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APPROACHES TO MEASUREMENT OF RETURNS TO EDUCATION

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Abstract: Returns to education have gathered huge literature .We have to look at the different conceptual and empirical issues surrounding the various ways to measure the rate of return to education. Rate of return is a guiding factor in decision making by individuals as expenditure on education is treated as an expenditure.

Keywords: Returns, education , human capital , investment, earnings.

I. INTRODUCTION

Returns to education have gathered a huge literature both for social and private returns to education. Education systems produce the skills which boost labour productivity. Further multiple social and non-market benefits are gained when people undergo school education compulsorily.Shultz (1961) mentioned that knowledge as well as skills sound alike similar in terms of acquiring the means of production. The focus of human capital investment must be upon boosting an individual to get enrolled in higher education.

The basic argument relating to human capital and growth in earnings can be put in the form of a sequence,
"Education> cognitive capacity>higher productivity> earnings> a measure of human capital."

Thus, we can see that rate of return is a guiding factor in decision making by the individuals is expenditure on education is treated as an investment. Not only so, it is also important for investment decisions at the Macro level for National level There are two methods followed in empirical research to determine the value of education. The first one is to observe micro data at both individual level and to household levels followed by comparisons of earnings between highly educated less educated. The second method is to consider the aggregate National data and contrast it

with some other country that has similar GDP or per capita growth for the resources allotted to education. Though both methods are more or less similar, the first approach i.e, the micro approach is better equipped to handle externalities produced by education

Different Approaches to Measure Returns to Education

Life Time Earnings Approach

Pshcarapoulous (1995) started current study results with the Becker's (1964) model. In model the equation is very simple i.e., an individual's total earnings in her of his lifetime are nothing but the addition of returns investments in education plus the earnings from actual human capital. Becker studied human capital model and the measured its value. The basic theory behind this approach is that if one looks for higher earnings in future, then the human capital investment must be done at present itself.

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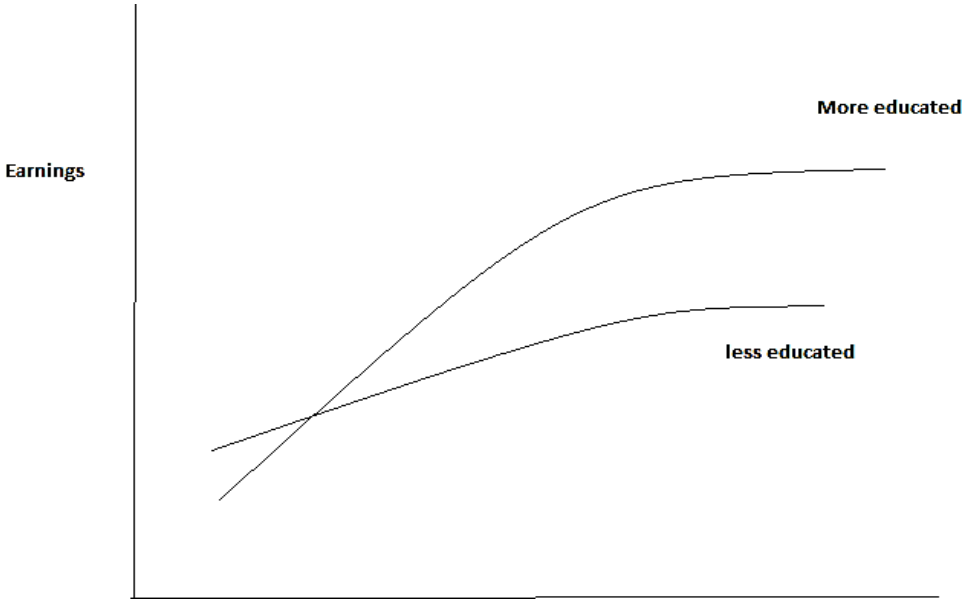

Figure1 : Earnings and Education

Source: G. Psacharopoules – The Value of Investment in Education 2006)

The above figure shows the earnings profile of a less educated worker and that of a less educated worker for comparison. The more educated worker foregoes earnings in the early part of his life to earn higher in the future time periods. Since earnings are spread over different time periods, to aggregate them present value concept can be used.

Now the equation can be written as follows:

$$Ei = Xi + \sum_{j=1}^{m} R_{ij} * Cij$$

Where, Ei = lifetime earnings of individual i

Cij = amount spent by person i on j^{th} unit of education Rij = marginal return
Xi = return to individual i from human capital

Each individual invest in education until the marginal rate of return on a unit of investment equals the marginal interest cost of that unit.

