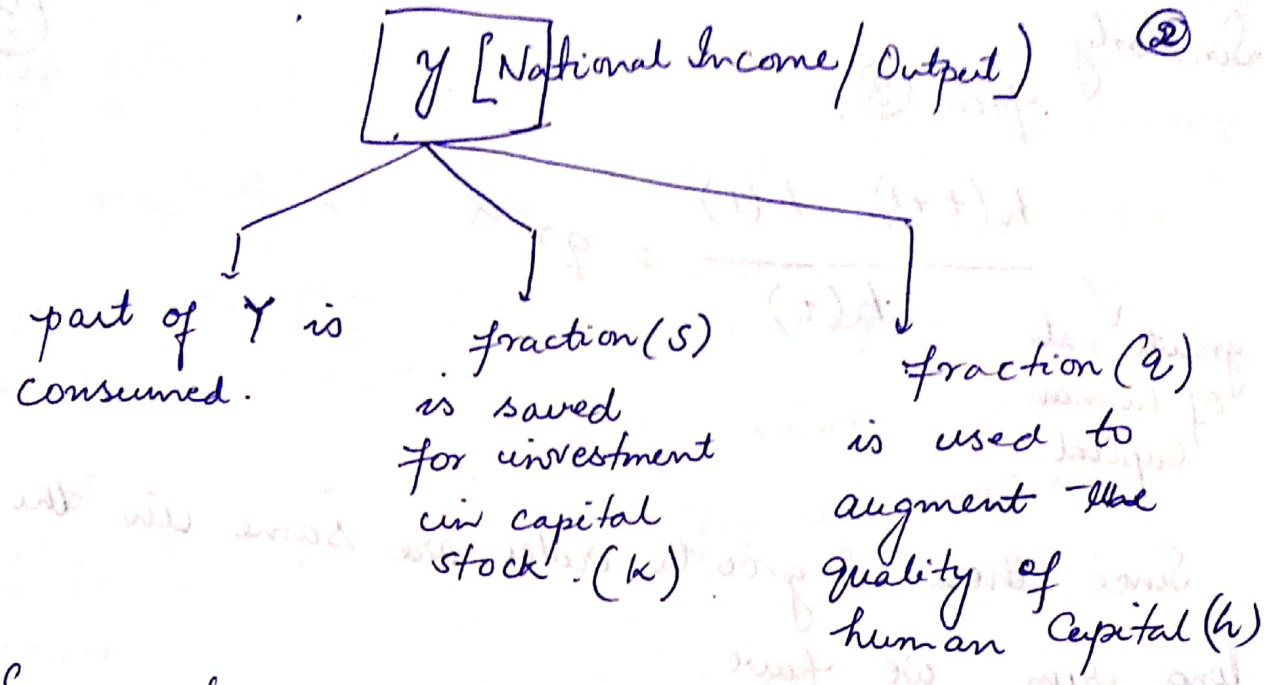
HUMAN CAPITAL AND GROWTH

Human Capital: labor that is skilled in production, that can operate sophisticated machines, that can create new ideas and new methods in economic activity. [different from Unskilled labor].

Context / Setting of the model:

- ✓ Like Physical Capital (K), human Capital (H) can be augmented via investments ~~in~~ as directed at accumulating H.
- ✓ ~~Output (Y)~~ So, human Capital is deliberately accumulated [not just the outcome of population growth or exogenous technical progress].
- ✓ Output is a function of two inputs of production: physical Capital (K) and human Capital (H).

Suppose, $$y = K^{\alpha} h^{1-\alpha} \quad \text{——— (1)}$$



So, we have,

$$k(t+1) - k(t) = s\,y(t) \quad \text{——} \quad (2)$$

$$h(t+1) - h(t) = q\,y(t) \quad \text{——} \quad (3).$$

Eqns. (1), (2) & (3). will cause the economy ultimately have all its variables — y, k and h — grow at some common, rate.

