(Chapter head:)Education, Labor Market and Earnings

(Chapter head:)**Concepts:**

Bell-Curve, Genetic explanation of poverty cycle, and no hope for improvement by intervention,

Early childhood development,

1 Investment in human capital

Talk about Bell-Curve hypothesis, and explain its implications as to why investment in disadvantaged children and adults will have no economic benefits if much of economic outcomes are determined by gene not the environment or training. Explain the implications of this theory for poverty trap related to teen-age pregnancy, or underclass society and in rural and slums in less developed as well as developed countries. Give empirical evidence against it. Show how little can be improved by improving the schools only in the US but probably a great deal could be attained in less developed countries by improving the school quality and great deal could be attained in developed and less developed countries by focusing on early childhood development.

Our view is the life time is divided as follows:

[0–5——16)[16+——25][25+——] The part is decided by parents and the second and third part is by the individual.

We will derive the Malthusian type poverty trap phenomena, and the factors contributing to it and how to get out of it.

1.1 Earnings function

Assume family background β and innate ability τ determine motivation, sociability type of skills for both school performance and more importantly for labor market success. We begin with the earnings function for an individual (τ, β) :

$$w\left(s, x; \tau, \beta, Gender, Race, Occupation\right) \tag{1}$$

where x is the age. How does this earnings function look like?

1.2 Mincer earnings function:

Mincer postulated a simpler function:

$$\ln w = \alpha_0 + \alpha_1 s + \alpha_2 x + \alpha_3 x^2 + \alpha_4 Gender + \alpha_5 Race + \epsilon \tag{2}$$

where the error term includes all other error terms such as innate ability school quality occupation etc. The findings from data sets all over the world are very similar, and the coefficient of α_1 represents the rate of earnings in terms of lost earnings is about 9% in most countries, and the coefficient of x^2 is negatively significant and that of x is positive signifying that earnings follow inverted-U shape for each schooling groups, which means that for each schooling groups, the earnings rise with age up to a point and then it start decreasing.

1.2.1 Ability Bias

We ignore the gender and racial differences in earnings and postulate the following

$$\ln w = \ln \alpha_0 + \alpha_1 \ln s + \alpha_2 \ln \tau + \alpha_3 \ln \beta + \epsilon$$

Details in the powerpoint.

1.2.2 Education Signaling

We can augment the above to include τ and some other family background variables, say motivation, and sociability in the above regression whenever data permits. Here are some of the estimates from NLSY data set for the US and IFLS for Indonesia.

How to explain the hump shape of the earnings over the life-cycle? –on-the-job-training etc. we will not explore it here. How will treat w as a life-time earnings profile, or rather base our calculations on Present Value calculations. We also will first assume that the parental investment in children's pre-school etc. a part of his/her family back and given, and the problem of schooling choice we formulate as the problem of the individual in perfect capital market set-up in the next sub-section.

1.3 Years of schooling decision

We begin with a simpler model of investment in which we assume that the parental investment in preschool and primary education are given exogenously. An individual decides how many years of education to have. We take a life-cycle view and an agent is denoted by (τ, β) . Assume that he/she knows her market determined earnings function for different education level s, i.e., (s)he knows

$$w\left(s; \tau, \beta\right) \tag{3}$$

[[Develop two models: - in one each years of schooling costs time which might vary inversely with the talent type]]. We assume that earnings are functions not only depends of one's schooling and innate ability, but it also depends on other acquired attributes such as motivation and sociability that are determined by family background and community level variables. We denote an agent with talent τ and family backgrounds β by $\alpha = (\tau, \beta)$. His/her problem

$$\begin{aligned}
& \max_{s,A}\ u\left(c_1, c_2\right) \\
& \text{subject to} \\
c_1 + A &= \left(1 - \frac{s}{\tau}\right) w_1 \\
c_2 &= (1+r)\, A + w_2\left(s;, \tau, \beta\right)
\end{aligned} \tag{4}$$

The constraints combine into one constraint:

$$c_1 + \frac{c_2}{1+r} = \left(1 - \frac{s}{\tau}\right) w_1 + \frac{w_2\left(s;, \tau, \beta\right)}{1+r} \tag{5}$$

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$$\frac{dw_2\left(s;, \tau, \beta\right)}{ds} = \frac{w_1\,(1+r)}{\tau} \tag{6}$$

Diagram, and explain equality of opportunity. Lower r, and higher w_1 β implies higher in

Analytically, for the Mincer earnings function the solution is of the form

$$\frac{1}{\alpha_0 s^{\alpha_1} \tau^{\alpha_2} \beta^{\alpha_3}} \cdot \frac{\alpha_1}{s} = \frac{w_1\,(1+r)}{\tau}$$

Which implies,

$$s = \left[\frac{\alpha_1 \tau^{1-\alpha_2}}{\alpha_0 \cdot \beta^{\alpha_3} w_1\,(1+r)}\right]^{\frac{1}{1+\alpha_1}} \equiv \sigma\left(\tau, \beta\right) \tag{7}$$

1.3.1 Credit constraint:

Not covered..

