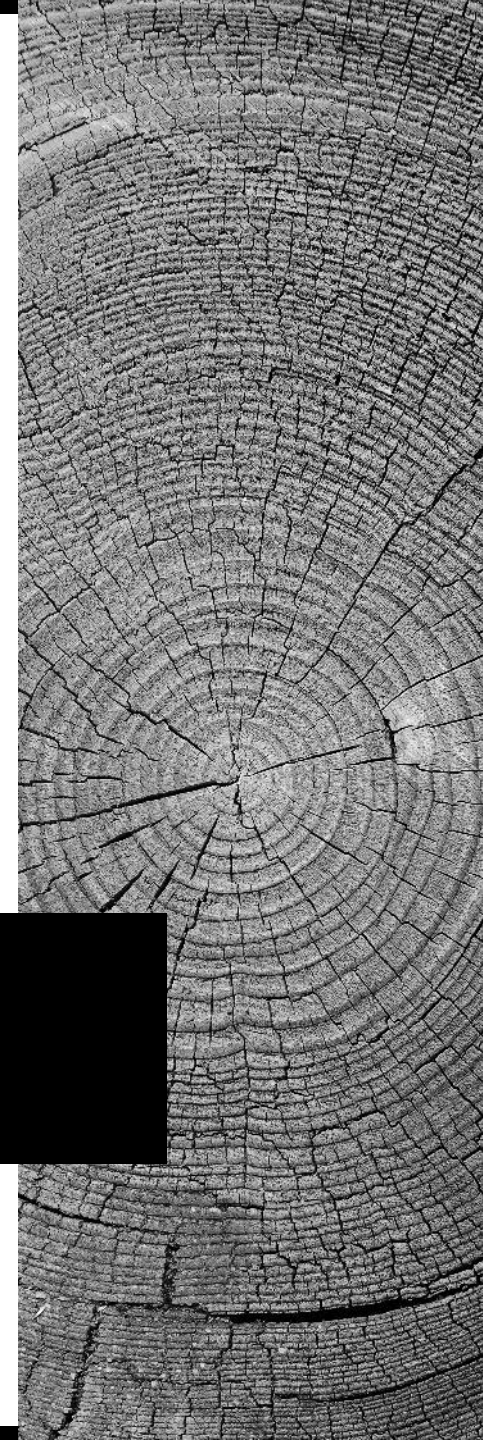Jonathan Pincus
Summer 2022
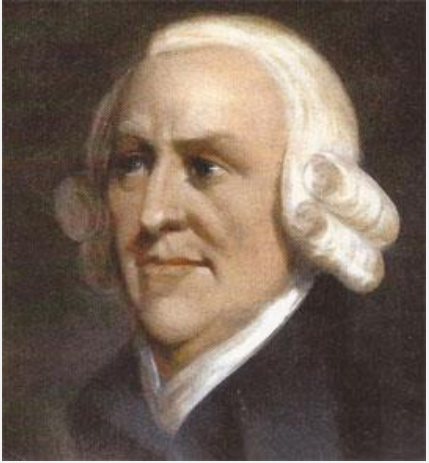
ECONOMIC GROWTH

Development Policy

FSPPM

ADAM SMITH, *THE WEALTH OF NATIONS* (1776)

Adam Smith

- The source of economic growth are s*pecialization* and the *division of labor.*
- Smith anticipated modern manufacturing:
  - Skills develop when performing repeated tasks: "learning by doing"
  - The assembly line: no time lost switching between tasks; speed and precision
  - Mechanization of simple tasks (capital equipment)
- Specialization and the division of labor depend on the size of the market → Smith never assumed that everything produced will automatically find a market

SPECIALIZATION AND THE DIVISION OF LABOR DEPEND ON THE SIZE OF THE MARKET

Hla Myint

- Hla Myint brought Smith's concept of "vent for surplus" to Southeast Asian development
- Southeast Asia traditionally exported plantation crops (rubber, coffee, rice) bringing underulitized land into production (recall Southeast Asia's land-abundant past)
- Myint was an early proponent of export-led growth (opposed to the export pessimism of Gunnar Myrdal)
- Export markets create opportunities to realize economies of scale → example of shrimp and catfish in MRD
- Profitability drives capital investment, which increases productivity and profits (recall the Lewis Model).