A formal specification of the Becker model of higher education is as:

Educational level "S" is selected to increase the expected present value of of future incomes, until T time when retirement occurs .Here the total amount incurred in education is denoted by Cs. In order to obtain optimum point "S", one should equalize the S^{th} year of schooling with the cost incurred for the S^{th} year of education.

$$\sum_{t=1}^{t-s} \frac{W_S - W_{S-1}}{(1+V_S} = W_{S-1} + C_s$$

v_S= IRR (Internal Rate of Return)

Optimal decision concludes that it is important to invest in S^{th}year of schooling if at all then all R's should be more than I , the market rate of interest). In line with this technique, a micro model was constructed. This done so, in line with fact that one can understand the impact of increasing level of education on wages, from the correct measure of return of

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human capital investment. This further boosts the possibility of higher investment. A slight increase was proposed in this model in which return is possible as a price and not as an asset that is income streams. The investor buys the income, which is not the usual income of service streams, while he can sell his labour services at a huge price.

The model assumes identical preferences and is timeless.

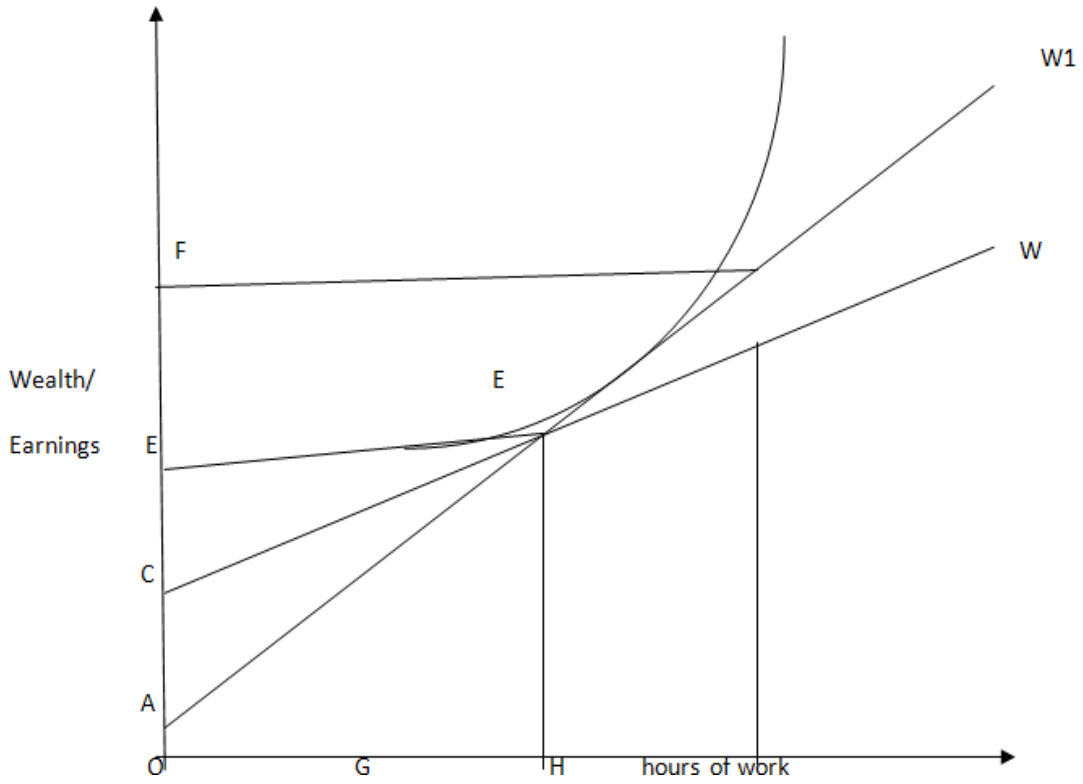

Figure2: Earnings and Labour Supply

Let initial wealth be OC, then equilibrium wages for untrained worker is the slope Cw, equilibrium is at OG hours of work and CE is income.

Now suppose in order to do skilled work, a person must undergo some additional higher education at cost AC. Human capital returns are earned in the form of price changes, individual must earn slope AW as wages in order to pay for higher education. If this happens individual would work for ‘OH’ hours of work and earn ‘AF’.

