THEORIES OF ECONOMIC GROWTH

Economic Growth and Development

ECONOMIC GROWTH

is contingent upon:

- **factor accumulation**: increasing the size of the capital stock and/or increasing the labor force

- **productivity growth**: improving efficiency and introducing technological change

5 important equations and relationships

$$Y = f(K, L)$$

$$\Delta K = I - (dK)$$

$$S = I$$

$$I = sY$$

$$\Delta L = nL$$

Capital (K) can be money, equipment, infrastructure; capital **depreciates** (d) in time; therefore it has to be maintained or replaced. To maintain or increase capital, **investments** (I) are needed.

Investments come from **savings** (S), or **income** (Y) from peoples' wages that are not consumed; if the **savings rate** is s, the savings = sY (which is invested); wages come from **labor** (L); increase in labor is the population rate multiplied by L

Basic Growth Model

- Output is a function of capital and labor
- Increase of capital depends on investments minus depreciation of capital
- Investment comes from savings; savings are derived from income times the saving rate
- Increased income will therefore increase savings, which will increase investments
- Increased investment will increase capital stock
- In the long run this causes growth in output

Y = output = income

K = capital
ΔK = capital increase

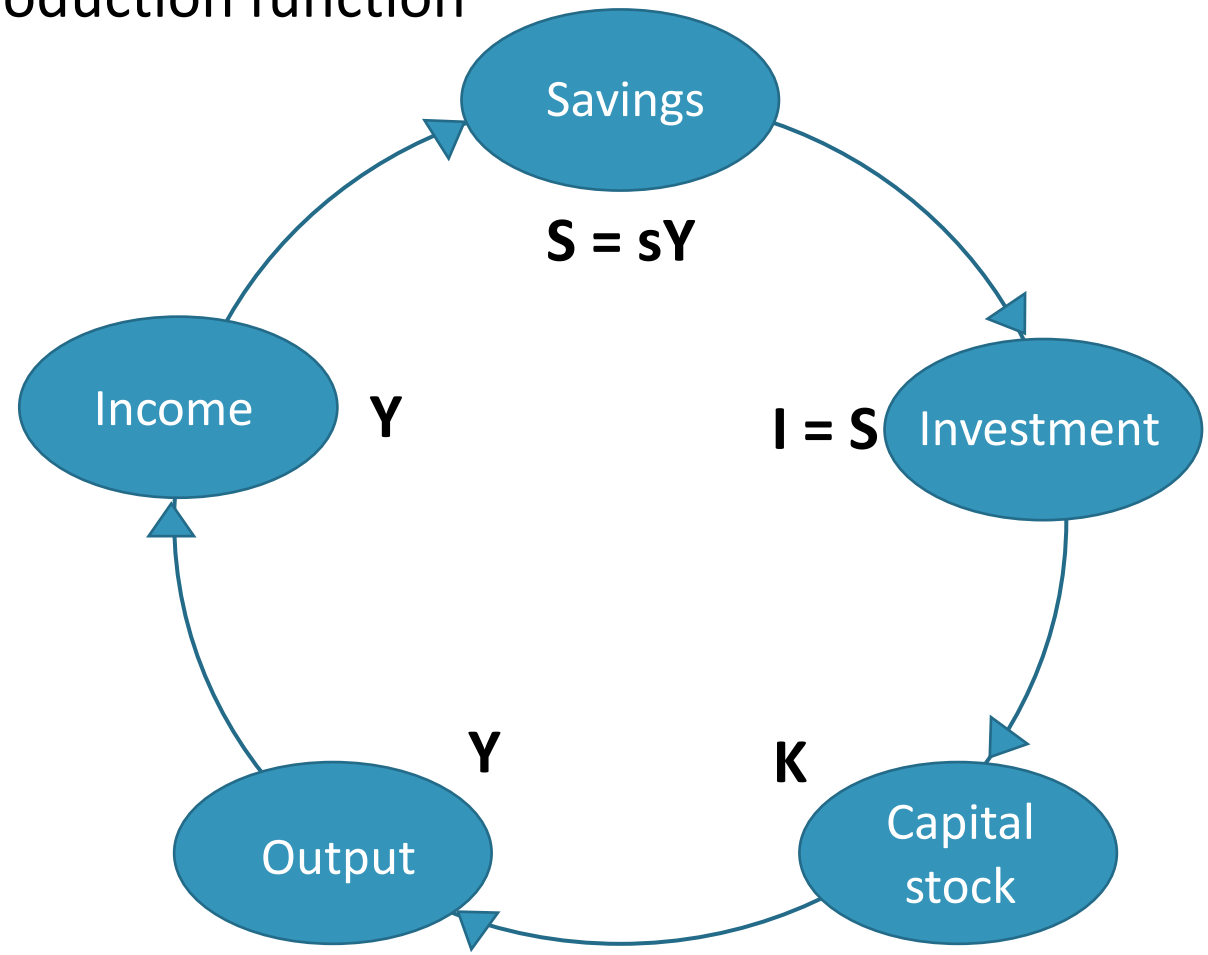
d = capital depreciation

L = labor

S = savings
s = savings rate

Basic Growth Model

The aggregate production function



Notes:
I = investment
S = savings
s = saving rate
K = capital
ΔK = capital increase
Y = output = income

Harrod – Domar Growth Model

- Based on work by Roy Harrod (UK) and Evsey Domar (US); examines the relationship between growth and capital requirements
- Output is assumed to be a linear function of capital; uses a capital-output ratio
- Growth requires a right mix of capital and labor; equals the increment of output divided by the total output
- The lower the ICOR, the better (capital becomes more productive)

Incremental capital-output ratio used to measure the productivity of capital; determines the impact of additional capital

