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RETURNS FROM INVESTMENT IN TECHNICAL AND PROFESSIONAL EDUCATION WITH REFERENCE TO J.N.V. UNIVERSITY, JODHPUR (RAJASTHAN) INDIA

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ABSTRACT: *Angus Maddison (Former Member of OECD) in his article "What is Education For" published in Lloyds Bank Review describes the major purpose of education as to provide opportunities for self-fulfilment and personal development – a more complex process with humans than with animals because of the vast stock of knowledge we have accumulated. Access to this heritage is a basic human right which should yield satisfaction throughout life. "Education is designed to produce existing knowledge in new minds and to make these minds more receptive and more capable of absorbing, transforming, creating and using knowledge, Research and Development, meanwhile, is designed to produce new knowledge. This crucial segment of the knowledge industry sustains a two-way link between successful investment, which permits the faster growth of GNP, and GNP growth, which permits more investment in knowledge production" (Burke, Willam 1966). That education adds to the productivity and earning power of the individual and can raise a nation's level of GNP has long been recognised. However, implications of treating investment in human capital, analogues to that in physical capital are the story of past fifty years. The basis of the argument is the empirical evidences. According to Brookings institutions' Edward Denison, knowledge investment accounted for about 40 per cent of the 2.9 per cent annual rate of growth in the 1929-1957 periods. Denison further estimates that the education of the labour force was responsible for 23 per cent of the growth in real national income in that period. The calculus of cost and benefits from investment in education of thirsty countries have shown education to have been a worthwhile investment and results have shown that further expansion of educational facilities is warranted in most countries, except at postgraduate level (Psacharopoulos , 1973). The 'Chicago School' of economists has been the first in developing a theory of human capital. These economists estimated the variations in earnings by education-standard as a measure of its economic benefit and they have used earnings and costs of education to calculate private and social rates of return from investment in education.*

KEYWORDS: Human Capital, Investment, Returns, Private and Social Returns.

INTRODUCTION

Education generates direct and indirect and private and social benefits. However, there is no uniformity in defining direct and indirect benefits of education. Direct benefits accrue to the individual concerned only whereas indirect benefits accrue to people other than the recipients

of education. Private benefits are obtained by the educated individual. Social benefits are the sum of the private benefits and the uncaptured benefits of the educated individual to the society. However, identifying and measurement all social benefits is a very difficult task. Some have succeeded in identifying positive and negative externalities but few have been able to quantify them. Weisbrod (1962:109) classified the direct benefits of education in terms of direct financial return, financial option return, non-financial option, hedging options returns, and Non-market returns.

Blaug (1969) described indirect benefits as the current spill over income gains to persons other that those who have received extra-education. Indirect benefits include spillovers income gain to others as well as future generations (Psacharopoulos and Woodhall 1985:54).

Direct benefits are corrected for ability, unemployment, non-participation in work, mortality, taxes, and growth in income. Boissiere, Knight and Sabot (1982) using earning functions suggested that ability, years of schooling, and cognitive skills interact to influence earnings. Debi (1982) used regression technique to isolate the effect of education without making correction for ability. Denison (1962), Becker (1975), Psacharopolos (1975) and Shortlidge (1973) attributed a significant proportion (about 60 percent) of benefits to the innate ability of the individual. Blaug designated it as alpha coefficient. Arrow (1973) and Berg (1970), however, found that education has no effect on earnings except for the coincidence of personal abilities. Card (2001) reaffirms Griliches' (1970) conclusion that the effect of ability and related factors does not exceed 10 percent of the estimated schooling coefficient.

Hussain (1967), Blaug (1969), Nair (1989) corrected direct benefits for unemployment period. Pandit (1972), Tilak (1980:64-65) adjusted the rates of return for non-participation in work. Kothari (1966) and Pandit (1972) corrected the benefits for mortality as some people may die during their working life and don't get full benefits of education. However, (Shortlidge 1974) discussed this correction factor, as it is insignificant in advanced stages. Blaug (1971), Goel (1975), Pandit (1972) Tilak (1980:64-65) adjusted the benefits for secular growth in income.

Returns to Education - Preparation of Age-Earnings Profiles

Since 1960's, returns to education are estimated based on human capital theory pioneered by Schultz (1961). There have been several studies in which the economic benefits of education are measured in terms of its effect on the lifetime earnings of individual workers and then the implied rate of return is estimated (Lau, Jamison and Louat 1991: 2). According to Psacharopoulos and Mattson (1998:271-284), rate of return can be calculated by the internal rate of return and earnings function procedures (Basic Mincerian and Extended Mincerian). The elaborate rate of return method refers to calculation of the internal rate of return based on individual earnings profiles, and in the short-cut method, flat age-earnings profiles are assumed to reach at a return to investment in education. On the other hand, basic Mincerian earnings function method approximates this procedure by means of fitting a semi-logarithm earnings function to individual data sets (Mincer 1974). In this method, the coefficient of years of schooling gives the average rate of return to additional year of schooling (Duraiswamy 1999, Jeemol: 160-161; 1996, Shah and Srikantiah 1984, Chiswick 1974, Becker and Chiswick 1966, Snooks 1983, Fields 1980 b). However, it is impossible to compute rate of return for specific level of schooling from this procedure.

