

Business Cycle and Economic Growth

“Many economists are able to define different business cycles ...

... but a few are able to predict them”



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Economic Growth (I)

The importance of GDP

- **Economic growth** is a term used to indicate the increase of total gross domestic product (GDP). It is often measured as the **(real) rate of change of GDP**. Economic growth refers only to the quantity of goods and services produced.
- Economic growth can be either positive, negative or zero:
 - Positive growth means increasing GDP.
 - Zero growth means that the economy is in stagnation.
 - Negative growth can be referred to by saying that the economy is shrinking. Negative growth is associated with **economic recession** and **economic depression**.

Economic Growth (II)

Short-run and long-run distinctions

- Economists draw a distinction between **short-term economic stabilization** and **long-term economic growth**: the topic of **economic growth** is primarily concerned with the long run, the short-run variation of economic growth is termed the **business cycle**.
- **The long-run path of economic growth** is one of the central questions of economics; in spite of the problems of measurement, an increase in GDP of a country is generally taken as an increase in the standard of living of its inhabitants.
- We will focus on **long-run economic growth** in the second part of this topic.

Business Cycle (I)

Trend and Cycle basic calculations

- The term **business cycle** (or **economic cycle**) refers to economy-wide fluctuations in production or economic activity over several months or years. These fluctuations occur around **a long-term growth trend**, and typically involve shifts over time between periods of relatively rapid economic growth (**expansion** or **boom**), and periods of relative stagnation or decline (**contraction** or **recession**).

- A long-run growth trend can be calculated as:
$$t = \left[\left(\frac{FV}{IV} \right)^{\frac{1}{n}} - 1 \right]$$

Where IV and FV are the Initial and the Final value of the GDP and n is the number of years between IV and FV.

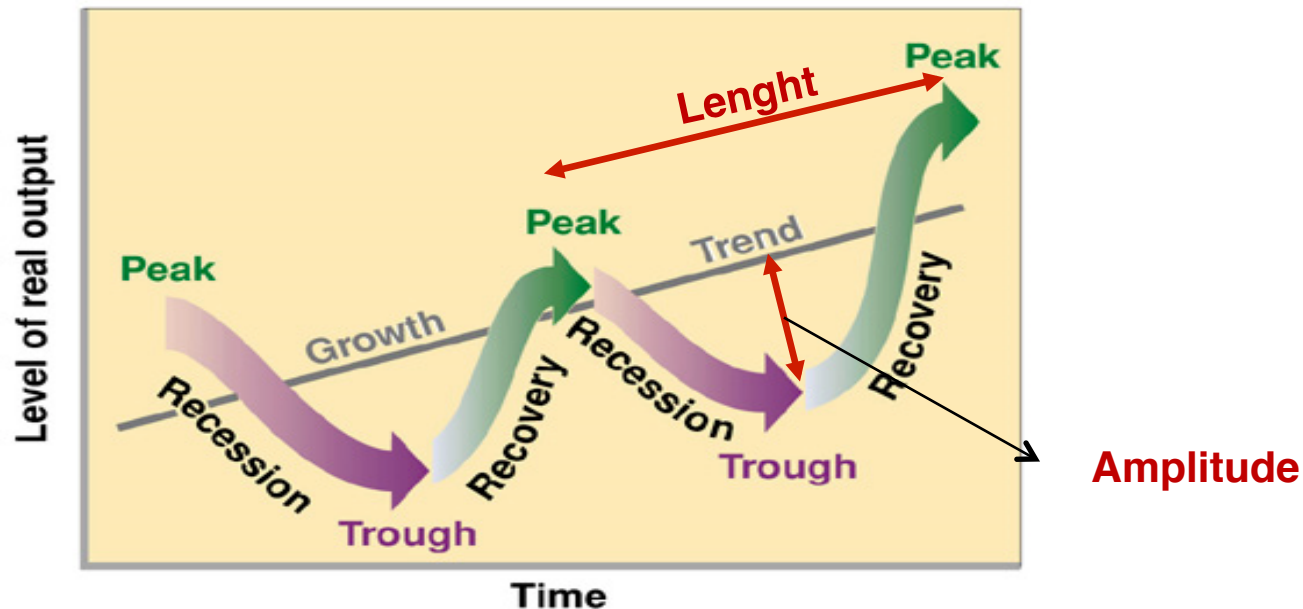
- Whilst a cycle is calculated as: $c_t = r_t - t$

being r_t the GDP real growth rate.

Business Cycle (II)

Stages of a BC

- We can find the following stages in any business cycle:
 1. **Peak**: the upper turning point of a BC (expansion turns into a contraction).
 2. **Contraction** or **recession**: a slowdown in the pace of economic activity. It goes from a peak to a trough. If it is severe enough it is called a **depression**.
 3. **Trough**: the lower turning point of a BC (contraction turns into an expansion).
 4. **Expansion**: or **recovery**: A speed-up in the pace of economic activity.



Business Cycle (III)

The NBER

- In the US, it is generally accepted that the **National Bureau of Economic Research (NBER)** is the final arbiter of the dates of the peaks and troughs of the business cycle. The NBER identifies a recession as "*a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production*".
- see the latest announcement from the NBER in <http://www.nber.org/cycles/cyclesmain.html>
- Due to its work on national accounts and BC, the NBER is well-known for providing start and end dates for recessions in the US.
- The NBER is the largest economics research organization in the US. Sixteen of the thirty-one American winners of the Nobel Price in Economics have been NBER associates.