II. COST -BENEFIT APPROACH

This approach is based on several variants of 'benefit-cost' analysis of Higher Education. While the traditional methods of net present value or an absolute method, the relative methods are based on 'benefit cost' ratio. (Tilak 1981)

One can analyze the cost as well as advantages of education alike how it is done in other project types . When it comes to spending on higher education for 3-4 years, it is expected to occur during the entire course of study. So it is important to note that discount provided for determining net returns in terms of present value series. Return concepts are discussed herewith.

A) Private rate of return—The private rate of return is generally utilized to give details for the education demand. It is possible to utilize it to access the equity or to get rid of poverty effects by spending on public education. Cost benefit analysis conducts a structured comparison of the magnitude of cost and benefits attained from some kinds of investment, in order to get an idea of the viability of the investment. For any investment some resources have to be investment by foregoing present consumption in order to have a better return in the future time periods. Thus we look at prospective yields to give a guide about efficient allocation of resources.

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Costs would cover both actual and opportunity cost. It involves an attempt to estimate the total cost of investment in education in terms of alternative opportunities borne by the individuals concerned. The benefits would include the contribution of the investment in education to future streams of income. Education contributes towards improving the productivity of labour which in turn is reflected in higher earning .If we need them for lifetime earnings profile, benefits have to be discounted to convert it to present value terms in order to facilitate comparison across different time frames.

B) The Social Rate of Return---The social return provides a bird's eye view on the costs incurred and benefits reaped from investment in education from the view point of state. The cost incurred is inclusive of full cost of education rather than the fees paid by the recipient of education. It is impossible to measure the full amount of the monetary and non-monetary benefits / costs without agreement on conceptual and mathematical issues. Let us first classify the impact of human capital (source OCED 2000, Pscharapoulous 2007)

Table 1: Cost Benefit of Education

Benefits

BASIS	*DIRECT/PRIVATE*	*INDIRECT/SOCIAL*
MONETARY	• Higher earnings • Better employability • Mobility	• Higher productivity • Improved revenue of government
NON-MONETARY	• Better health + quality of health • Better efficiency	• Improved social cohesion • Better voter participation

Costs

BASIS	*INDIVIDUAL*	*SOCIAL*
DIRECT	Direct cost of fees, etc.	Public subsidy on education
INDIRECT	Foregone production	Spill over effects

Source: Psacharapoulous 2007

III. LET US EXAMINE THESE IN DETAILS.

1. Private Rate of Return

An individual spends amount based on his or her foregone earnings while during any course. Any educational expenses or incidental fees are incurred by the individual

themselves. The advantages gained by a private individual can be understood from his or her own earnings after deducting taxes and this value is be higher than the control group of individuals who possess no higher education. The comparison can be easily understood as a comparison between university graduates and secondary school graduates.

One can estimate private rate of return of education made in as a specific hierarchy through determining the rate of discount (r) that balances the stream of discounted benefits to the stream of cost for a specific period. For University education, the formula given below is used

$$\sum_{t=1}^{37} \frac{Wu - Ws}{(1+r)\,t} = \sum_{t=1}^{5} (Cu_{t=1} + C_S)\,(1+r)^t$$

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where, (Wu-Ws) is the differential in wages earned by a university graduate and a secondary graduate. Here. Cu, denotes the direct costs of university whereas, Ws, corresponds to the opportunity costs or indirect costs of foregone earnings.