Extended Mincerian function is used to overcome this problem substituting dummy variables for years of schooling, corresponding to discrete educational levels. Malathy and Duraisamy (1993) Debi (1988) and Shah, Srikantiah (1984) to derive the age-earnings profiles.

REVIEW OF LITERATURE

There is vast literature on returns to different types and levels of Education in India and abroad. However, few studies could be found for technical, vocational and professional level of education. In this study, we reviewed some important research work and provide their conclusion.

(1) There is extensive work done in estimating returns to general education at micro level in India **(Sahota 1962, Harberger 1965, Nallagoundan 1965, Selowsky, Kothari 1967, Husain 1967 and 1969, Bhattacharya 1968, Panchmukhi and Panchmukhi 1969, Blaug, Layard and Woodhall 1969)** have estimated returns to education at micro level in India.

(2) **Pandit (1972) and Goel (1975)** computed returns at the macro level. Similar attempts were carried out by **Chaudhri (1979), Venkata Subramaniam (1980), Bhatt (1984), Debi (1988), Acharya, S. (1996) and Unni (1996)** at state level. But these studies yield different results due to difference in coverage, reference period, nature and size of data, methodology used and adjustments made or otherwise.

(3) **Madheswaran (1966)** estimated rates of return to higher education in India. He found that professional education has higher returns than the general education and the time trends in rate of return are not consistent.

(4) **Chaudhary and Rao (1970)** obtained marginal private and social rates of return to higher education of Delhi University students and concluded that the demand for higher education reflected 'pressure for a slice in the higher subsidy at the higher level'.

(5) **Pandit's (1972)** estimates were low due to higher adjustment and SRR and PRR came to be 5.0 percent and 5.6 percent respectively for professional courses.

(6) **Samuel (1972)** found that even at a 13 percent discount rate, management programme at the Indian Institute of Management, Ahmedabad yields a positive social net present value.

(7) **Thakur (1979)** estimated 17 percent private rate of return to apprenticeship and 14 percent to industrial training as compared to 9.4 and 7.5 percent social rate of return respectively for the trainees of the Industrial Training Institute, Delhi.

(8) **Tilak (1980)** estimated marginal and average private and social rates of return to different levels of education from literacy to higher general and professional levels for *sex* and caste in West Godavari district of Andhra Pradesh.

(9) **Kothari (1967: 126-140)** expected 25 percent and 22 percent private and social monetary returns respectively in India for technical and engineering graduates.

(10) Shortlidge (1973,) and Mehta (1996) estimated private and social returns to agriculture education respectively for Govind Ballabh Pant University of Agriculture and Technology, Pantnagar and Rajasthan Agriculture University, Bikaner**.**

(11) **Shortlidge (1974a and 1975)** also calculated rates of return to the University training programme for Gramsevaks (in range of 8.3 to 13.5 percent) vis-a-vis the agricultural graduates (9.9 to 10.3 percent) by adjusting for mortality and ability.

(12) **Malathy and Duraisamy (1993)** estimated returns to educational investment of scientific and technical personnel in India. They found that marginal rates of return per year of schooling declines as education level increases. Also the returns to scientific and technical education of women are higher than men for all the levels of education.

(13) **Debi (1988)** found the higher rates of returns for medical and engineering graduates over general graduates.

(14) **Acharya (1996:383-396)** computed private return to lower levels of "education for rural and urban areas of Maharashtra. She found higher returns to education in rural females than urban areas, and higher returns for women than men

(15) **Bhatt (1981)** calculated private costs and benefits of education and thereafter also calculated the rate of return to general Education in Rajasthan. The private rate of return to graduates came to 23.6 percent and that of post-graduate qualification was 12.0 percent. In contrast, social rate of return for graduates and post-graduates were 19.7 and 9.7 percent, respectively.

(16) **Srivastava and Nauriyal (1997)** using data set of "Degree Holders and Technical Personnel" examined the impact of professional education on the supply of high level manpower and role of earnings in growth of the high level manpower in Rajasthan with reference to technical and engineering education; and also studied the employment and unemployment status of engineering and technology degree holding manpower in Rajasthan.

(17) **Tilak (1981:213-289)** established that the rates of returns to education of backward classes are generally higher than that of non-backward castes and thus urged for higher support for education of backward classes on economic grounds.

(18) **Muthiyan and Selvanathan (1991)** found that the Scheduled Caste belongs to the better-off families. Most of the parents of Scheduled Caste students are holding middle level white-collar jobs. Contrarily he again found that the poor and deserving Scheduled Caste students especially from rural areas do not get admission in professional colleges.

(19) **Chakrabarty (1998)** analysed household level data on income, education, health status of Scheduled Caste, Schedule Tribe and other using data collected by NCAER in its Human Developing India survey of 33,230 rural households. He concluded that there was wide income disparity in Scheduled Caste-Schedule Tribe and non Scheduled Caste-Schedule Tribe household. further, mortality measured by crude death rate was found to be higher among Scheduled Casts and Schedule Tribes.