From (2).

$$\frac{k(t+1) - k(t)}{k(t)} = s\,\frac{y(t)}{k(t)}$$

$$\Rightarrow \quad \frac{k(t+1) - k(t)}{k(t)} = s\,\frac{k(t)^{\alpha}\, h(t)^{1-\alpha}}{k(t)}$$

$$\Rightarrow \quad \frac{k(t+1) - k(t)}{k(t)} = s\,r^{1-\alpha} \quad ; \quad r = \frac{h}{k}.$$

Growth rate of physical Capital

Similarly, from (3),

$$\frac{h(t+1) - h(t)}{h(t)} = q r^{-\alpha}$$

growth rate of human Capital.

Since, these 2 growth rates are same in the long run. we have,

$$s r^{1-\alpha} = q r^{-\alpha}$$

$$\Rightarrow r = \frac{q}{s}$$

$$\therefore \frac{k(t+1) - k(t)}{k(t)} = \frac{h(t+1) - h(t)}{h(t)} = \frac{y(t+1) - y(t)}{y(t)}$$

$$= s r^{1-\alpha} = \boxed{s^{\alpha} q^{1-\alpha}}$$

Long Run growth rate of all the variables. [no notion of convergence].

Implications :

1) perfectly possible for there to be diminishing returns to physical Capital and yet for there to be no convergence in per capita income.

If countries have similar savings and technological parameters, they will grow at the same rate in the long run, but there is no tendency for their per capita incomes to come together.

[++ this implication may falter once we introduce unskilled labor into the model].

2) Endogenous Growth model, as the pace of growth is determined from within the model [Unlike the Solow Model].

3) Introduction of human Capital also helps to explain why rates of return to physical capital may not be as high in poor countries as the Solow model predicts.

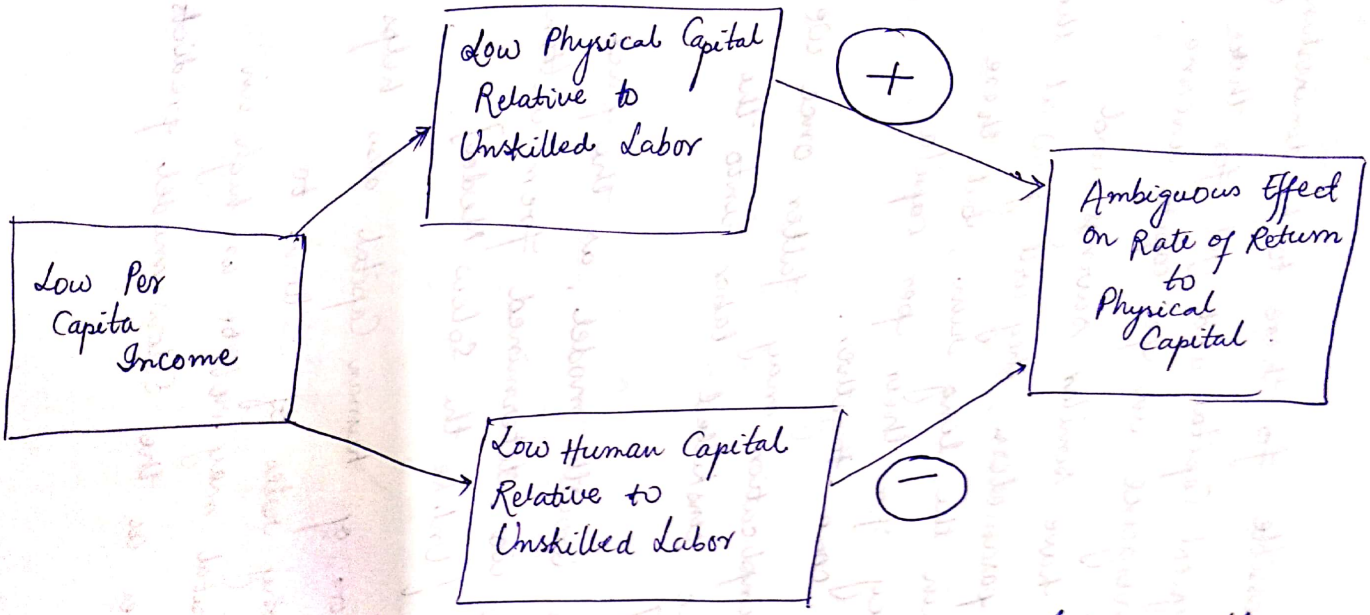


Fig. Opposing Effects of Skilled and Unskilled Labor on the Return to Physical Capital.