attributable to education, (3) 50% are attributable to education. Calculation of rates of return based on (1) gives us the maximum rate of return and calculation based on (3) gives us the minimum rates of return to education.
ability factor in earnings is that "All we have is a dim light at the end of a tunnel; every one has been wrong and every one has been right because the problem has proved to be more complicated than was originally imagined".

However, we can use $\zeta$-factor or multiple regression analysis for isolating the effect of education on earnings.

With regard to the second objection that rates of return measure only direct benefits of education ignoring indirect benefits and spillovers of education. Schultz pointed out that the consumption benefits of education can be incorporated by subtracting a notional consumption component from educational costs or by adding some estimates of consumption benefits to monetary return. In either case the effect is to increase the rate of return to investment in education. The problem cannot be solved so simply by adding to social rate of return to investment in education a figure which reflects an intrinsic value of education. When objectives are in different dimensions, every addition of values implies a set of weights which constitutes problem of decision-making. The non-pecuniary benefits of certain white-collar occupation constitute psychic income and neglect of this at the time of calculating benefits leads to a tendency to underestimate the private rate of return. But the magnitude of this bias is not large. If it were we would not always observe a
positive correlation between education and earnings of all age-groups. Non-pecuniary alternatives, however, create no bias for social rate of return. In addition to this there is a second-round spillover in the form of encouragement to research. Becker\(^5\) argues that we can get an idea of their probable magnitude without measuring them directly. The education process is intimately related to advances in knowledge and it is equally clear that advances in knowledge can have important economic effects. Becker began by deriving social rate of return in the usual way from pre-tax earnings differentials as a percentage yield on total resource cost of education. This figure, constructed as a lower limit to the true social rate of return, comes to 12.5% for 1949 cohort of white male college graduates. As an upper limit, Becker takes the value of 'advancement in knowledge' and this gives him an upper limit of 25%. The difference between 12.5% and 25%, Becker concludes, "measures our ignorance of external effects of education". Becker's procedure, therefore, amounts to attributing another 12.5% to side effects of university-based research and incidence of self-help promoted by schooling. Villard says this may be correct but it seems difficult to believe.

Bowen (1964: 23) observes: "External benefits are important. I think that most people, who worked actively on the problem of estimating national returns to education, find that this is biggest unsolved riddle of all. At the present time all is that estimates of direct return ought to be adjusted upward to take account of external economies - we do not know how much of an adjustment to make".

In meeting the third objection to rates of return analysis that current income differentials between successive levels of education cannot measure future benefits, we may fall back on the general notion that earnings by and large do reflect the push and pull of the market forces. Data show that higher earnings do accrue to people who are relatively scarce because they have invested much in acquiring skills.

The fourth objection is that the assumption that workers are paid according to their marginal product is not valid. The workers may be paid more or less than their marginal product in both private and public sector. The rate of return analysis does not assume perfect competition in the markets. But it assumes that labour market is competitive. But labour market may not be competitive - there may be monopolistic restrictions on entry and so rates of return to some levels of education may be higher
than the rates of return to other levels of education.

The fifth criticism that the unadjusted rates of return assume full employment is valid. Proper adjustment for unemployment can be made if necessary data are available. And rates of return can be calculated after making proper adjustment for unemployment. According to Woodhall (1980) the effect of unemployment can be adjusted by estimating for employees of different age groups in different levels and types of education so that benefits of education can be evaluated in terms of earnings weighted by the probability of employment for educated workers. Blaug, Layard and Woodhall (1969) adopted the same rule for estimating rates of return to Indian educational investment. But Psacharopoulos (1981) is of opinion that unemployment rate is high among young people: it lasts for a few months or for a few years. This may be said to be a reflection of job-search process. And he observes, "certainly it would be a mistake to reduce the whole age-earnings profiles by the average rate of unemployment that mainly refer to young people."

In order to get over the sixth objection we have to adjust for long-term secular growth of income in our rates

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of return analysis. A cross-section analysis of age-education-earnings data include some people who were educated thirty or forty years ago. Thus a time-series projection of life-time earnings from cross-section data is bound to underestimate the expected rate of return to education. But this criticism is not so fatal as it appears at first sight. We must remember that the rates of return, calculated from projected life-time earnings figures are not equally sensitive to earnings of older and younger workers. The simple reason for this is the fact that later years get very little weight in the final calculation. Rates of return are extremely sensitive to the first ten or fifteen years of life-time earnings. Still economists have made adjustment to rates of return calculated from cross-section data corresponding to the assumed growth of real earnings in future.

The seventh criticism that there is unearned component in earnings is valid. But there is no reason to throw away the cost-benefit analysis. It gives us some important informations which are necessary at the time of making educational planning.

Over and above the above-mentioned adjustments there is adjustment for uncertainty. It is not certain that all the investments made in education will yield output, one
can identify the following kinds of uncertainties which significantly influence the rate of return to education.

