## Economic Growth Theories

- Classical growth theory
- Neoclassical growth theory
- Endogenous growth theory



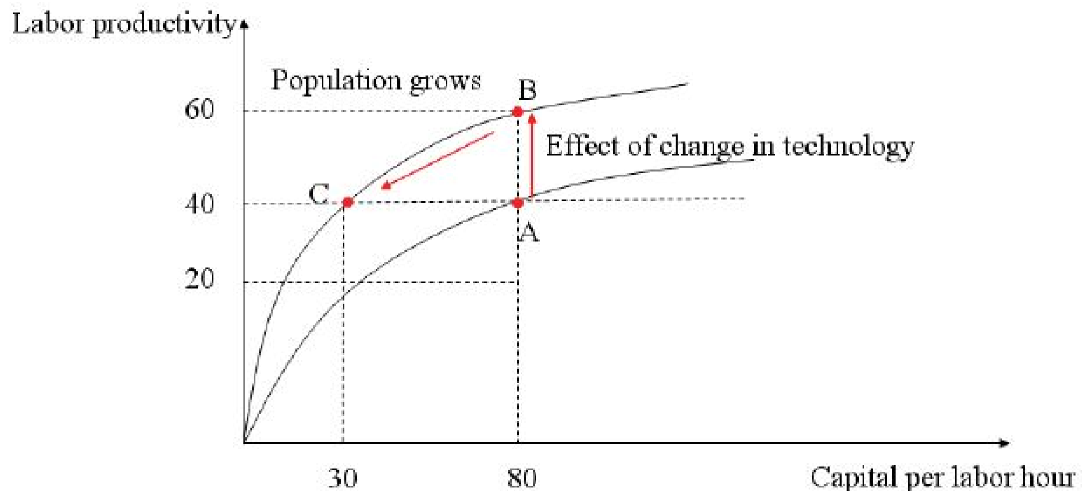
## Classical Growth Theories

### Classical theory

- The growth in real GDP is **not permanent.**
- Technological advances → investment in new capital↑ → labor productivity and new business start and demand for labor ↑ → real wages and employment ↑ → **population explosion** → real GDP ↓
- Subsistence real wage: minimum real wage necessary to support life 支持生活的最低工資底線
- No matter how much technology advances, real wages will eventually be driven back to the subsistence level, and no permanent productivity growth or improvement in the standard of living will occur.

## Classical Growth Theories

### Classical theory and the productivity curve






- Long-term
  - The economy is at equilibrium when the output-to-capital ratio is constant. When the output-to-capital ratio is constant, the labor-tocapital ratio and output per capita also grow at the equilibrium growth rate, g*.
  - Sustainable growth of output per capita (or output per worker) (g*) is equal to the growth rate in technology (θ) divided by labor's share of GDP (1-α)

$$g^* = \frac{\theta}{(1-\alpha)}$$

  - Sustainable growth rate of output (G*) is equal to the sustainable growth rate of output per capita, plus the growth of labor (ΔL)

$$G^* = \frac{\theta}{(1-\alpha)} + \Delta L$$

## Neoclassical Growth Theories

- Capital deepening affects the *level* of output but not the *growth rate* in the long run. Capital deepening may temporarily increase the growth rate, but the growth rate will revert back to the sustainable level if there is no technological progress.
- An economy's growth rate will move towards its steady state regardless of the *initial* capital to labor ratio or level of technology. In the steady state, the growth rate in productivity (i.e., output per worker) is a function only of the growth rate of technology ($\theta$) and labor's share of total output ($1 - \alpha$).
- In the steady state, marginal product of capital (MPK) = $\alpha Y/K$ is constant, but marginal productivity is diminishing.
- An increase in savings will only temporarily raise economic growth. However, countries with higher savings rates will enjoy higher capital to labor ratio and higher productivity.
- Developing countries (with a lower level of capital per worker) will be impacted less by diminishing marginal productivity of capital, and hence have higher growth rates as compared to developed countries; there will be eventual convergence of per capita incomes.



## Endogenous Growth Theory

- Assumption
  - The driving force behind the endogenous growth theory result is the assumption that certain investments increase TFP (i.e., lead to technological progress) from a societal standpoint.
  - Increasing R&D investments, for example, results in benefits that are also external to the firm making the R&D investments.
- 主要思想
  - In contrast to the neoclassical model, endogenous growth theory contends that technological growth emerges as a *result* of investment in both physical and human capital (hence the name *endogenous* which means coming from within). Technological progress enhances productivity of both labor and capital.
  - Unlike the neoclassical model, there is no steady state growth rate, so that increased investment can permanently increase the rate of growth.

## Endogenous Growth Theory

- The difference between neoclassical and endogenous growth theory relates to total factor productivity.
  - Neoclassical theory assumes that capital investment will expand as technology improves (i.e., growth comes from increases in TFP not related to the investment in capital within the model).
  - Endogenous growth theory assumes that capital investment (R&D expenditures) may actually improve total factor productivity.



## Convergence Hypotheses

- Whether productivity, and hence, living standards tend to converge over time
  - Absolute convergence hypothesis
    - Less developed countries will achieve equal living standards over time
  - Conditional convergence hypothesis
    - Convergence in living standards will only occur for countries with the same savings rates, population growth rates, and production functions
  - club convergence hypothesis
    - Countries may be part of a 'club' (i.e., countries with similar institutional features such as savings rates, financial markets, property rights, health and educational services, etc.).
    - Countries can 'join' the club by making appropriate institutional changes. Those countries that are not part of the club may never achieve the higher standard of living.
    - ✓ Increased markets for domestic products, resulting in economies of scale.