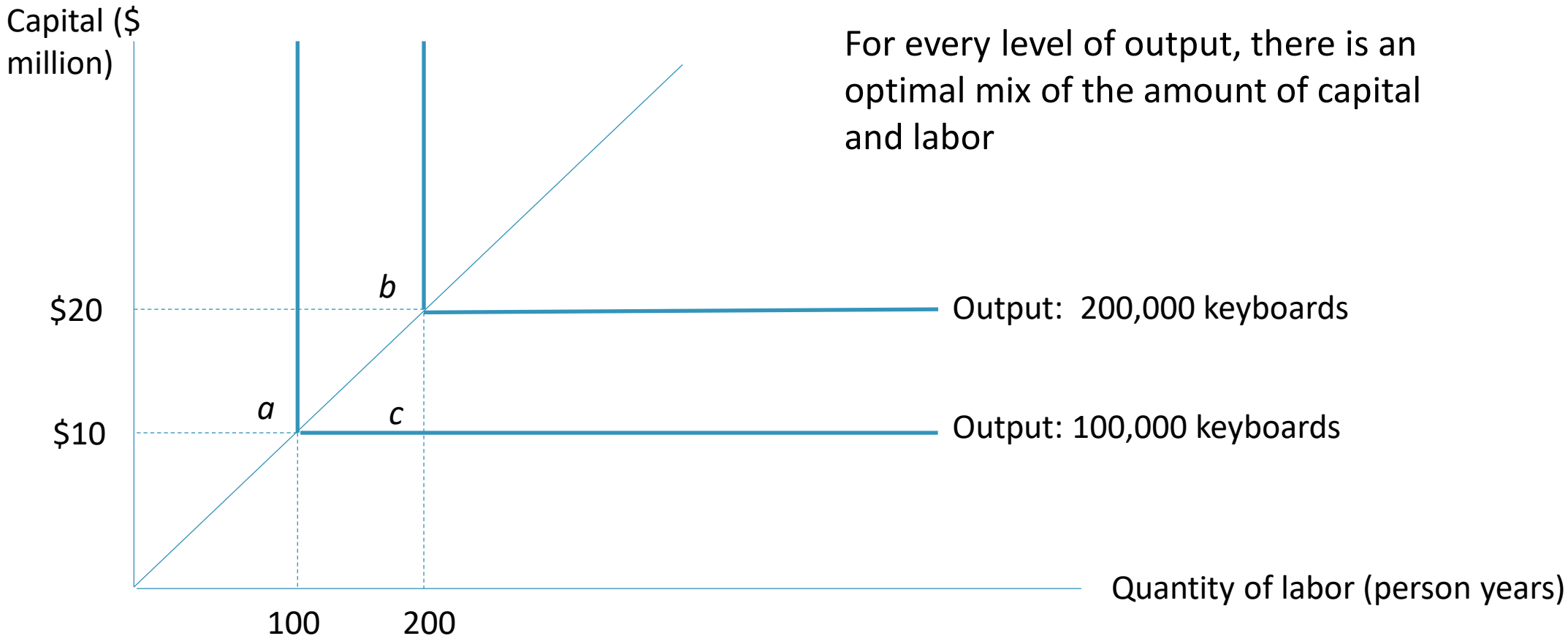
$$v = K/Y$$

$$\Delta Y = \Delta K/v$$

$$g = \Delta Y/Y = \Delta K/Yv$$

whereby:
g = growth
v = capital-output ratio
K = capital
Y = output

Harrod – Domar Growth Model



Harrod – Domar Growth Model

- Harrod and Domar view: capital created by investment is the main determinant of growth
- Since investment = savings, countries that save more will experience higher economic growth
- With ICOR, the growth rate can be predicted by adding incremental capital/ investment

Harrod – Domar Growth Model

Strengths

- Simple, data requirements are small and outcome is easy to estimate
- Focuses the importance of savings
- Estimates are fairly accurate in the short term

Weaknesses

- Not all investments are productive
- Does not take into account external economic shocks
- Not reliable for long term estimates
- Assumes that relationships between labor, capital, and output are fixed and grow at the same rate
- Does not take into account productivity growth

Neoclassical Growth Model (Solow)

- Developed by Robert Solow, who views that in reality, the relation between capital, labor and output is not fixed;
- Output is a function of capital per worker
- More investments (capital) per worker will increase worker output; however it will give diminishing returns
- Change in in capital stock is equal to savings minus capital depreciation

Neoclassical Growth Model (Solow)