(20) **Wankhede (2001: 1553-1558)** found that the scheduled castes in general in India and Maharashtra in particular do not form a monolithic group and have a social hierarchy and practice of untouchability among themselves. Their overall educational backwardness is attributed to poverty, lack of easy access to schooling, unattractiveness of the educational system, relative neglect of elementary education, discrimination in schools and inequality of opportunities among the scheduled castes themselves.

Objectives of the Study:

Technical and professional education is considered as a capital goods and hence there should be returns to such investment in education. These returns have to be compared with returns in the next best alternative. This requires the measurement of costs and benefits and the choice of an investment criterion. In this article private and social rates of return from investment in

technical and professional education offered by JNV University Jodhpur (Rajasthan) is estimated.

Investment Criteria in Education

One of the following three criteria is generally used in making investment decisions in education viz. (a) Net Present Value (N.P.V.) (b) Cost-benefits Ratio (BCR) and (c) Internal Rate of Return (I.R.R.).

Costs and benefits do not crop up simultaneously but over a period of time hence, these have to be aggregated into some summary measures. However, accruals at different points of time cannot be simply added up since future outcomes are discounted in comparison to the present one. One method is to compute the present value of all flow of present and future costs and benefits using a discount rate so as to make them commensurate with the current costs and benefits. (Layard 1972:13). This is important both in the net present value and cost-benefit approaches.

Net Present Value (NPV)

If 'r' is the rate of discount, B_t and C_t are benefits and costs in year 't', then the present value will be estimated as under :

$$NPV = (B_0 – C_0) + (B_1 – C_1)/(1+r) + (B_2 – C_2)/(1+r)2 + ...(Bn – Cn)/(1+r)^n$$

Where

$B_0, B_1 ... B_n$ denotes the series of prospective benefits in the year 0, 1, 2,...n

$C_0, C_1, ... C_n$ stand for the series of prospective costs in the year 0,1,2 ....n and

r is the rate of discount.

Project should be undertaken if present value is positive and the project should be ranked in order of the present value. However, the choice of a proper discount rate is crucial and really a difficult one.

Cost Benefit Ratio (BCR)

Cost-Benefit ratio is an alternative to the NPV criterion. According to the cost-benefit ratio an investment is profitable if the cost benefit ratio is greater than unity. The projects should be arranged in descending order of this ratio and should be taken up in that order.

Internal Rate of Return (IRR)

Internal rate of return is that value of discount rate (say 'ρ') which makes the net present value equal to zero. The project, is to be undertaken only if 'ρ' exceeds the discount rate. Internal rate of return (IRR) is not an actual rate of return rather it is a prospective rate weighing all expected benefits against all costs and expenditures likely to be incurred. However, Layard (1972:52) does not prefer IRR approach to NPV approach since at times it gives potentially wrong decisions in case of choice between mutually exclusive projects. Often it does not provide unique answer, when there are changes in the stream of net returns.

There are two types of Internal Rate of Return: **Social Internal Rate of Return (SRR),** and **Private Rate of Return (PRR)**. Social Rate of Return considers all direct and indirect benefits accruing to the individual receiving education as well as other members of the society. Private rate of returns consider all benefits accruing to that particular individual. It is

to be remembered that only direct pecuniary benefits are considered for calculating the returns to education in this study.

If there is perfect competition and free mobility of funds in the capital market then Internal Rate of Return will be same in all the fields. But this does not happen in reality therefore, IRR will differ for different courses.

Social Rate of Return can be used to compare the cost- benefit relationships in education with those in other social investments, and also to compare the returns from different levels and streams of education. This is immensely helpful in determining investment priorities in national plans as also extent of subsidization of education (Morris and Ziderman 1971, Morris 1973, Williams and Gordan 1981:199-227). On the other hand, Private Rate of Return helps to explain the individual returns and hence to predict the private demand for voluntary education and for its different subject specialisms and institutional provisions (Freeman 1971,1976).

There is problem of choosing discount rate in the cost benefit ratio and present value methods. Hence, these are not widely used for evaluation of educational projects. The calculation of Internal Rate of Return does not require the discount rate; rather Internal Rate of Return is to be compared with the discount rate or the next best alternative rate of return.

Internal Rate Return suffers from the problem of multiple or negative solutions and even indeterminacy. Still it is preferred as the most suitable investment criterion on two grounds :(i) being a pure number it is more useful in allowing projects of different sizes to be compared directly and (ii) it by-passes the problem of choosing the appropriate social discount rate and the problems associated with it (Debi, 1982:23).

METHODOLOGY

In the present study corrections are applied to estimate rate of return and adjustment is made for the average unemployment period in form of waiting period on the earning side, e.g., if the waiting period is of two months, then the lifetime earnings stream would start after this waiting period. Thus, for the initial two months, there are no earnings, after which adjusted profiles are taken as such. Also, unemployment period is included as a regressor in the econometric equation.