Business Cycle (IV)

Economic Indicators (I)

- An **economic indicator** is simply any economic statistic which indicate how the BC is going and how it is going to go in the future.
- They can be classified into three categories:
 1. **Leading indicators** usually change before the economy as a whole changes. They are useful as short-term predictors of the economy, *e.g.*, the stock market usually begins to decline before the GDP declines and usually begins to improve before the economy begins to recover.
 2. **Lagging indicators** usually change after the economy does. Typically the lag is a few quarters of a year, *e.g.*, the employment tends to increase two or three quarters after the trough.
 3. **Coincident indicators** change at approximately the same time as the whole economy, thereby providing information about the current state of the economy. Personal income, industrial production and retail sales are coincident indicators.

Business Cycle (V)

Economic Indicators (II)

- There are also three terms that describe an **economic indicator's property** relative to the direction of the general economy:

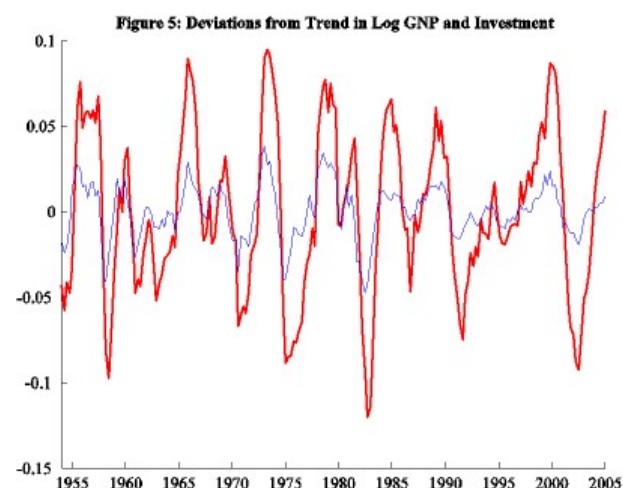
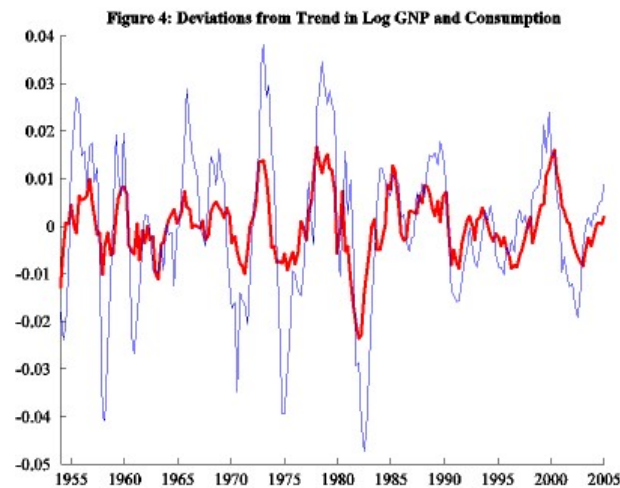
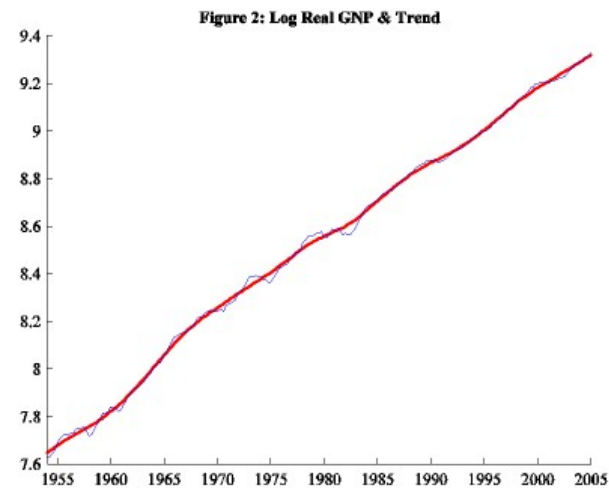
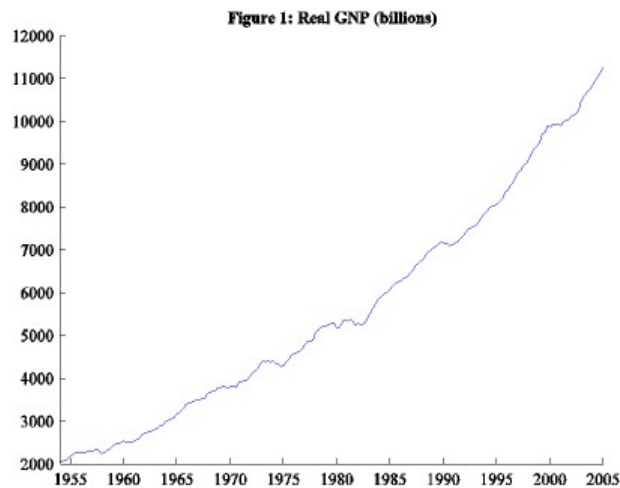
Procyclic indicators move in the same direction as the general economy (GDP): they increase when the economy is doing well; decrease when it is doing badly. Private consumption is a procyclic indicator.

Countercyclic indicators move in the opposite direction to the GDP. The unemployment rate is countercyclic: it rises when the economy is decreasing.

Acyclic indicators are those with little or no correlation to the business cycle: they may rise or fall when the general economy is doing well, and may rise or fall when it is not.