MODERN THEORY OF ECONOMIC GROWTH HAS HAD STRANGE POLICY IMPLICATIONS

- Classical economists like Adam Smith and Hla Myint emphasized capital investment, the division of labor and trade as the sources of economic growth.

- Neoclassical growth models use some restrictive assumptions that changed the growth policy agenda for a generation
  - The assumption of diminishing returns to capital led many economists to conclude that investment doesn't matter.
  - The assumption that technology is external to investment
  - The assumption of a single sector blinded economists to the importance of the manufacturing sector in the early stages of development
  - The assumption of full employment led to the conclusion that poor countries had to trade-off between investment and consumption

- For policy makers these models are not important, but one must be aware of the assumptions that economists are making.

MODERN GROWTH THEORY

- Neoclassical growth theory predicts that poor countries will grow faster than rich ones (convergence)
  - diminishing returns to capital
  - lower capital output ratios in poor countries
- "New" neoclassical growth theory from the 1980s relaxed some of these assumptions to explain the absence of convergence
  - Poor countries do not always catch up, although some do
  - Why do some poor countries stay poor?
  - "New" growth theory relaxed the assumption of diminishing returns to capital

TRADITIONAL NEOCLASSICAL GROWTH THEORY: THE SOLOW MODEL

- Neoclassical economics assumes that prices adjust to ensure that supply always equals demand

- Therefore
  - Savings always equals investment ($S = I$)
  - The level of investment is given by saving (less consumption and smaller government deficits raise the level of investment)
  - Expected profits disappear as a factor in the level of investment

- There are three more assumptions to keep the math simple:
  - Technology changes over time, but this is outside of the model as is assumed to grow at a constant rate
  - There are *constant returns to scale* and *diminishing returns to capital and labor*
  - The labor force grows at the same rate as the population

THE COBB-DOUGLAS PRODUCTION FUNCTION

$$Y = TK^{\alpha}L^{1-\alpha}$$

where *Y* is income (GDP), T is constant technological progress (constant), K is capital and L is labor.

α is the elasticity of output with respect to capital, and (1- α) is the elasticity of output with respect to labor

Because α + (1- α) = 1, we know the system has constant returns to scale and diminishing returns to capital and labor.

Increasing *K* and *L* by 1% results in a 1% increase in *Y*

DIVIDE BOTH SIDES BY *L* TO MAKE LABOR PRODUCTIVITY THE DEPENDENT VARIABLE

$$\frac{Y}{L} = \frac{TK^{\alpha}L^{1-\alpha}}{L} = T(\frac{K}{L})^{\alpha}$$

Y/L is labor productivity (output per person). Let's call that *q*

K/L is the capital-labor ratio (the amount of capital per worker). Let's call that *k*.

$q = T(k)^{\alpha}$ or labor productivity is equal to technology applied to the capital-labor ratio, growing at a constant rate but less than one.

The *level* of labor productivity (*q*) depends on the amount of capital per worker (*k*)

But there are *diminishing returns to capital* so the *rate of growth of q* is slower when the capital-labor ratio is higher (α is less than 1).

