Human capital: Education

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Chayanee Chawanote

Contribution of education to economic growth

Two viewpoints about uneducated vs. educated workers

- Perfectly substitutable production inputs between uneducated and educated workers
  - Labor is homogeneous and can be measured in terms of "efficiency units".
  - Holding constant the number of actual workers, an increase the average level of education of the labor force increases the size of the labor force measured in efficiency units.
  - Growth in the average years of schooling per worker is associated with growth in output per worker.
- Imperfectly substitutable production inputs between uneducated and educated workers
  - They are treated as different inputs: think about skilled vs. unskilled labor intensive production

Contribution of education to economic growth

Another view whether education is a direct factor of production?

- Lack of educated workers is seen as an obstacle to the rapid economic growth.
- Educated labor as learning and creating technology generates more output, holding levels of inputs constant.
  - It helps country *absorb foreign technology*
- Benhabib and Spiegel (1994) found that growth of GDP per capita from 1965-1985 was not significantly affected by *growth* in average years of schooling in the labor force, but was positively affected by the *level* of average years of schooling in 1965.
  - Positive effect of the initial level of education $\Rightarrow$ the ability to absorb technology from abroad and create appropriate domestic technologies during the following 20 years
  - Lack of education growth effect $\Rightarrow$ education is not a direct factor of production

Contribution of education to economic growth

Another view whether education is a direct factor of production?

- Pritchett (2003) argues that the failure of per capita GDP growth rates and education growth despite the continued increase in the average level of schooling means that B&S(1994)'s findings must not reflect a true causal relationship.
  - What's a causal relationship?
- In the international trade literature, as less developed countried catch up to the education levels of more developed countries, they move up the ladder from exports of uneducated worker intensive products to educated worker intensive products.
- Still little evidence in international trade to support growth in output per worker in manufacturing and to growth in GDP per capita.

Economic impact of education

Micro evidence

- Rate of return to educational investment (r)
  - $r = \frac{(Y_1 - Y_0)}{S(Y_0 + C_1)}$
  - $Y_1 - Y_0$: permanent annual benefits stream due to education, or difference of mean earnings of literate and illiterate workers
  - C_1: annual cost of keeping someone in school, cost of obtaining additional education
  - S: the number of years of schooling it takes for someone to become literate
  - What does Y_0 in the denominator mean?

Economic impact of education

Micro evidence

- The returns to education in developing countries are higher relative to industrial countries, reflecting the scarcity of human capital in poorer countries and barriers to the allocation of funds to human capital investment.
- Returns to schooling decline by level of schooling.
- Private vs. social returns to schooling
  - Private rates are higher than social rates of return
  - The cost in a private rate of return estimation refers only to what the individual pays out of his/her pocket
  - The cost in a social rate of return estimation refers to the full resource cost of someone attending school
  - The distortion is incurred by the public subsidization of education. [Maximum distortion at university level]
- Investment in education of females yields a higher rate of return than that of males

Economic impact of education

Macro evidence

- Aggregate production function: Output = f(Land, Labor, Capital)
  - output = gross domestic product; land = cultivated area; labor = the number of persons or man-hours worked; capital = the value of physical plant in operation
  - Output grew faster than increases in these factors of production.
  - Define the residual as 'technical change'
- Schultz (1961) and Denison (1967) introduced the quality of labor/human capital into the above production function
  - Schultz used expenditures on education as the amount of investment. This explains a great part of the previous residual.

Economic impact of education

Wider social impact (non-market effects)

- Literate people tend to enjoy a higher lifetime consumption path
- If more educated females are housewives, they better provide good sanitation conditions and more nutritional meals $\rightarrow$ social impact of education
- However, education increases the opportunity cost to these housewives and induces her to participate in the labor market.
  - Her market wage is higher than her implicit shadow wage of being engaged in household activities
- Education makes the worker aware of employment opportunities elsewhere and instigate a more efficient allocation of labor to the most productive uses.
- Literacy and other measures of education are more closely correlated with life expentancy than per capita income is.