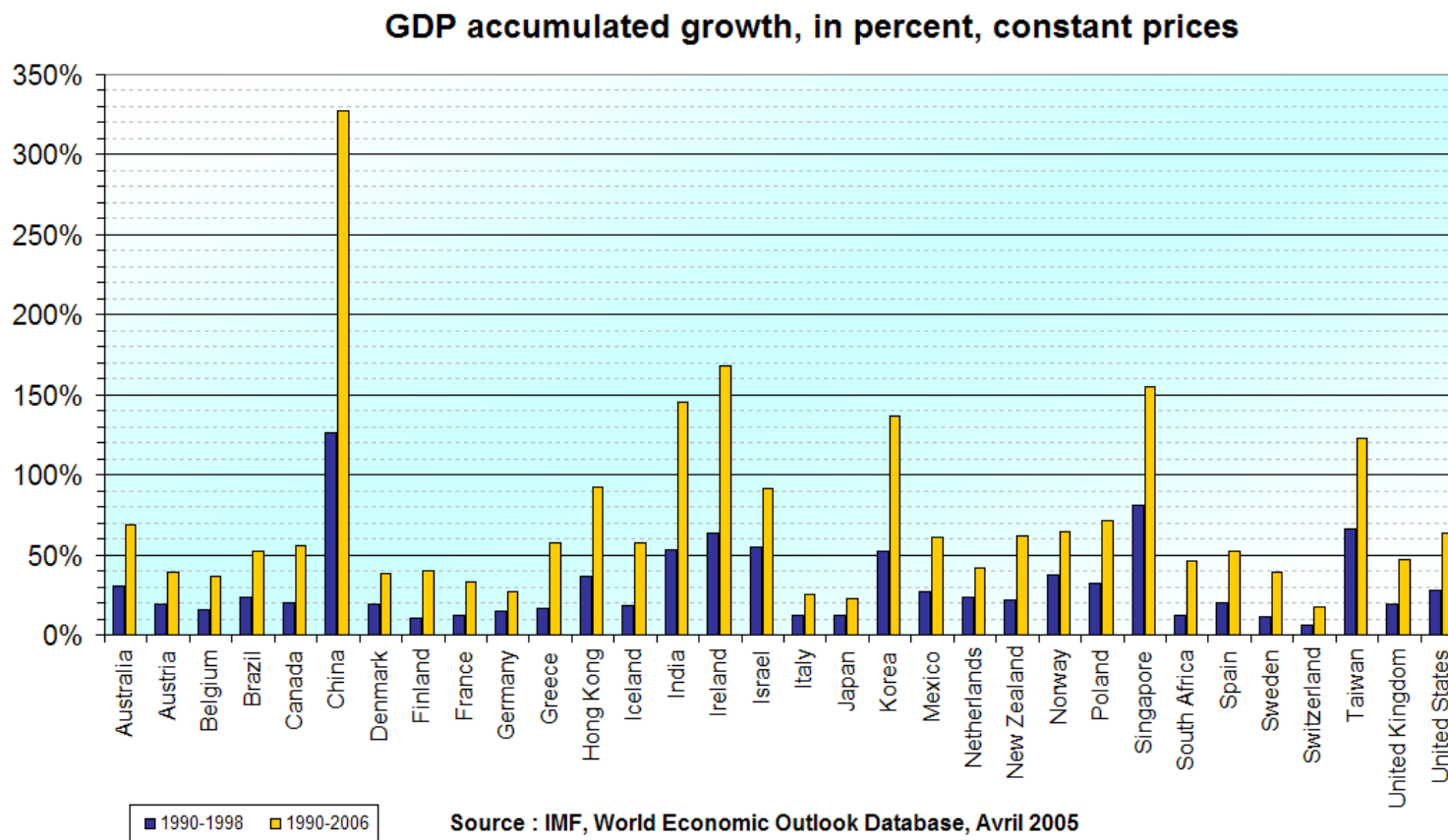
Business Cycle (VI)

Some charts



Economic Growth: Revisited (I)

Gross domestic product growth in the advanced economies, accumulated for the periods 1990-1999 and 1990-2006