Private returns are adjusted for the income tax rates on the basis of existing tax rates. Average tax rates are calculated at the existing tax rates and deducted from the average income of the respondents. Tax rates are used to find post tax income for each course. For instance, for LL.B graduates mean additional income is Rs. 1,15000 and tax liability comes out to be of Rs. 12000 (i.e., average tax, burden comes out to be 12000/115000=0.104). Thus, post tax income is 89.6 percent of the pre-tax income. Similarly, tax rates have been estimated for all the courses. It may be noted that average tax rate instead of marginal tax rate is applied here that too without providing for any deductions and exemptions permissible under the existing income tax act. These averages are given in Table 1.

Since the effect of non-institutional factors (ability, family background) are already reflected in the regression estimates hence no separate correction has been applied for it, that is, in the

above formula, a_0=0. Earnings have been adjusted for mortality using the probability of survival chances applied to the different age groups.

Table 1
Average Income Tax Rates on Income

Course	Average Tax Rate (%)
B.E. (Mining)	18
B.E. (Electrical)	18
B.E. (Mechanical)	17
B.E. (E & C)	20
B.E. (Civil)	13
B.E. (CSE)	23
M.B.A.	22
LL.B.	11

Source : Calculations are based on Income Tax Rates.

Estimation of Social Rate of Return and Private Rate of Return

Social Rate of Return is estimated with the help of social cost[1] including private and public cost and private rate of return is calculated using private cost. Costs are entered in the age-earnings profiles with negative sign against the years of schooling. Opportunity cost of income-foregone starts with the admission in the course and benefits start after the completion of the course. Thus, age-earnings profiles are netted out for age profiles of earnings foregone. These adjusted age-earnings profiles show additional earnings consequent on obtaining the degree over the nest best alternative.

Social Rate of Return is that rate of return, which makes the present value of net social benefits equal to zero. Social Rate of Return is computed by solving following equation and making several adjustments.

$$SRR = \frac{[\sum[B_i(1-a_0) - SC_i]Lo_i}{[1+SRR]^i} = 0$$

i= 1, 2, ...n

Where

B_i = Net differential in income in the i^{th} years after graduation.

a_0 = Ability coefficient capturing the effect of non-schooling factors (like socio-economic background, ability) on benefits.

SC_i = Total resource cost or social cost in i^{th} year.

Lo_i = Probability of living from the base year of investment 0 to the i^{th} year.

SRR = Social Rate of Return or required discount rate.

Private Rate of Return is obtained by putting the net present value equal to zero in the following equation.

$$PRR = \frac{\sum[B_i(1-a_0)(1-\delta T_i) - PC_i]\, Lo^i}{[1+PRR]^i} = 0$$

i = 1, 2,....n

Where

δT_i = Marginal Tax Rate

PC_i = Private Cost in i^{th} year

[1] For detailed discussion of Cost of technical and professional education refer Saruparia C. & Lodha S.l (2013), Developing Country Studies ISSN 2224-607X, Vol.3, 2013. (www.iiste.org)

PRR = Private Rate of Return or Discount Rate

Using the above formulae and applying the listed corrections, Social Rate of Return and Private Rate of Return are calculated for each degree (combined for all employer categories) and for each employer category separately. Here the income considered is the income reported by the respondent in his income tax return. It may not include income from several other sources like rent, tuitions, interest and profit. On the other hand, as already reported, institutional cost, especially capital cost is under-estimated.

Table 2:
Unadjusted and Adjusted SRR and PRR (All Employer Categories Combined)

Degree	Unadjusted SRR	Adjusted SRR*	Unadjusted PRR	Adjusted PRR*
B.E. (Mining)/H.S.	32.20	32.15	39.98	39.93
B.E. (Electrical)/ H.S.	46.08	43.95	41.46	39.50
B.E. (Mechanical)/ H.S	29.44	29.39	26.04	25.99
B.E. (E&C)/H.S.	30.50	30.48	37.74	37.69
B.E. (Civil)/H.S.	21.79	21.74	28.53	28.48
B.E. (CSE)/H.S.	41.81	41.76	49.41	49.36
M.B.A/Graduation	61.16	61.86	61.68	63.01
LL.B /Graduation	14.93	14.82	15.50	15.40

* Adjusted for mortality.

Table 2 presents the Social Rate of Return and Private Rate of Return unadjusted and adjusted for mortality and other mentioned correction factors. Corrections for mortality do not affect much the results of Social Rate of Return and Private Rate of Return except in case of B.E. (Electrical). This is perhaps due to the fact that Electrical group relatively consists of older people than the other streams. Results are interpretated on the basis of adjusted results only. Surprisingly, returns to M.E. over B.E. came out to be negative.

Social Rate of Return and Private Rate of Return are the highest for M.B.A 61.86 and 63.01) and the lowest for Law graduates (14.82 and 15.40). Social Rate of Return for M.B.A. and LL.B. graduates is 61.86 and 14.82 percent; respectively, whereas Private Rate of Return is slightly higher at 63.01 and 15.40 percent respectively.