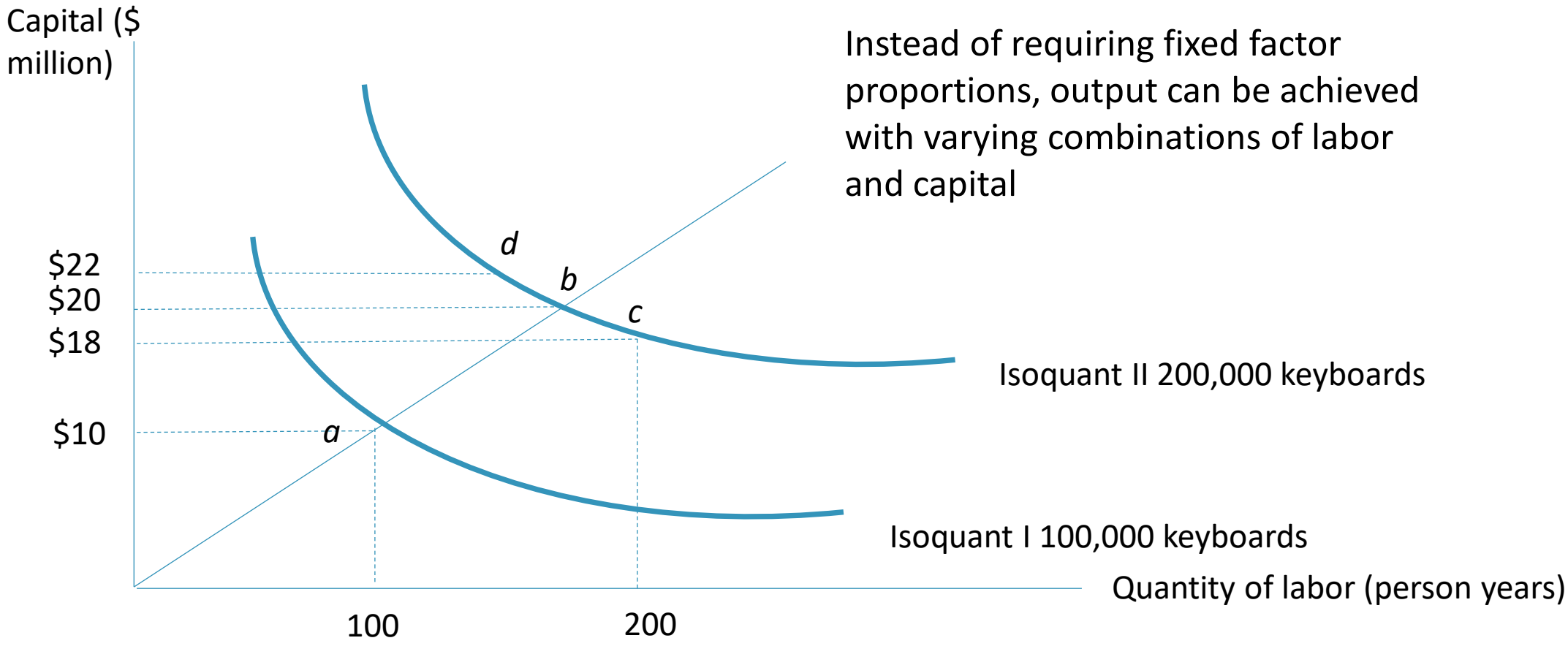
Assumptions

- The population grows at a constant rate, *n*
- All workers in the economy save a constant proportion, *s*
- All firms in the economy produce output using the same production technology that takes in capital and labor as inputs