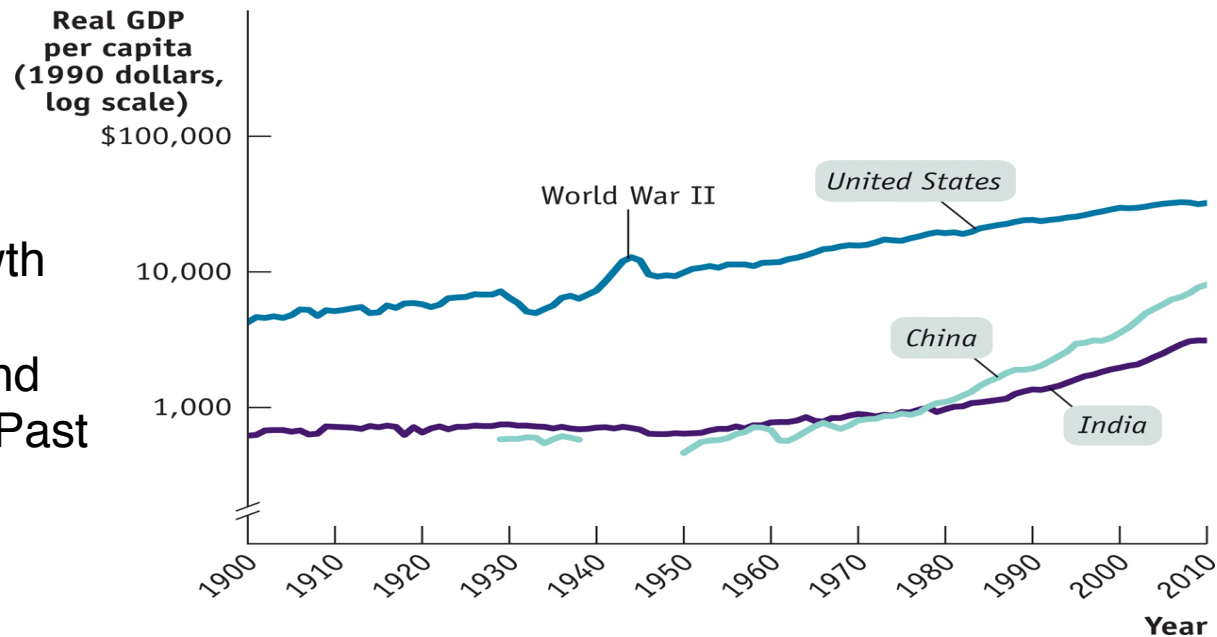


Economic Growth: Revisited (II)

Real GDP per Capita (I)

- *Real GDP per capita* is real GDP divided by the population size.
- *Real GDP* is used to separate changes in the quantity of goods and services from the effects of a rising price level. However, **a huge economy is not always a rich economy.**
- *Real GDP per capita* is used to isolate the effect of changes in population.

Economic Growth
in the United
States, India, and
China over the Past
Century



Economic Growth: Revisited (III)

Real GDP per Capita (II)

TABLE 13-1 U.S. Real GDP per Capita

Year	Percentage of 1900 real GDP per capita	Percentage of 2010 real GDP per capita
1900	100%	13%
1920	136	18
1940	171	23
1980	454	60
2000	696	92
2010	758	100

Sources: Angus Maddison, *Statistics on World Population, GDP, and Per Capita GDP, 1–2008AD*, <http://www.ggdc.net/maddison>; Bureau of Economic Analysis.

Long-Run Economic Growth

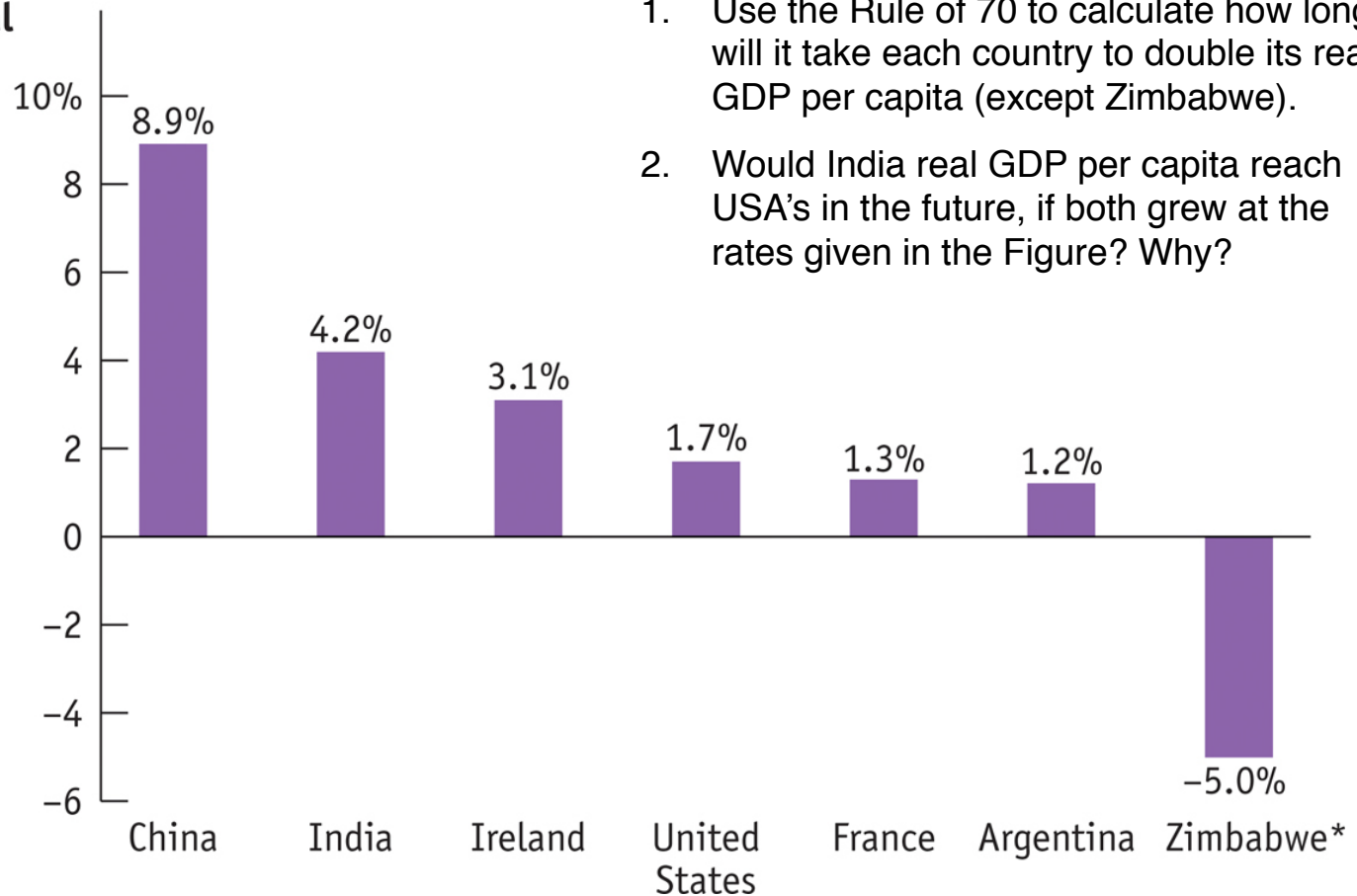
Growth Rates (I)