In engineering courses, Social Rate of Return highest in case of electrical graduates (43.95 percent) followed by computer graduates (41.76 percent), mining (39.98 percent), electronic and communication (30.48 percent), mechanical (29.39 percent) and the lowest for civil graduates (21.74 percent) in that order. In contrast, Private Rate of Return is the highest for computer science (49.36 percent) followed by mining (39.93 percent), electrical (39.50 percent), electronics and communication (37.69 percent), civil (28.48 percent) and the lowest for mechanical graduates (25.99 percent). In brief, only in case of mechanical and electrical graduates, Social Rate of Return exceeds Private Rate of Return whereas, in all the remaining courses, Private Rate of Return is higher than Social Rate of Return. This implies that government investment is more beneficial to the society in courses like mechanical and electrical. However, in other courses, it can be recommended to shift the burden of cost of education from government to individual. Both the Social Rate of Return and Private Rate of Return are much higher than the social discount rate as well as the market rates of interest

and rates of return on physical investment. High private rate of return implies that starting engineering colleges in the private sector is a profitable business. Direct subsidization in the form of lower fees is not necessary. It may be through provision of scholarships and liberal loans with easy repayment schedules. Higher private returns to investment in computer science and MBA indicate the increasing demand for computer and managerial experts.
Though Social Rate of Return and Private Rate of Return are both the lowest to law studies, still these can be considered to be higher than the market interest rate or the Social Rate of Rate as well as to returns to investment in others sectors.

Returns in Some Alternative Investments

All the above estimates are made on assumptions that the fee structure, existing during the period of survey will persist in future also. Colleges in the private sector have their own fee structures. Hence, some alternative estimates have been made out to find out the private returns if fees are increased under different assumptions.

Presently, three types of fee-structures are prevailing in engineering and management courses for Free, Payment and NRI seats. In engineering, fees for free seat are Rs. 18000 for the first year followed by Rs. 16,000 in the next three consecutive years. However, fees for payments and NRI seats are Rs. 53,000 &. and Rs.1, 20,000 in all the four years. In MBA programme, fees for free seats are Rs. 15500 in the first year and Rs. 15000 in the second year while for payment and NRI seats are Rs. 25,000 and $ 4500, respectively. Therefore, four alternative rates of return (private) calculations have been made for the courses under scrutiny.

Alternative 1: Assumption: No Institutional cost is incurred i.e. whole of the institutional expenditure is shifted to the individual student/parents and state does not spend any amount on technical and professional education.
Alternative 2 : Rate of return to investment by students admitted to Free seats.
Alternative 3 : Rate of return to investment by students admitted to Payment Seats.
Alternative 4 : Rate of return to investment by students admitted to N.R.I. quota.
These alternative calculations are presented in *Table* .3.

Table 3 : Alternative Private Rate of Return

Courses	Alternative 1	Alternative 2	Alternative 3	Alternative 4
B.E. (Mining)	28.76	29.82	23.78	19.57
B.E. (Electrical)	28.94	30.16	23.81	18.80
B.E. (Mechanical)	27.13	27.00	22.00	20.00
B.E. (E&C)	27.09	28.16	25.84	18.40
B.E. (Civil)	19.53	20.88	16.45	13.34
B.E. (CSE)	36.11	37.00	31.00	25.00
M.B.A.	52.12	66.16	62.93	29.61

Alternative 1 calculations show that even if the state does not spend any money on such education and individual bears the entire expenditure of the course then still the private returns are quite high. This suggests that the burden of institutional cost can easily be shifted to the individuals. Alternative 2, 3 and 4 suggests that private returns to free seats are higher than that of payment seats. However, returns to NRI seats lie between the two. Relatively returns to NRI seats are low in all the courses in general and civil engineering in particular, supporting the fact that no private engineering college is offering free, payment and NRI

seats In civil engineering. Most of the private engineering colleges are offering courses on computer science due to high returns even for the NRI seat also (25 percent). Thus, to sum up private rate of return is much higher than the rate of interest on long-term loans or any alternative increase of discount rate etc.

Social and Private Rate of Return for each Employer Category

Social and Private Rate of Return to different courses are estimated for each employer-categories, which are presented in **Table 4** for engineering graduates in **Table 5** for MBA graduates and in **Table 6** for Law graduates. In all the tables first row gives Social Rate of Return and second gives Private Rate of Return corrected for mortality, unemployment, wastage and income taxes.

Table 4 : Social and Private Rate of Return to Engineering Courses for each Employer Categories