(i) Adjustment for wastage and stagnation:

All pupils who enter a particular level of education may not come out of it in form of finished product within the normal period. Some may withdraw from the system before they complete the particular level of education. From economic point of view the drop-out cases as well as the unsuccessful pupil constitute wastage of educational resources. Wastage due to drop-out and stagnation should be considered while calculating cost of education per pupil.

(ii) Adjustment for non-participation in labour force:

Non-participation of some educated persons in the labour force should be considered. Such people constitute wastage in so far as investment in education is considered. Generally adjustment for this can be made by multiplying age-education-earnings profiles with the labour force participation rates by age and educational levels.

(iii) Adjustment for mortality:

Another adjustment should be made for mortality as the pre-mature death of the educated person results in loss of benefits of education. So the age-earnings profiles have to be adjusted downward by the probability of survival.
The adjustments described above do not affect the rate of return in the same direction. The adjustment for growth raises the rate of return, while all the other adjustments push it down.

2.6 Application of Rate of Return in Indian Education

The various studies on rates of return to Indian education do not yield uniform result due to differences in methodology applied, differences in coverage, reference period and nature of data. In this section a review of all important studies is presented. Harberger (1965) was the first person to calculate systematically the rates of return to different levels of Indian education and he compared these rates with the rates of return to physical capital. It was revealed from his comparative study of returns to human capital and physical capital that investment in physical capital is more profitable than investment in education. Kothari (1967), Husain (1967 and 1969), H.N.Pandit (1972), Mallagounden (1967), Blaug, Layard and Woodhall (1969), Shortlidge (1973), Psacharopoulos (1973), Goel (1975) and Tilak (1980) etc. have estimated rates of return for India. Rates of return to different types and levels of education in some states of India have been calculated. Chowdhuri and Rao (1970) have estimated marginal private and social rates of return for Delhi University students.
Sailabala Debi (1980-81) has calculated rates of return to higher education in Orissa. Chaudhuri (1979) has estimated rates of return to rural education in Punjab and Haryana. Tilak (1980) has estimated rates of return to various levels of education in West Godavari district of Andhra Pradesh. V. Subramanian (1980) has estimated rates of return to primary and middle levels of education in Tamilnadu.

In 1967 Kothari and Husain have calculated the rates of return to investment in Indian education. Kothari has computed social and private rates of return for different levels of education and has obtained high rate of return for Engineering education. Husain has made adjustment for mortality rate, unemployment rate and replacement cost of physical equipment at the time of calculating rates of return to investment in Matric and Graduate level of education. She has found the average rate of return as high as 37% for matriculation as against 4% for graduate level of education. Further, in her estimate the marginal rates of return are negative for graduate and post-graduate level of education as compared to matriculation. Professional education is the exception - here marginal rate of return is positive as compared to matriculation. Blaug et.al. and H.N.Pandit have estimated social marginal, social average, private marginal and private average rates of return to
different levels of education and made several adjustments. Of H.N. Pandit's estimated rates of return are lower than the rates of return calculated by Blaug et al. This is due to the fact that Pandit has made more adjustments at the time of calculation. Blaug et al. have adjusted for unemployment, wastage and stagnation. Income-tax, extra-educational factors and secular growth in income at the time of calculation of benefits whereas Pandit has adjusted for mortality, non-participation rate of labour force in work over and above the adjustments made by Blaug et al. On the cost-side both of them have adjusted for foregone earnings. The estimates of Nallagounden, Blaug, Layard and Woodhall and Tilak show falling rates of return to higher level of education. Goel's estimation follows the same pattern except for the post-graduate level.

P.R. Panchamukhi and V.R. Panchamukhi (1969) have also tried to look at the problem of educational planning in India with the help of rate of return analysis. They have estimated returns by using the coefficients of marginal contribution, annual returns to a type of education. Samuel Paul (1972) has applied cost-benefit analysis to 'Management Education' and has obtained positive social net value even at 13% rate of discount. Chaudhuri and Rao (1970) have estimated marginal social rate of return to Delhi University Graduates. Shortlidge (1973) has applied this
technique to Agricultural Education of Govinda Ballav Pant University of Agriculture and Technology and estimated private and social rates of return to Agricultural Education. Psacharopoulos (1973) has taken the average of the rates of return calculated by Nothari, Husain, Harberger, Shortlidge and his own calculation and Chaudhuri (1979) has estimated high rates of return to Rural Education in Punjab and Haryana, Tilak (1980) has estimated private and social rates of return (both marginal and average) to different levels of education from literacy to higher general and professional levels for sex and caste groups in West Godavari district of Andhra Pradesh. He has made adjustment for wastage and stagnation, ability, economic growth, unemployment, labour force participation rate and mortality. S. Debi (1980-81) has estimated the rates of return to different types and levels of higher education in Orissa. She has estimated unadjusted and adjusted rates of return for different types and levels of education. She has adjusted for ability, average waiting period in the benefit side and for unemployment rate and foregone earnings in the cost-side.