- How did the United States manage to produce **over six times more per person** in 2010 than in 1900? The answer: **A little bit at a time.**
- Long-run economic growth is normally a gradual process, in which real GDP per capita grows at most a few percent per year. From 1900 to 2010, real GDP per capita in the United States increased an average of 1.9% each year.
- The **Rule of 70** tells us that the time it takes a variable that grows gradually over time to double is approximately 70 divided by that variable's annual growth rate.
- Over long periods of time, even small rates of annual growth can have large effects. A growth rate of **2.5% per year** will lead to a doubling of GDP **within 28 years**, whilst a growth rate of **8% per year** (experienced by some Asian Tigers) will lead to a doubling of GDP **within 9 years**. This exponential characteristic can exacerbate differences across nations.

Long-Run Economic Growth

Growth Rates (II)

Average annual growth rate of real GDP per capita, 1980–2010



1. Use the Rule of 70 to calculate how long will it take each country to double its real GDP per capita (except Zimbabwe).
2. Would India real GDP per capita reach USA's in the future, if both grew at the rates given in the Figure? Why?

Crucial Importance of Productivity

Productivity

- **Labor productivity**, or productivity, is output per worker.
- For the economy as a whole, productivity is simply GDP divided by the number of people working.
- Any increase in real GDP per capita must be the result of increase come from **increased output per worker**. That is, it must be due to **higher productivity**.
- **Factors affecting productivity:** **Physical capital** consists of human-made resources such as buildings and machines. **Human capital** is the improvement in labor created by the education and knowledge embodied in the workforce. **Technological** progress is the advance in the technical means for the production of goods and services.

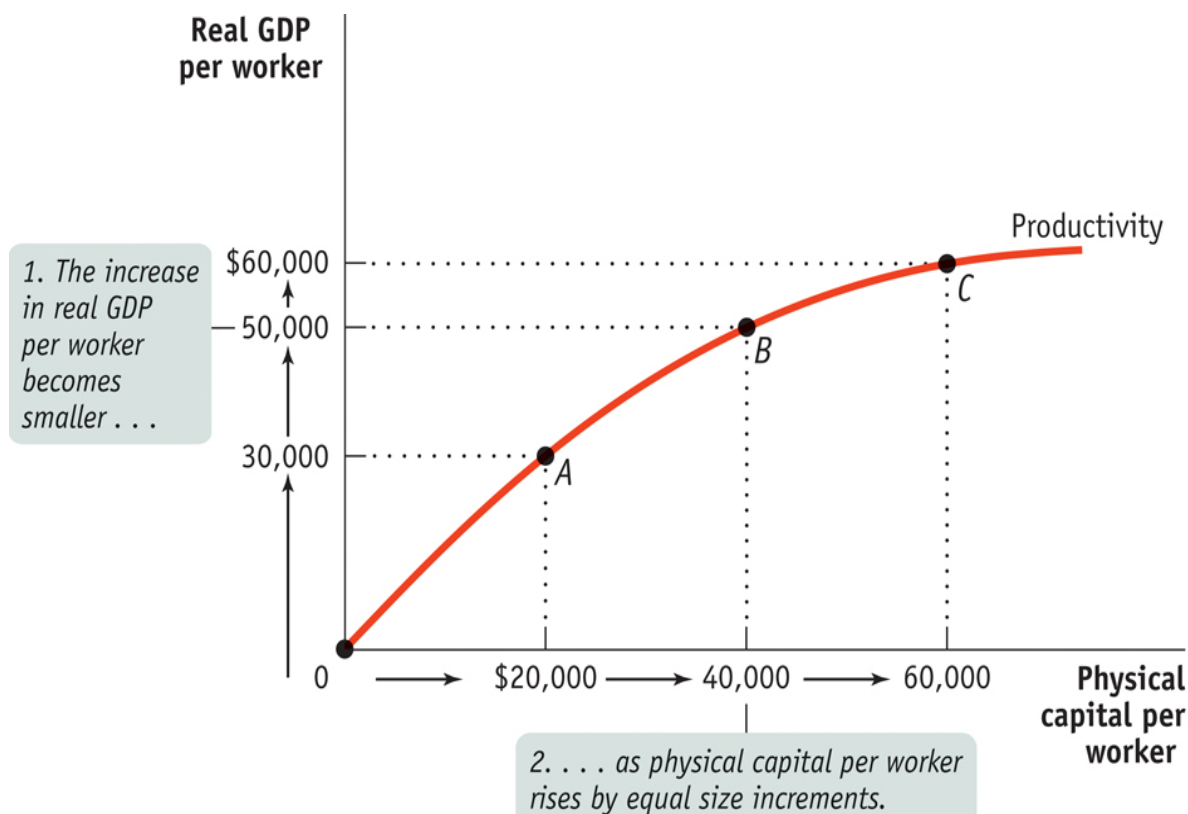
Explaining Growth

The Aggregate Production Function (I)

- The aggregate production function is a hypothetical function that shows how productivity (real GDP per worker) depends on:
 - The quantities of physical capital per worker
 - Human capital per worker
 - The state of the technology
- An aggregate production function exhibits **diminishing returns to physical capital** when, holding the amount of human capital and the state of technology fixed, each successive increase in the amount of physical capital per worker leads to a smaller increase in productivity.

