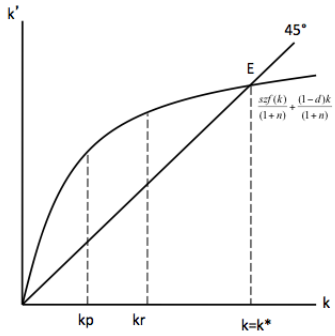
EE312 Macroeconomics, 2/2013 (Sec. 046402)
Ch.4 Part 2 Endogenous Growth Model

1 Solow growth predictions

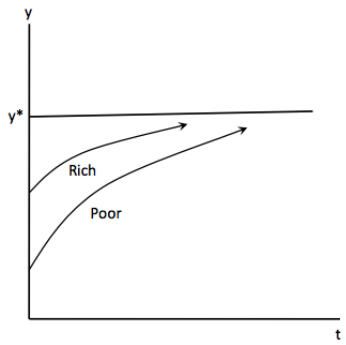
1.1 Absolute convergence:

[the same population growth rate (n), saving rate (s) and total factor productivity (z), but different per capita incomes (y), e.g., rich versus poor countries; hey will converge to the same steady-state k*, y* and c*.]

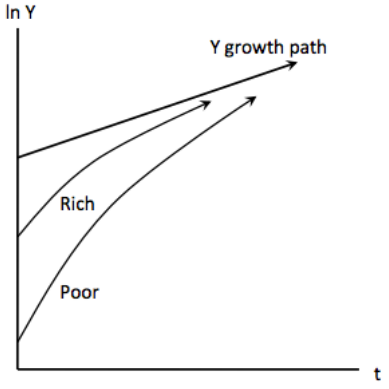
"The poor country will have temporary higher growth and catch up with the rich."



They converge to k* and y* in the long run.



Convergence in per capita income : The rich and the poor converge to the same level of y*.



Convergence in output growth path: The rich and the poor converge to the long-run growth rate (n) of aggregate output (Y).

1.2 Conditional convergence:

[With differences in n, z and s, the steady-state k*, y*, c* are different. Each country has its own steady state. The steady-state growth rate of aggregates (K, Y) is still n for each country.]

"Countries are predicted to converge to their own steady state."

Disparity among countries due to **different values of n, z and s.**

1.3 Solow model VS. growth facts:

- Absolute convergence has occurred among rich countries. No absolute convergence among poor countries/ between rich and poor countries [Exception is East Asia.] .
- Why no absolute convergence? **different values of n, z and s.**
- Differences in s and n are not large enough to explain disparity ⇒**Difference in access to technology (z) due to barriers to technology adoption** (i.e. Labor legislation: Trade protectionism: Political corruption: Undeveloped financial system:)
- How to catch up? ⇒ i.e. Promotion of more competition among firms, Free trade for greater international competition, etc.

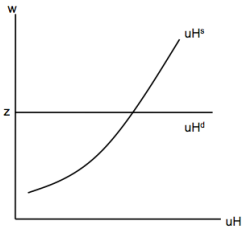
1.4 Growth in Solow model (Exogenous growth]

- The Solow model does not explain the mechanism of growth. Total factor productivity (z) is exogenously determined.

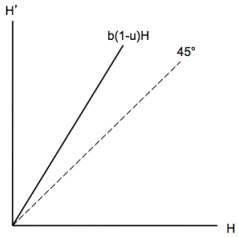
2 Endogenous growth model :A model of human capital accumulation

- Endogenous growth model : Explanation of growth within the model.
- Here; - simplified version of Lucas (1988), important constribution from Paul Romer
- The higher human capital, the more efficiency the production of human capital has.
- **Human capital is an investment** : sacrifice of current consumption → more future production and consumption.
- Knowledge is '**non-rivalry**', **NOT subject to diminishing marginal returns**, **No limit**

Consumers	**Firm**
$C = uwH^S$ $H^{s'} = (1-u)bH^s$	$Y = zuH^d$ $\pi = (z-w)uH^d$
b = efficiency of human capital accumulation technology	The demand curve is infinitely elastic at w = z



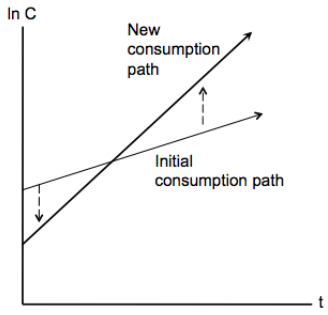
- The market clears at w = z where uH^d = uH^s.
- Equilibrium consumption and growth of human capital accumulation: $\frac{H'}{H} - 1 = b(1-u) - 1$, where $b(1-u)-1$ is constant.
- $H' = b(1-u)H$.
- H'> H. Slope = b(1-u) = rate of growth of human capital.



- More time spent on education, increase in efficiency of human capital accumulation promotes growth in human capital; $\frac{H'}{H} - 1 = b(1-u) - 1$, $b \uparrow$ *or* $u \downarrow \Rightarrow \frac{H'}{H} \uparrow$.
- Consumption and output grows at the same rate as human capital; $\frac{C'}{C} - 1 = \frac{zuH'}{zuH} - 1 = \frac{H'}{H} - 1 = b(1-u) - 1$.
- Growth is determined inside the model, by the value of **b** and **u**.

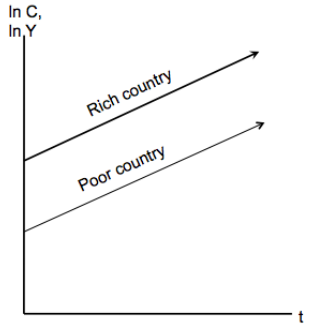
Government policy on growth

- Reduction in u, taxes or subsidies to education.
- a lower u results in lower current consumption but higher consumption in the long run.
- Government's education policy (raising b) involves expenses of current resources and lower current consumption.
- Higher long-run growth is desirable?
  - This depends on the consumer's preference on current and future consumption.
  - The consumer may be worse off if current consumption is actually preferred.



No convergence: rich and poor do not converge

- Countries with all identical characteristics except differences in initial human capital will not converge on the levels of consumption and income.
- The Y and Y time paths do not converge despite the same growth rate of b(1-u).



Human capital externalities

- Why does convergence occur among rich countries?
  - Contact with others with higher human capital increases our own human capital.
  - Capital and labor are highly mobile; skills are more easily transferred in rich countries.
  - More opportunities and contact make levels of human capital in rich countries converge.
  - Convergence of income per worker.
- Why does not convergence occur among poor countries?
  - Lack of human capital externalities in poor countries.
  - Less contact with developed countries.
  - People with high human capital move to developed countries (i.e., brain drains).
  - Differences in human capital persist.