THE STEADY STATE: WHERE THE GROWTH RATE OF *L* IS EQUAL TO THE GROWTH RATE OF *K*
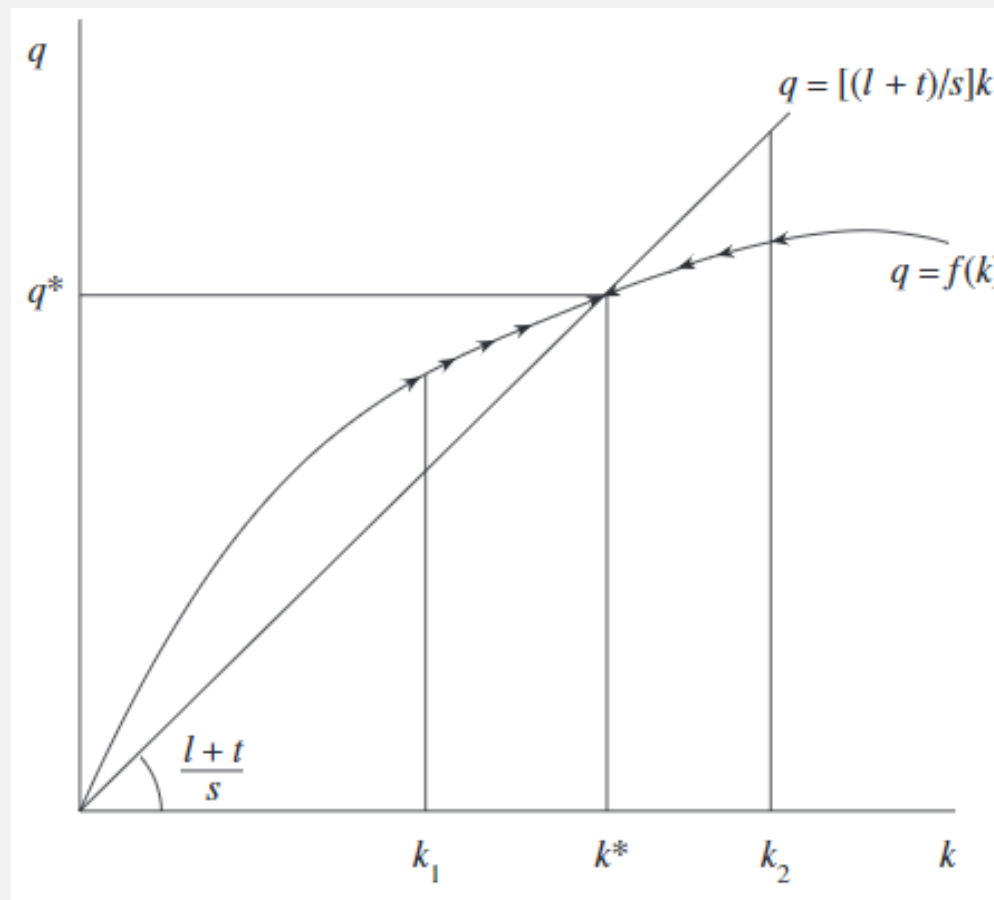
$q = T(k)^\alpha$ grows more for each unit of *k when* capital per worker is lower

The 45° line from the origin shows the point at which the capital-labor and output-labor ratios are equal.

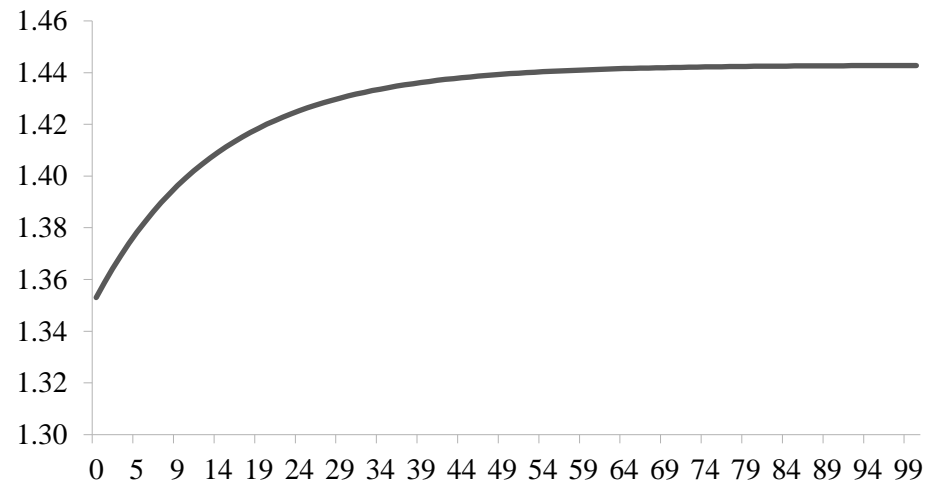At k_1 output per worker is increasing more than capital per worker