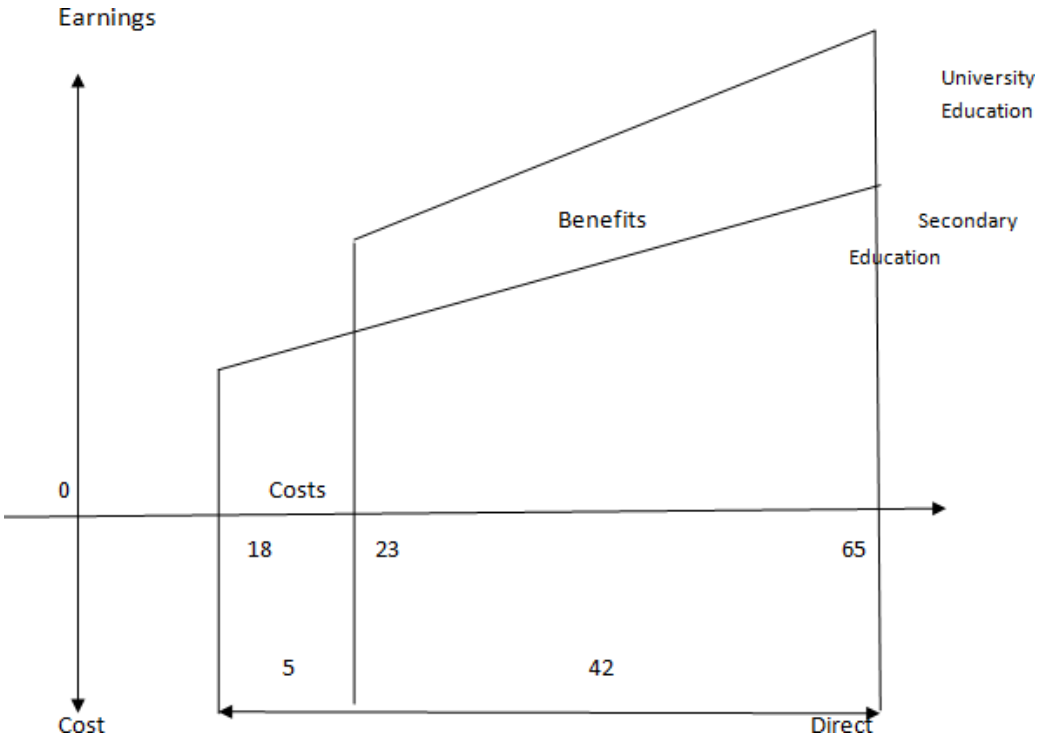

Figure3 : Age Earnings Profile

Source Pscharapoulous 2007

2. Social Rates of Return to Education

These are based on costs and benefits which are all inclusive , essentially we try to incorporate the activity at all different levels. These are essentially used for efficiency of public spending and as a guide on whether to expand or contract a particular Universal level of education. In terms of practical / actual application the cost would include the states or societies at large spending on education. Hence for example we would include rental of buildings / salaries and for benefits we would include gross earnings and also include earnings in kind.

Social rates of return from education is generally decided on the basis of costs and benefits which is necessarily including different activities. This measure is generally utilized to understand the efficiency of public spending based on which a specific university level of education can be decided whether to proceed or not. When it comes to actual or practical applications, the costs incurred include rent for buildings, salaries (except benefits), gross earnings and earnings in kind. Social attribute of the expected rate of return denotes the inclusion of complete resource investment cost. The social benefits , generally include external or non- monetary advantages. However, some of the data forces to make use of base analysis in order to identify the available entities. The cost calculated in social rate of return is generally high compared to private rate of return i.e, private rates of returns are always higher than the social rates of returns. Here, the social rate of return reciprocates the cost of education that got subsidized for the public.

A detailed analysis can be as follows:

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Table 2: Benefits of Education

BENEFIT	EVIDENCE
1. Reduction in crime	Reduction in spending for Per capita police expenditure with additional schooling years.
2. Non-wage remuneration	The individuals with better education gain excellent benefits and good working atmosphere.
3. Child's education	When parents are educated, it enhances the levels of a child and he can make academic achievements easily.
4. Technological change	Higher education helps aids in dissemination of research and development.
5. Social cohesion	The Schooling process enhances incidence of voting, increases attachment to country and stops alienating.
6. Household health	Health of a family can improve with Higher education.

***Source**:* OCED (2005)

Thus while cost benefit analysis is designed to maximize efficiency it overlooks the questions of distributive justice and cannot easily deal with ethics and equity. Therefore it is of limited use in policy making, while it does not guide us about the most desirable educational option it can guide about the efficient of given courses of action.

It also suffers from the reliance of converting benefits, economic and non-economic to a single scale. This creates problems of incommensurability. Some non-economic benefits cannot be converted to monetary terms and cannot be compared .This may thus distort value assigned to them and therefore may have wise results. That is why while cost benefit is a powerful tool but it should be used only in appropriate circumstances.

IV. THE EARNINGS FUNCTION APPROACH

"Mincer's" method (Mincer 1974) fits a log wages (ln w) function with years of education (s), years of labour market experience and its square as independent variables for stocks. Further in this semi log specification, one can calculate the coefficient on years of education (β) as an average private rate of return to an additional year of education irrespective of the education level.

One can determine the returns to education using earnings function at various levels through the conversion of continuous years of education variable (S) into a series of dummy variables as Dp, Ds and Du. This kind of conversion is to denote the education completed by the corresponding person, Mincer's equation is a correction of empirical economics. Mincer's equation is nothing but an improved version of empirical economics and is often inclusive of framework which can be utilized to determine he returns to schooling and other demographic variables. Mincer's Framework captures two distinct economic concept in one equation:

a) A wage equation that disseminates information on how labour market provides rewards to variables like experience and education.
b) Rate of return to education which can be contrasted to existing rate of interest to calculating the optimal level of human capital Investments.