The following general conclusions emerge from the studies.

(1) The returns to educational investment in India are lower than returns to investment in physical capital
but the rates of return are positive at all levels of education indicating that investment in education is a reasonable, not an uneconomic choice.

(2) The high private rates compared to social rates give us a misleading conclusion that investment in education is more profitable from private point of view. This is misleading because of our ignorance of several externalities of education. If it is possible to quantify externalities the social rates of return will surely be higher than the private rates of return.

(3) Rates of return decline if one moves up along the educational ladder. So all studies conclude that "Indian education is heavy at top and weak at bottom" (Nallagounden : 1967 : 367). So there is a strong case for diversion of resources from higher levels of education to lower levels of education.

(4) The studies show that internal rates of return are not seriously affected by unemployment. Secondly, wastage and stagnation cause a substantial fall in rates of return and lastly "\( \alpha \)-coefficient" reduces rates of return less than proportionately.

2.7 **Significance of Rate of Return Analysis in Education**

The rate of return analysis in education helps the planner to make efficient allocation of resources in
education. It throws some light on the following issues:

1. What amount of society's resources should go for expansion of education?

2. How much of these resources should be distributed among different levels and types of education?

The rate of return is a summary statistic that helps us to make comparison between the yields of different forms of investment. The cost-benefit analysis does not offer an automatic solution to the problem of resource allocation. It does not provide numerical targets for the planner. Woodhall (1980: 46) observes, "At best it provides a 'direction indicator' to invest in this type of education, not to provide for other types of education".

With the help of rate of return analysis we can make the following comparisons:

1. Comparison between private and social rates of return to education of different countries.

2. Comparison between the rates of return to education in the same country at different point of time.

3. Comparison between rates of return to education and other forms of social investments.

4. Comparison between relative profitability of different types and levels of education.
(5) Comparison between socio-economic class or group if rates of return for such groups are available.

Rates of return analysis in most countries show that rate of return is higher in primary level than that in secondary and higher level of education. Schultz (1967) and Carnoy (1967) analysed rates of return to education in Latin American countries. They have pointed out that due to low rate of return to higher education in these countries brain-drain from these countries is high. Blaug, Layard and Woodhall (1969) have suggested that in a developing country like India the rush for higher education is due to high private rate of return although there is acute unemployment problem among the educated persons. The study of Harberger reveals that investment in physical capital is more profitable than investment in education. Such results help the government to allocate the resources accordingly.

Becker has estimated the rates of return to education of white males and non-white males of USA with 1949 data and it has been found that the returns to education of white males are greater than the returns to non-white males. Hans Thias and Martin Carnoy (1972) have applied rates of return analysis to educational planning in Kenya. They have projected future wage structure on the basis of present demand for and supply of labour. The present wage-structure
and related rates of return present a starting point from
which to measure further wage-structure.

But we must remember that rates of return to
investment in education are not marginal as understood in
normal economics usage. The marginal investment does not
refer to a small increment in outlay but rather to a
quantum increment in outlay required for the relevant
increment in length of schooling. The quantum of marginal
investment is widely different in different levels of
schooling. Hence arises the problem of comparability. From
the standpoint of individual decisions, the rates of return
to investment for different levels of education only give
information for levels of education that must be taken in
sequence. So the rates are not operationally relevant at a
given point of time. From social point of view the
input-output-input relationship between sectors of
education complicate straight comparisons of rates of
returns. The input-output-input kind of relationship that
seems to exist between the sectors make the viability of
the investment in primary sector of education dependent on
the availability of graduates from the higher education
sector.

A given rate of return is not optimal for that
particular level available to the average investor. Possible
returns from investment in the quality of education at a given level (rather than proceeding to next higher level) are not considered.

2.8 A Concluding Remark

It is impossible to expect that the rate of return is a perfect technique to solve all problems of resource allocation in education and educational planning. Professor Tapas Majumdar observes (1984: 60) "Marginal rates of return to investment in education are not in the same category as marginal rates of return to investment as understood in normal economics usage. The conclusion is that this will not be a dependable instrument for an optimal investment policy that can be adopted by any decision-maker, whether individual or institutional - contrary to what has often been claimed". It is true that the cost-benefit analysis does not provide wholly satisfactory answer to the problem of resource allocation but it provides information on costs and benefits of education which are important elements of resource allocation decision. Woodhall (1980) also points out that rate of return analysis may be complementary to manpower planning approach.

In spite of conceptual limitations and data limitations, as Kothari and Panchamukhi (1980: 190) observe, the rate of return studies have led to two distinct advantages: (1) The studies emphasise the need to recognise educational planning as a part of overall planning of allocation of resources, (2) The studies also implicitly stress the need for the decision making process in education to be based on more relevant information rather than on intuition.