Degree/ Employer	Pvt. Busi./ Ind. (D2)		Self Emp/ Consultancy (D3)		Teaching Research (D4)		Pvt. Sec. / MNC (D5)		PSU/F.I. (D6)		NRI (D7*)		Retired (D9)	
	SRR	PRR	SRR	PRR	SRR	PRR	SRR	PRR	SRR	PRR	SRR	PRR	SRR	PRR
B.E. (Mining)	36.83	46.23	33.56	41.86	31.89	39.57	31.89	39.57	31.89	39.57	91.69	105.70	31.89	39.57
B.E. (Electrical) /H.S.	48.70	44.09	41.05	36.89	38.00	33.78	39.54	35.27	36.07	31.93	Int.**	Int.**	Int.**	Int.**
B.E. (Mechanical)/ H.S.	38.17	34.09	34.60	30.78	25.60	22.51	28.99	25.62	25.60	22.51	79.79	73.20	25.13	22.06
B.E. (E&C)/ H.S.	30.87	38.22	31.59	39.21	30.87	38.22	30.48	37.69	30.87	38.22	39.44	49.46	30.87	38.22
B.E. (Civil)/ H.S.	22.01	28.92	22.05	28.97	21.70	28.42	21.70	28.42	21.70	28.42	21.70	28.42	21.70	28.42
B.E. (CSE)/ H.S.	38.44	45.29	38.44	45.29	38.44	45.29	39.89	47.08	38.44	45.29	59.53	69.62	38.44	45.29

** Due to Fluctuations in Income; Int. = Intermediate.

Table 5 : Social and Private Rate of Return to M.B.A. Graduates for Each Employer-Categories

Employer	SRR	PRR
D1 (Pvt. Busi. /Ind.)	64.77	65.78
D2 (Self. Emp/Cons.)	70.93	71.75
D3 (Teaching/Research)	56.25	57.52
D4 (State/central Govt.)	56.25	57.52
D5 (NRI)*	156.86	154.09
D6 (Retired)	56.25	57.52
D7 (Pvt. Sector/Multinational)	56.25	57.52

* It is inappropriate to term it, as social rate of return since the return do not accrue to India entirely though the cost of education is entirely borne by Indian society. In fact, Indian society is subsidizing education for the benefit of the host countries. There is clear case for putting a price tag on each Indian graduate employed elsewhere.

Table 6 : Social and Private Rate of Return to LL.B. Graduates for Each Employer-Categories

Employer	**SRR**	**PRR**
D1 (Private Busi. /Ind.)	26.46	27.61
D2 (Self. Emp/Cons.)	16.52	17.14
D3 (Teaching/Research)	7.00	7.19
D4 (Private Sector/ Multinational)	16.52	17.14
D5 (State/Central Govt.)	16.52	17.14
D6 (Retired)	16.52	17.14

Social Rate of Return

A glance at tables 4, 5 and 6 leads to the conclusion that social rate of return is lower than that of private rate of return for graduates of all the courses except in case of B.E. Electrical and Mechanical graduates. In case of Mining and Mechanical graduates, social rate of return is as high as 91.69 percent and 79.79 percent respectively to employees in overseas and 36.83 percent and 38.17 percent respectively for those in business. For computer science graduates Social Rate of Return is 59.53 percent in overseas and 39.89 percent in private sector including multinational corporations (Table 4).

Social rate of return is also high for Electrical graduates. It is 48.70 percent in private business, 41.05 percent in self-employment and consultancy and 39.54 percent in private sector including multinational corporations. However, it is low for civil graduates (around 21 to 22 percent) for all the employers.

In the case of MBA, (Table 5) social rate of return is the highest at the level of 156.86 for employees in overseas followed by self-employment (70.93 percent) and business (64.77 percent) respectively. It is same for remaining occupations (56.25 percent).

Social rate of return is the lowest for Law graduates (Table 6). It is 26.46 percent for those in Private business and 7 percent for those in teaching and research. The wide differences in the social rate of return among different courses indicate that the allocation of public funds is not optimal to different courses. This indicates that the number of seats in each courses needs reconsideration.

It is pertinent to note that in engineering and management course where foreign market is yielding more returns cannot be termed as social returns as these benefits are accruing to the foreign society not to the Indian society which actually borne the cost of education.

Private Rate of Return:

In case of Mining and Mechanical graduates, private rate of return is as high as 105.70 percent and 73.20 percent respectively to employees in overseas and 46.23 percent and 34.09 percent respectively, for those in business. (Table 4). For computer science graduates, Private Rate of Return is as high as 69.62 percent in overseas and 47.08 percent in private sector

including multinational corporations. Private rate of return is relatively lower for Electrical graduates. It is 44.09 percent in private business, 36.89 percent in self-employment and consultancy and 35.27 percent in private sector including multinational corporations. In case of civil graduates, Private Rate of Return is around 28 percent for each employer, though more than that Private rate of return is Social Rate of Return.

Private rate of return is the highest at the level of 154.09 in case of MBA graduates employed in overseas followed by self-employment (71.75 percent) and business (65.78 percent) respectively. For other occupations, Private Rate of Return is 57.52 percent respectively. (Table 5)

In case of Law graduates private rate of return is as 27.61 percent for those in Private business and 7.19 percent for those in teaching and research. (Table 6)

Comparison with other Studies

In the present section, rate of return estimates (Private Rate of Return and Social Rate of Return) so obtained after adjusting for factors like unemployment, wastage, income tax and mortality are compared with estimates on general education (Table 7) and technical and professional education (Table 8). However, these studies differ in coverage, reference period and adjustments, and hence comparison of rates of return should be taken as general statements.