- Capital stock (K), change in capital stock(Δk), the rate of capital depreciation (*d*) and investment (I) are linked together

$$\Delta k = sy - (n + d)k$$

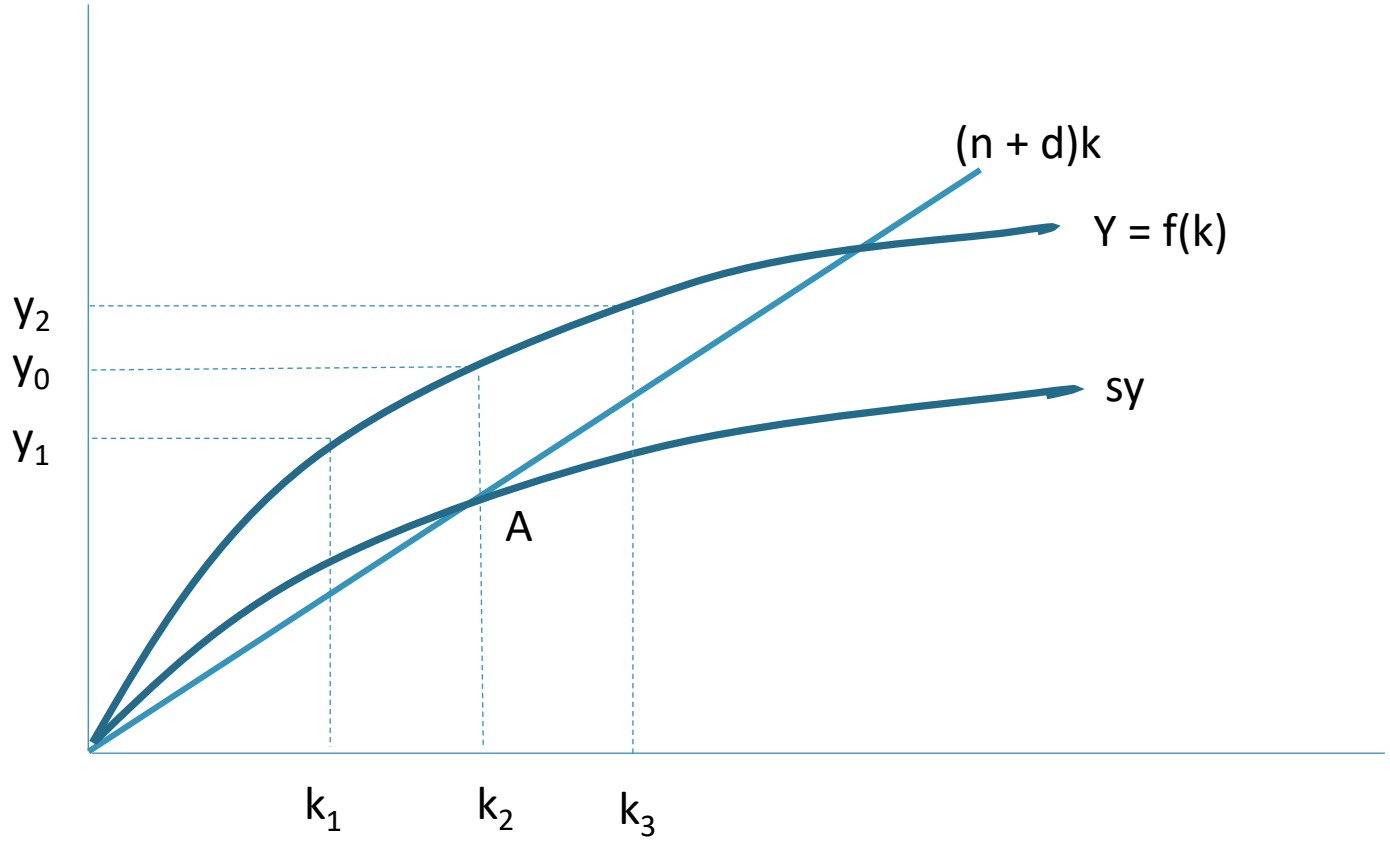
Change in in capital stock is equal to savings minus capital depreciation