Explaining Growth

Physical Capital and Productivity

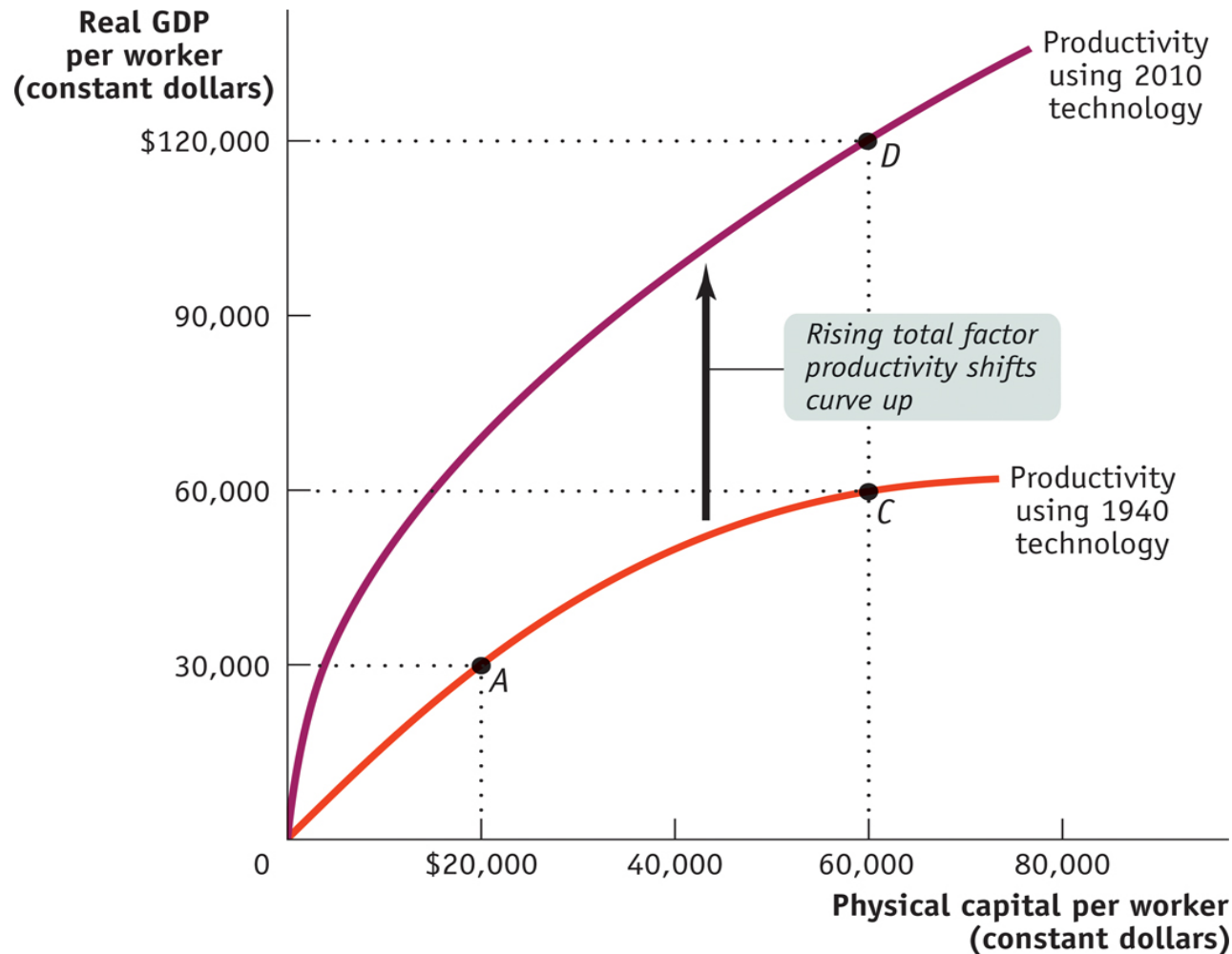


Physical capital per worker	Real GDP per worker
\$ 0	\$ 0
20,000	30,000
40,000	50,000
60,000	60,000

- According to estimates of the aggregate production function, each 1% rise in physical capital per worker, holding human capital and technology constant, raises output per worker by $\frac{1}{3}$ of 1%, or 0.33%.