Table 7 : Social and Private Rate of Returns to General Education: Different Estimates for India

Harberger	**SRR**	**PRR**	**Kothari**	**SRR**	**SPR**	**Hussain**	**SRR**	**SPR**
Secondary/ Primary	11.9	-	High School	20.00	-	Matriculate	37.00	48.00
Graduate, P.G./ Prim.	15.0	-	College (All type)	13.00	14.00	Graduate (General)	4.00	12.00
Graduate, P.G./ Secondary	16.9	-	Arts & Science	10.00	-	Post Graduate (General)	3.00	10.00
Nalla-Gounden	**SRR**	**PRR**	**Pandit**	**SRR**	**SPR**	**Goel**	**SRR**	**SPR**
Literary Over 2 yrs	15.9	3.0	Intermediate/ Metric	5.00	6.78	Literary/ Illiterate	10.1	10.4
Primary School	7.0	23.0	Ist Degree Metric	5.25	8.11	Primary School	9.9	10.1
Middle	11.8	13.0	IInd Degree Metric	5.00	7.81	Middle	5.0	6.0
Secondary	10.3	10.0	IInd degree/ Ist degree	5.56	6.63	Ist degree (General)	4.8	
Bachelor Degree Metric	7.0	8.1				IInd degree (gen)	8.6	

Bhatt[1]	**SRR**	**PRR**	**Debi**[2]	**SRR**	**SPR**	**UNNI**[3]	**Tamil Nadu**		**Madhya Pradesh**	
All (Science)	19.4	24.2	Intermediate/Metric	14.63	17.94	OLS estimates	SRR (Men)	PRR (Women)	SRR (Men)	PRR (Women)
All (Arts)	11.1	14.6	General Graduate/ Metric	19.95	25.77	Middle School (4 years)	9.0	-	9.7	-
All (Commerce)	22.8	26.0	Graduate/ under graduate (general)	20.08	25.01	Secondary school (3 years)	17.0	20.0	12.0	-
All (Arts + Science + Commerce)	19.7	23.96	Agriculture Under	10.63	12.87	Graduate (3 years)	20.9	36.0	18.0	14.7
			Post Graduate	11.71	13.15	Graduate (4 years)	15.6	27.0	13.5	11.0

Source: Tilak, Jandhyala, B.G. (1981) : Returns to Education in India : A Review, Reprinted From Bulletin of The Indian Institute of Education, Vol. II (Processed)
Source – (1) Bhatt G.K. (1981); (2) Debi, Shailbala (1988), (3) Unni, Jeemol (1996).

Table 8
Rate of Return to Technical & Professional Education Different Estimates (India)

Nalla-Gounden	**SRR**	**PRR**	**Kothari**	**SRR**	**SPR**	**Hussain**	**SRR**	**SPR**
Engineering-Metric	9.8	13.5	Technical	22.00	25.00	Professional (Graduation)	3.00	9.00
Engineering – Bachelor	9.7	20.3	-	-	-	-	-	-

Blaug et al	$\alpha = 0.65$		$\alpha=0$		Paul, Samuel[1]	SRR	SPR	Pandit	SRR	SPR
	SRR	**PRR**	**SRR**	**PRR**						
Engineering-Metric	12.5	15.5	16.6	21.2	Management Education	12.14	27	Higher (Professional)	5.00	6.14
Engineering-Illiterate	13.8	17.0	17.2	21.2						

Shortlidge[2]	**SRR**	**PRR**	**Debi[3]**	**SRR**	**SPR**	**Malathay & Dauraisary[4]**	**SRR**	**PRR**
B.Sc. (Ag)/ Metric			Professional UG/Metric	26.25	32.95	UG Diploma/ UG Certificate		17.4
B.Sc./ Metric	4.5	8.8	Engineering/ Metric	12.98	16.61	UG Graduate/ UG Diploma		10.1
B.Sc./Metric	8.2	14.0	Medical/ Metric	13.85	16.69	Graduate/ UG Certificate		18.6
M.Sc. (Ag)/ Metric	7.5	12.5	Engineering/ UG	10.38	12.82	PG Diploma		26.2
MVSC (Ag)/ Metric	8.9	13.1	Medical/ UG	12.19	14.06	PG Degree/ Graduate		15.9
M.Sc. (Ag)/ B.Sc.	6.2	11.3				M.Phil./PG		2.9
M.VS (Ag) BVSC	7.8	22.5				Ph.D./P.G.		18.9
Mehta[5]	SRR	SPR	Kingdom[6]	SRR	PRR	Tilak	SRR	PRR
B.Sc./ HS	5.0	8.2	Higher education	18.2		Professional Education/ Intermediate	12.50	14.93
M.Sc./B.Sc.	>20.0	>35						
Ph.D./M.Sc.	1.5	2.6						
BVSC/HS	10.6	26.2						
MVSC/BVSC	6.5	7.1						
BDT/HS	3.3	9.3						
B.E./H.S.	8.9	17.6						
M.E./B.E.	Neg.	7.1						
M.Sc./H.S.	5.7	10.7						
MVSC/HS	6.0	13.5						

Mehta (1996:84-85) : estimated private rates of return for degree courses in agriculture engineering in Rajasthan Agriculture University, Udaipur (Rajasthan) is high ranging from 8 to 26 percent and social rates of returns are tow varying from 5 to 8 percent respectively. For agriculture courses, returns to master's degree is high over bachelor's degree, whereas reverse holds in Engineering and Veterinary degrees.