Neoclassical Growth Model (Solow)



Instead of requiring fixed factor proportions, output can be achieved with varying combinations of labor and capital

Neoclassical Growth Model (Solow)



A is the only point wherein the amount of new savings *sy* is exactly the same as the amount of capital depreciation; A is therefore the steady state of capital worker and output per worker

Neoclassical Growth Model (Solow)

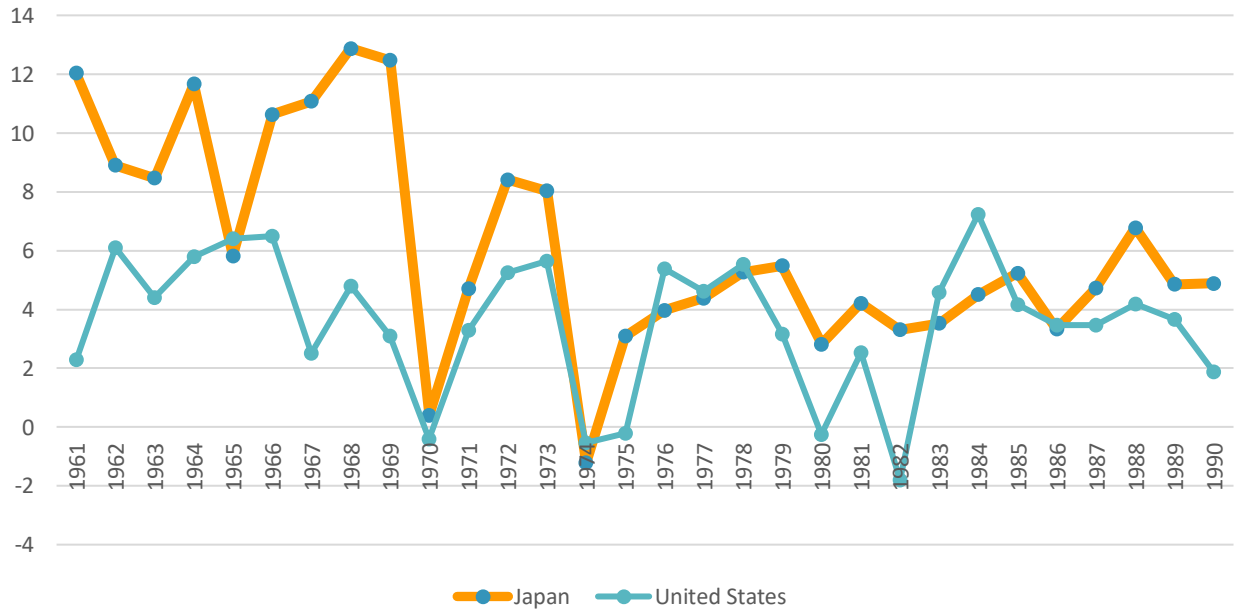
- The Solow model: useful for analyzing the relationships between savings, investment, population growth, output and economic growth
- Once an economy reaches its long run potential level of income and economic growth matches population growth, sustained increase in income is unlikely (known as the *steady state*)
- Introduction of technological change will increases productivity, therefore raising the production function