Explaining Growth

Physical Capital and Productivity

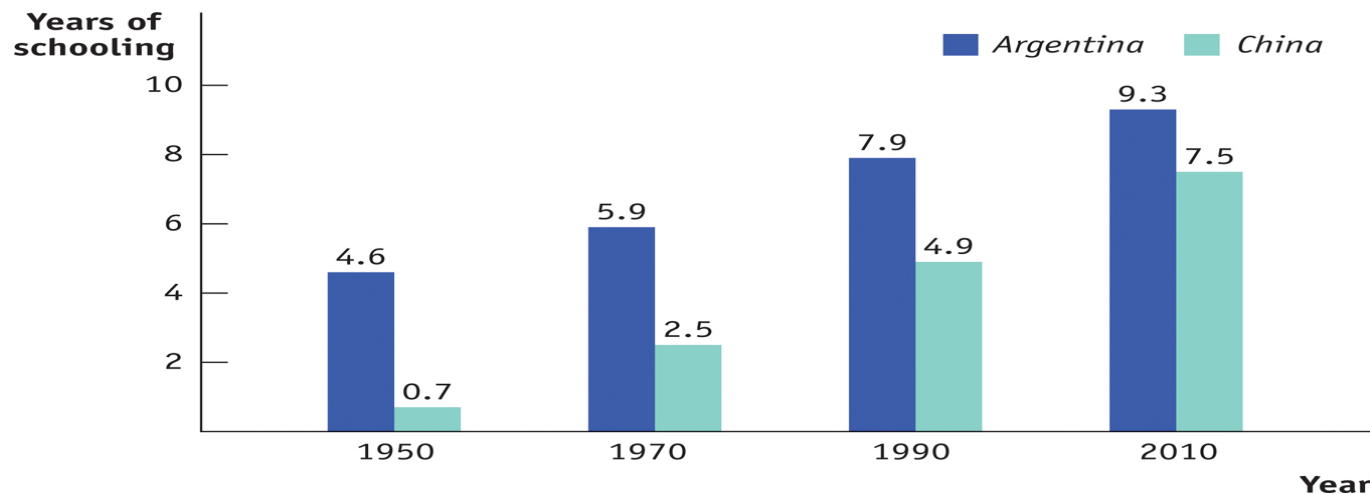


- In the modern world, **natural resources** are a much less determinant of productivity than human or physical capital for the great majority of countries.

- Some nations with very high real GDP per capita (Japan) have very few natural resources. Some resource-rich nations, (Nigeria, Venezuela: with sizable oil deposits) are much poorer.

Why Growth Rates Differ?

- Government policies and institutions can cause differences in the growth rate of countries.
- Some of **these policies** are:
 - Savings and investment spending
 - Education
 - Research and Development
- Research and development, or R&D, is spending **to create and implement new technologies**.
- **Infrastructure** is the roads, power lines, ports, information networks, and other underpinnings for economic activity.



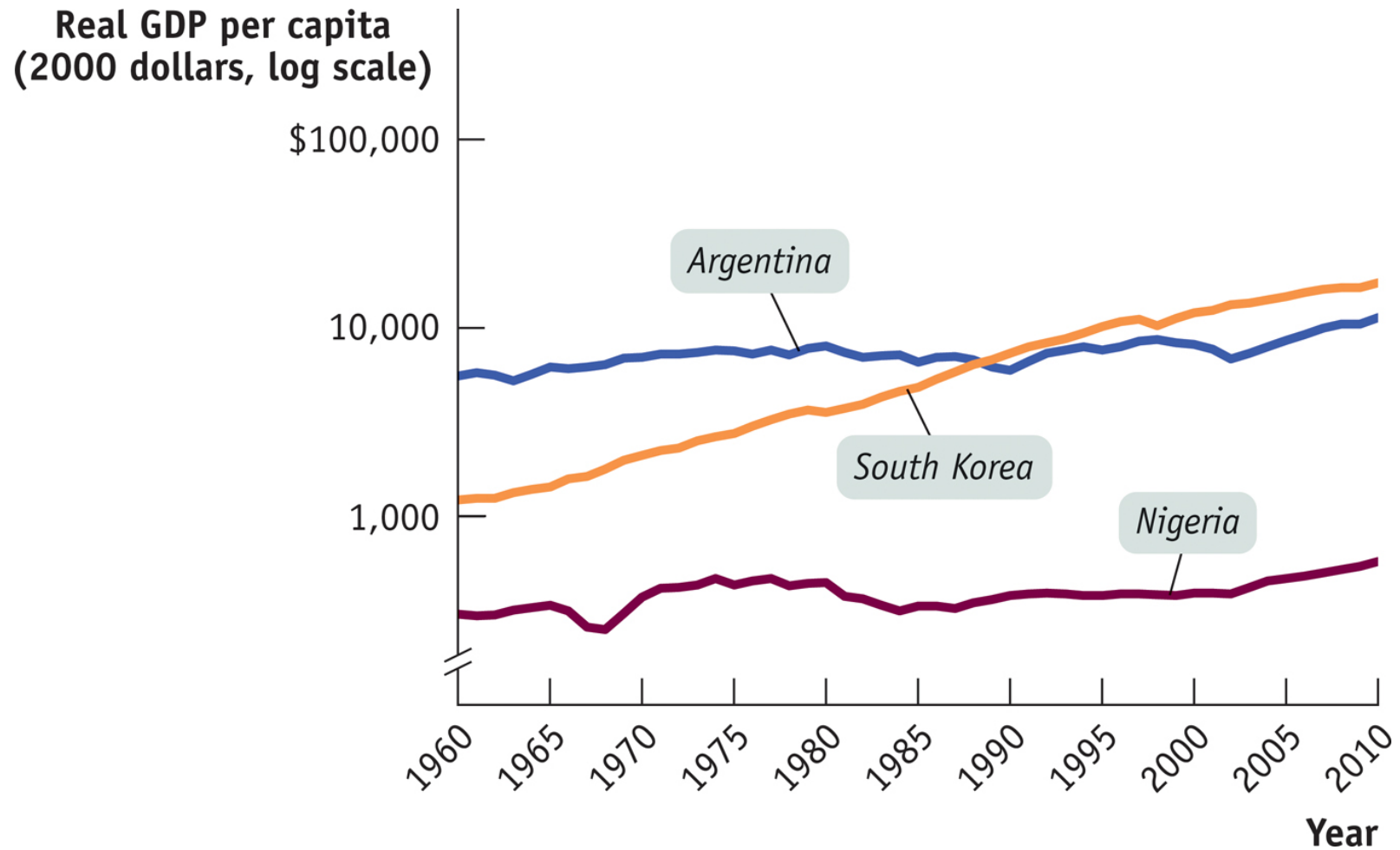
The Role of Gov in Promoting Economic Growth