At k_2 output per worker is less than capital per worker

At $q*$ and $k*$ the capital/labor ratio is at the steady state. Capital per workers and income are constant.
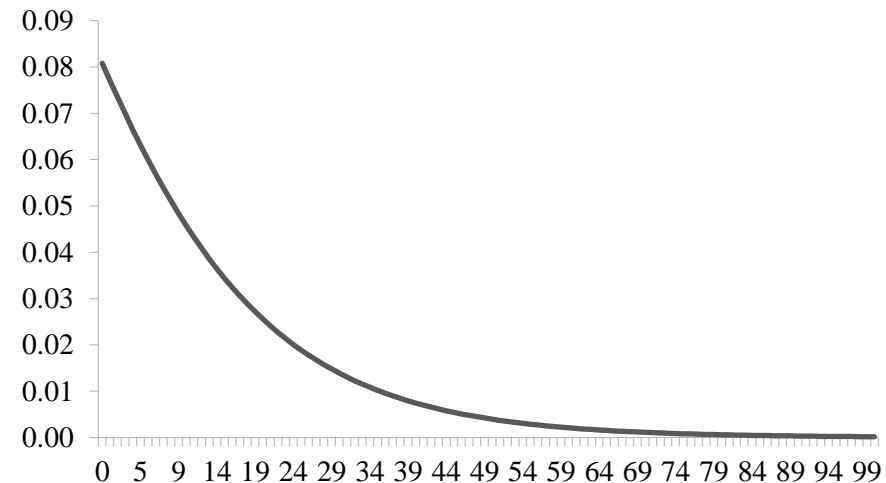
YOU CAN HAVE A LOOK AT A NUMERICAL EXAMPLE IN THE FILE "SOLOW MODEL EXAMPLE.XLSX"

Output (per cápita)

Output growth

WHAT DOES THE SOLOW MODEL MEAN?

- The main conclusion is that economic growth should be faster in poor countries (lower k) and slower in rich countries (higher k).

- We should see *convergence* in incomes over time (we will discuss this I the next class).

- The savings rate affects the *level* of income at the steady state (higher k at the steady state), but not the *rate* of economic growth, which is external to the model (technological change and the rate of population growth)

- Investment always equals savings and there is no unemployment → a supply side model with no role for demand

- A higher investment rate can't raise the rate of growth: growth is largely explained by technology, which is not explained.

NEW NEOCLASSICAL GROWTH THEORY: "ENDOGENOUS" GROWTH

- Drops the assumption of constant returns to scale and diminishing returns to capital.
- The investment rate matters because diminishing returns will not set in at higher K/L ratios
  - If there are positive externalities from research and development activity, then returns to capital will not fall (Romer).
  - Technical progress is no longer external to the model (it is endogenous)
  - Or education, or trade, or infrastructure or any other reason that prevents the returns to capital from falling as k rises
- A simple form of "endogenous" growth model;

$$Y=AK$$

Where A is the productivity of investment and is constant, so as investment grows growth grows at the same rate

"NEW" GROWTH THEORY: OLD WINE IN NEW BOTTLES?

- Endogenous growth theory seeks to explain the absence of diminishing returns to capital within the neoclassical framework

- Remember Adam Smith, the division of labor, increasing returns to scale and the accumulation of capital

- Nicholas Kaldor (1957): Technological progress is not separate from K, it is embedded in it.
  - When diminishing returns to capital set in, new inventions come along and increase the productivity and capital
  - New inventions simulate investment, raising investment rate and growth rate
  - Countries grow at different rates because they are on different production functions, using different technologies

WHAT IS MISSING FROM THESE STORIES ABOUT GROWTH?

- Government: Throughout history, governments have played an important role in accelerating and holding back growth.
  - The US developed as a manufacturing power due to Alexander Hamilton's tariffs on manufactured imports
  - Japan, Korea, Taiwan and China have all benefited from government support for domestic industries.
- Demand: Neoclassical growth theory assumes supply always equals demand (there is no unemployment and savings always equals investment).
  - But development starts from a condition of surplus labor and low productivity, which cannot be assumed away
  - Investment will not occur, not matter what the level of savings, if there is insufficient demand for output

TOTAL FACTOR PRODUCTIVITY

- Uses Solow Model to estimate growth that is not a result of adding more capital or labor per worker

- Interpreted as a measure of technological change

- But maintains assumption of diminishing returns to capital and labor and constant returns to scale

- Also assumes technology is not embodies in capital investment (i.e. there is a relationship between the level of investment and the rate of technological change)

POLICY IMPLICATIONS

- Neoclassical growth theory had limited policy implications: technology is exogenous (external) to the model and the rate of investment does not affect the rate of growth

- New growth theory returns to the lessons of the past: capital investment, technological change and trade

- But policy implications are still limited: It leaves out the demand side and the role of the state
  - Savings still automatically equals investment
  - New growth theory does not generate testable hypotheses

- Total factor productivity is not a reliable measure of the rate of technological change

DISCUSSION QUESTIONS

1. What are the assumptions of the neoclassical growth model? Are they relevant to economic growth in Vietnam?

2. What are the factors relevant to economic growth that are not addressed in the Solow Model or "new" growth theory?