9.2 Shortlidge (1974) estimated social returns to Bachelors degree in Agriculture, Veterinary Science and Agriculture Engineering and technology over high school for G.B. Pant University of Agriculture and Technology to be 10.3, 4.5 and 8.2 percent, respectively. However, returns to master's degree in Agriculture and Veterinary Science over Bachelor's degree came to be 6.2 and 17.8 percent respectively, and those over high school was 7.5 and 8.9 percent respectively.

9.3 Malathay and Duraisamy (1993:396-406) estimated private returns to scientific and technical education in India using the human capital earnings function approach and census survey for the year 1981. They found earnings to be positively associated with education and experience. Their estimates show that the under-graduate diploma holders earn on the average 17 percent more than the under-graduate certificate holders. The return to post-graduate diploma-holders over graduates was the highest at the level of 26 per cent but that of M.Phil. over PG degree was only 2.9.

9.4 Kothari (1967) found high private rate of return (25 percent) and social rate of return (22 percent) for technical and engineering courses over high-school (9.5 per cent).

9.5 Blaug (1969) found 16.6 percent, social rate of return (unadjusted) for degree in engineering over High School. After applying corrections for ability, it varied from 8.8 to 10.5 percent.

9.6 Psacharopoulos and Patrinos (2002) reviewed and presented the latest estimates and patterns as found in the literature of rate of return studies. The average social and private returns to higher education estimated for Asian countries was 11.0 and 18.2 percent, respectively. Kingdom (1998) computed social returns for higher education at the level of 18.2 per credit.

9.7 Bhatt (1984) calculated the rates of return to non-professional higher education (Arts, Science and Commerce) in the colleges of Jaipur (Rajasthan). Social and private returns for science graduates over matriculates were 19.4 and 24.2 per cent respectively and for post-graduates over graduates these estimates were 12.9 and 15.0 percent respectively. For Commerce graduates, Social Rate of Return and Private Rate of Return was 22.8 and 26.0 percent respectively. Social and private returns for Arts graduates were low at the level of 11.1 and 14.6 percent respectively. The overall Social Rate of Return for all Faculties came out to be 19.7 and Private Rate of Return was 23.6 percent. However, the overall Social Rate of Return (9.7) and Private Rate of Return (12.0) percent for post-graduates (over graduates) were relatively low.

9.8 Tilak (1980) computed rates of return to different types and levels of education for Andhra Pradesh. He found SRR 10.80 per cent and Private Rate of Return 13.19 percent for first-degree course (over intermediate and 10.83 and 11.52 percent, respectively for second-degree course. Returns to professional education over intermediate was higher at the level of 12.54 and 14.93 percent respectively.

9.9 Debi (1988) calculated returns to general, technical and professional education for Orissa. She found the highest returns to under-graduate professionals (over matriculation) at the level of 26.25 and 32.95 respectively, followed by general graduate (over under-graduate) at 20.08 and 25.01 percent respectively. Social and Private Returns to general post-graduation (over graduate) were 11.71 and 13.15 percent, respectively. However, Social Rate of Return and Private Rate of Return for engineering over matriculation were 12.98 and 16.61, percent, respectively and over under-graduates were 10.38 and 12.82 percent, respectively. Returns to medical graduates were slightly high at 12.19 and 14.06, percent respectively.

9.10. Unni (1996 153-172) calculated private rates of return for both men and women in different levels of education for Tamil Nadu and Madhya Pradesh. It ranged from 8.8 to 21 percent to a year of schooling at different levels of education for men and 7.7 to 41 percent per year for women.

9.11 Acharya (1996:383-396) computed private return to lower levels of education for rural and urban areas of Maharashtra. She found higher returns to secondary schooling in rural males and females (9.33 and 17.42 percent respectively) than that of in urban areas (5.33 and 11.11 percent). In all, returns were higher in rural areas and for women.

Comparison of returns (SRR and PRR) to technical and professional courses of J.N.V. University, Jodhpur with above studies on general and technical and professional courses show that Private as well as Social Rate of Returns to investment in almost all the courses offered by J.N.V. University Jodhpur are higher than that of similar courses in Rajasthan and elsewhere. Professional education in J.N.V. University, Jodhpur especially Engineering and Management is highly rewarding.

CONCLUSION

Our results reveal that in all courses except B.E. (Electrical) and B.E. (Mechanical) Private Rate of Return is much more than that of Social Rate of Return. Thus for an individual, these courses are highly productive. Social Rate of Return is also high. Thus, Technical and Professional education offered by University is beneficial to the State also. Subsidies do not go waste. However, the wide margin of PRR over long run rate of interest suggests that the entire cost of education in J.N.V. University Jodhpur can be shifted to the individuals. The private colleges can charge high fees and still flourish. Technical and Professional education is a profitable business. This is true even in case of legal education also.

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