- Government policies
 - Government **subsidies to infrastructure**
 - Government **subsidies to education**
 - Government **subsidies to R&D**
 - Maintaining a **well-functioning financial system**
- Protection of **property rights**
- **Political stability and good governance**

A history of Success, disappointment, and Failure

- *East Asia's* spectacular growth was generated by **high savings and investment spending rates**, emphasis on **education**, and adoption of **technological advances** from other countries.
- **Poor education, political instability and irresponsible government policies** are major factors in the slow growth of *Latin America*.
- In *sub-Saharan Africa*, **severe instability, war and poor infrastructure** resulted in catastrophic failure of growth. But economic performance in recent years has been much better than in preceding years.

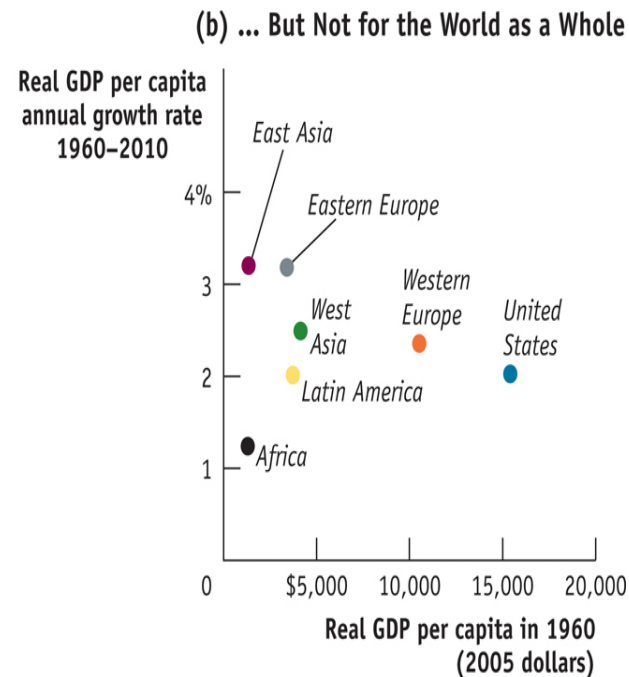
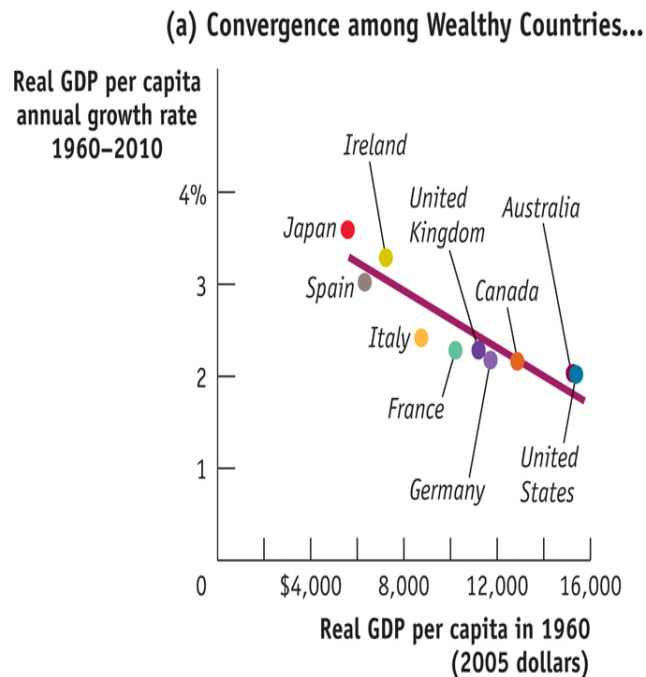
Success and Disappointment



Economic Growth

Are Economies Converging

- The **growth rates of economically advanced countries have converged**, but **not the growth rates of all countries** across the world.
- The **convergence hypothesis** (international differences in real GDP per capita tend to narrow over time) seems to hold only when other things that affect economic growth – such as education, infrastructure, property rights and so on – are held equal.



KEY TERMS

Economic Growth
Business (economic) cycle
Long-run growth trend
Peak
Trough
Contraction
Recession
Depression
Expansion
Recovery
Boom
Length
Amplitude
National Bureau of Economic
Research (NBER)

Length
Amplitude
National Bureau of Economic
Research (NBER)
Economic indicators
Leading indicators
Lagging indicators
Coincident indicators
Procyclic, Countercyclic,
Acyclic indicators
Rule of 70
Productivity
Physical and human capital
Diminishing returns
Convergence hypothesis