Mincer (74) used wage regression functions to explain the pattern of individual earnings, which can be influenced by a number of facts. His basic wage earnings function was:

$Y = F(S, Ex)$

Where, Y = Earnings
S = schooling in years Ex = experience in years
The equation was later modified to semi log form and made more Complex by adding more socio-economic and human capital variables. These earnings functions are useful as they can capture the influence of many variables on earnings and some other factors which are reflected in the constant term in the regression equation like ability adjustment. The equation in semi log form can be expressed as:

$$\text{Ln } Yi\ (t) = \alpha + \beta_1 Ei + \beta_2 Exp + \beta_3 Exp^2 + Ei$$

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where, Y is the earnings in the t^{th} time period Ei = level of education of the individual
Exp stands for job experience in years

Exp^2 denotes a quadratic term which is intended to capture the concavity of the relation that exists between earnings and experience.

This equation can be extended to capture other socio economic and human capital variables.

The Mincerian equation is based on a number of other options for which it is a useful piece of information and that individuals are risk-neutral. Also that the individuals are homogenous and differ only in the amount of human capital and not type. The framework argues that earnings level are related to human capital investments directly. It is based on the premise that market rewards higher productivity by higher earnings and secondly that earnings functions are concave.

The most debated hypothesis in the economics of education is the one referring to the fact that differences in earnings might be due to Superior ability rather than extra education. The Crux of the matter is that the Undisputable and universal positive correlation between education and earnings can be interpreted in many ways. The answers can be attempted only with empirical observations.

V. CRITIQUE OF HUMAN CAPITAL THEORY IN BRIEF

This theory has foundations in the writings of Shultz, Becker and Mincer. But many economists have criticized it and found it week to explain the decision-making process in education. A critical analysis helps in a better understanding of the relation between education and earnings and to bring out limitations of the existing literature.

Several approaches have come forward and critic of the human capital approach for stop one is based on theory of signaling and screening. This theory treats education as a screening device and is based on the notion that education acts as a screening device and segregates more able workers from less able workers. It has an inherent believe that that education leads to certain qualities that increase cognitive ability and productivity of workers. So, the problem of asymmetrical information, in the labour market is sorted through a third-party verification about the quality of labour. Educational institutions thus carry out this job of 'screening'. Demand for higher education goes up and screening give the signal to the employer and hence this is reflected in the higher rate of return to investment in education. So, what is different in the human capital theory and the screening mechanism is the casual relationship for conceptual framework.

The second approach to investment in education is the 'social choice' approach as advocated by Majumdar (1983).This approach emphasizes on society , while in the human capital theory education is treated as a homogeneous product but here it is stated that education is heterogeneous in nature and hence needs to be treated differently from investment in

education. The social choice approach also puts emphasis on social reality and macro aspects were there as the human capital theory was emphasizing on a micro approach. The social choice is broader and covers diverse interest and conflicts of investment in education.

The third approach was developed in 90s by Sen (1985).It was based on the concept of capability against the background of distributive justice. His approach was based on the central concept of capability and role of education in development. This approach provides overview on the entire 'quality of life'. According to Robeyns (2008), the concept of development is a function that works based on people's efficacy to execute tasks with their capabilities. A person is said to have achieved something if he or she is" functioning". Capability denotes the ability of a person in achieving a destined function of doing and being.

Entitlements generate capabilities. There is a functional relationship between entitlements and capabilities. Sen focuses on capabilities and real choices people have and values both direct and indirect role of human capability. This is in contrast to human capital approach which focuses only on indirect effects through economic production.

Thus, the different approaches emphasize different perspective. They all allow us to evaluate the role of education in the socio-economic setup as the limitations of human capital theory are realized and enrich our understanding of the economic concept of education.

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VI. LIMITATIONS OF THE MINCERIAN FRAMEWORK

One must mandatorily understand that the differences in few variables as, natural ability, occupation, spatial, location, gender and socioeconomic variables. They are not purely based on education benefits. They may not adequately reflect productivity of workers. This because of imperfections of the labour market so differences in earnings may not be because of education. Also this methodology does not adequately reflect past labour market conditions. Wages are related to education for both macro and micro factors. At the micro level, skill, job particulars, location, choices and preferences are important. At the Macro level, availability of job, labour supplies, national, regional and political factors play an important role.

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