What the Solow diagram tells us

Higher income countries have relatively lower growth rates; lower income countries tend to have the potential to achieve higher growth rates
Growth rate tends to slow down as incomes increase
Therefore incomes of low income countries can catch up with high income countries (convergence model)

Convergence Debate

- Higher income countries have relatively lower growth rates; lower income countries have the potential to achieve higher growth rates

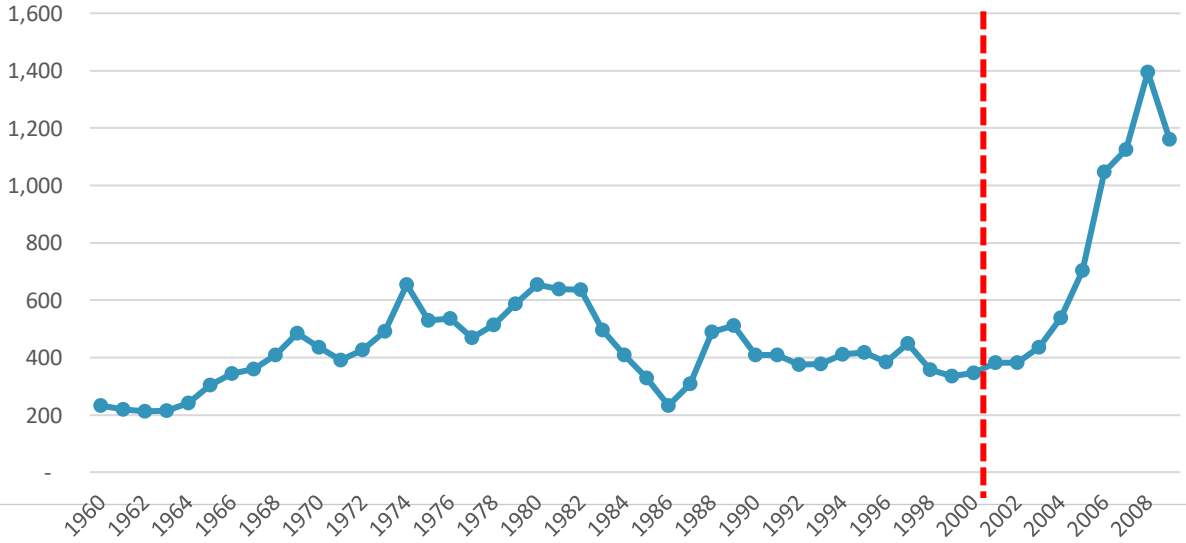


Case study: Japan

Between 1960-1990, Japan had high rate of growth In 1960, its GDP per capita was 1/3 of the US, and grew at 9% per year. In 1990, its GDP per capita was 85% of the US but growth rate fell to 4% and growth di not resume

Convergence Debate

- This is the case for most countries, however not for all cases
- The case of Zambia demonstrates how GDP growth is stagnant over time (up to 2000)
- Since 2000, policies to reform the economy led to improved economic growth



Case study: Zambia

In 1960 Zambia's GDP per capita was $1,803 and in 2009 was $1,765.
The economy did not grow because of the lack of foreign investments, government policy, lack of technological change and occurrence of natural disasters

Conclusion

- Countries undergo development experiences which vary from one country to another and depending on whether they are able to accumulate capital and increase productivity over time
- Among several explanations are macroeconomic and political stability, investments in health and education, governance and institutions, trade openness, and a favorable geography

Conclusion

- Economic models look at the relationships between output and capital, savings, and investment, along with other factors such as capital depreciation, and population growth
- Models, despite their usefulness, are based on assumptions and can only partially explain occurrences and as such, they are not necessarily accurate

THANK YOU!