1.4 Parental investment in children's human capital, social mobility

Suppose w_p is parent's income. Let w_k be the child's life time income. Suppose a child is born in a low income family, what are the chances that the child will move to higher social and income ladder. Which is basically the question regarding the relationship $w_k = \psi\left(w_p\right)$. Let us assume (we will derive it explicitly) that the relationship is linear as follows:

$$w_k = \alpha_0 + \alpha_1 w_p + \epsilon$$

where ϵ is a random variable. The coefficient α_1 in the above equation is a simple measure of social mobility: Lower is the α_1 the higher is the social mobility.

Suppose now that the family background β can be changed with parental pre-school investment in children: Higher investment leads to better family background. More specifically, suppose an investment of h on a child produces a family background $\beta(h)$. How do parents determine h? We take as given the schooling decision and the earnings function of the previous section as given. Let U_t be the utility of an adult of period t, which depends on his own consumption, the term $u(c_t)$ below, and depends on the utility U_{t+1} of each of his/her n_t identical children, the second term below. We assume that $\gamma(n) = n\delta(n)$ where the total utility from children $n_t U_{t+1}$ is discounted by $0 < \delta(n_t) < 1$. Higher the number of children, lower is the discount rate. Let us further assume that $\delta(n_t) = \delta_0 n^{\delta_1}$, $0 < \delta_1 < 1$. For technical reason[1]

$$U_t = u(c_t) + \gamma(n_t) U_{t+1} \tag{8}$$

Then the problem of the parent with life time wages w_t and ability τ_t is to solve the following

$$V(\tau_t, w_t) = \max_{0 \le h_t < w_t} u(w_t - h_t) + \gamma(n_t) V(\tau_{t+1}, w_{t+1}(\sigma(\tau_{t+1}, \beta(h_t)))) \tag{9}$$

The above is a difficult problem to solve. Let us assume that the second term in above is the utility perceived by parents and which may differ from V. We specify this perceived utility as $\tilde{U}_{t+1}(w_{t+1})$. Assume further that the number of children is fixed and hence γ is fixed. Then we have the following objective function for the parents:

$$u(c_t) + \gamma \tilde{U}_{t+1}(w_{t+1})$$

The trade-offs for parents are basically their own consumption c_t versus their children's higher earnings. A typical indifference curve as shown in the figure. We can also represent the trade-off between parent's own consumption and earnings of children: Given parent's earning w_p, more (s)he consumes, less (s)he invests in his/her child's pre-school or health and lower is the earnings of the child for two reasons (one, lower parental investment leads

[1] Notice that the recursive equation $U_t = u(c_t) + \gamma(n_t) U_{t+1}$ leads to solution

$$U_t = \sum_{i=0}^{\infty} \left[\prod_{\tau=0}^{i} \gamma(n_{t+\tau}) \right] u(c_{t+i}).$$

For the above solution to converge for bounded $c_t's$ it is necessary that $\gamma(n_t)'s$ be less than 1.

to lower ....) The locus of all these combinations of parental consumption and child's earning are shown in the following figure. Notice that higher innate ability of the child τ_{t+1}, or higher parental altruism γ, or higher parental income w_p leads to higher optimal investment in child and hence the child's earning. How can you induce higher social mobility?

It appears in this model that the social mobility is restricted by liquidity constraints of the parents. The old-age motive and child-labor motive also restrict social mobility a great deal. How about giving some subsidy to pre-school investment of disadvantaged children. For each dollar subsidized, parents might reduce their investment by a few cents. What about making the capital market perfect, i.e., poorer parents borrow from the credit market to invest in their children and

Let us assume now another special case of the above, when $h_t's$ take only two values $h_t = 0$, i.e., no investment, and $h_t = h_0$ a fixed investment. Alternatively assume that

$$\beta(h_t) = \begin{cases} \underline{h} & \text{if } h_t \leq \bar{h} \\ h_t^{\eta} & \text{otherwise} \end{cases}, 0 < \eta < 1, 0 < \underline{h} < \bar{h} \tag{10}$$

Then what will be

Let us now consider the case of child-labor and the effect of WTO ban on exports with child labor. pre-school investment or should we rather consider first whether to send the child to school and how many years of schooling?

$$\begin{aligned} V(w_t) &= \max_{h_t \in \{0,1\}} U\left(c_t^t, c_{t+1}^t\right) + \gamma V(w_{t+1}(h_t)) \qquad (11) \\ &\quad \text{subject to} \\ c_t^t &= (1-\tau) w_t - \theta h_t + \alpha w_t (1-h_t) - A_t \\ c_{t+1}^t &= (1+r) A_t + \tau w_{t+1}(h_t) \end{aligned}$$