25

Production and Growth

Economic Growth

- Real GDP per person
  - Living standard
  - Vary widely from country to country
- Growth rate
  - How rapidly real GDP per person grew in the typical year
- Because of differences in growth rates
  - Ranking of countries by income changes substantially over time

Table 1

- The Variety of Growth Experiences

Country	Period	Real GDP per Person at Beginning of Period[a]	Real GDP per Person at End of Period[a]	Growth Rate (per year)
Japan	1890–2010	$1,517	$34,810	2.65%
Brazil	1900–2010	785	10,980	2.43
Mexico	1900–2010	1,169	14,350	2.31
China	1900–2010	723	7,520	2.15
Germany	1870–2010	2,204	38,410	2.06
Canada	1870–2010	2,397	38,370	2.00
United States	1870–2010	4,044	47,210	1.77
Argentina	1900–2010	2,314	15,470	1.74
India	1900–2010	681	3,330	1.45
United Kingdom	1870–2010	4,853	35,620	1.43
Indonesia	1900–2010	899	4,180	1.41
Pakistan	1900–2010	744	2,760	1.20
Bangladesh	1900–2010	629	1,800	0.96

[a]Real GDP is measured in 2010 dollars.

Source: Robert J. Barro and Xavier Sala-i-Martin, *Economic Growth* (New York: McGraw-Hill, 1995), Tables 10.2 and 10.3; *World Development Indicators* online; and author's calculations.

A Picture Is Worth a Thousand Statistics

The United Kingdom is an advanced economy. In 2011, its GDP per person was $36,010. A negligible share of the population lives in extreme poverty, defined here as less than $2 a day. A baby born in the United Kingdom can expect a relatively healthy childhood: Only 5 out of 1,000 children die before reaching age 5. Educational attainment is high: Among children of high school age, 98 percent are in school.

A Picture Is Worth a Thousand Statistics

Mexico is a middle-income country. In 2011, its GDP per person was $15,390. About 5 percent of the population lives on less than $2 a day, and 16 out of 1,000 children die before age 5. Among those of high school age, 71 percent are in school

A Picture Is Worth a Thousand Statistics

Mali is a poor country. In 2011, its GDP per person was only $1,040. Extreme poverty is the norm: More than three-quarters of the population lives on less than $2 per day. Life is often cut short: 176 out of 1,000 children die before age 5. And educational attainment in Mali is low: Among those of high school age, only 31 percent are in school.

Productivity

- Productivity
  - Quantity of goods and services
  - Produced from each unit of labor input
- Why productivity is so important
  - Key determinant of living standards
  - Growth in productivity is the key determinant of growth in living standards
  - An economy's income is the economy's output

Productivity

- Determinants of productivity
  - Physical capital per worker
  - Human capital per worker
  - Natural resources per worker
  - Technological knowledge

Productivity

- Physical capital
  - Stock of equipment and structures
  - Used to produce goods and services
- Human capital
  - Knowledge and skills that workers acquire through education, training, and experience

Productivity

- Natural resources
  - Inputs into the production of goods and services
  - Provided by nature, such as land, rivers, and mineral deposits
- Technological knowledge
  - Society's understanding of the best ways to produce goods and services

case study

Are natural resources a limit to growth?

- Argument
  - Natural resources - will eventually limit how much the world's economies can grow
    - Fixed supply of nonrenewable natural resources – will run out
    - Stop economic growth
    - Force living standards to fall

Are natural resources a limit to growth?

- Technological progress
  - Often yields ways to avoid these limits
    - Improved use of natural resources over time
    - Recycling
    - New materials
- Are these efforts enough to permit continued economic growth?

case study

Are natural resources a limit to growth?

- Prices of natural resources
  - Scarcity - reflected in market prices
  - Natural resource prices
    - Substantial short-run fluctuations
    - Stable or falling - over long spans of time
  - Our ability to conserve these resources
    - Growing more rapidly than their supplies are dwindling

Saving and Investment

- Raise future productivity
  - Invest more current resources in the production of capital
  - Trade-off
    - Devote fewer resources to produce goods and services for current consumption

Diminishing Returns

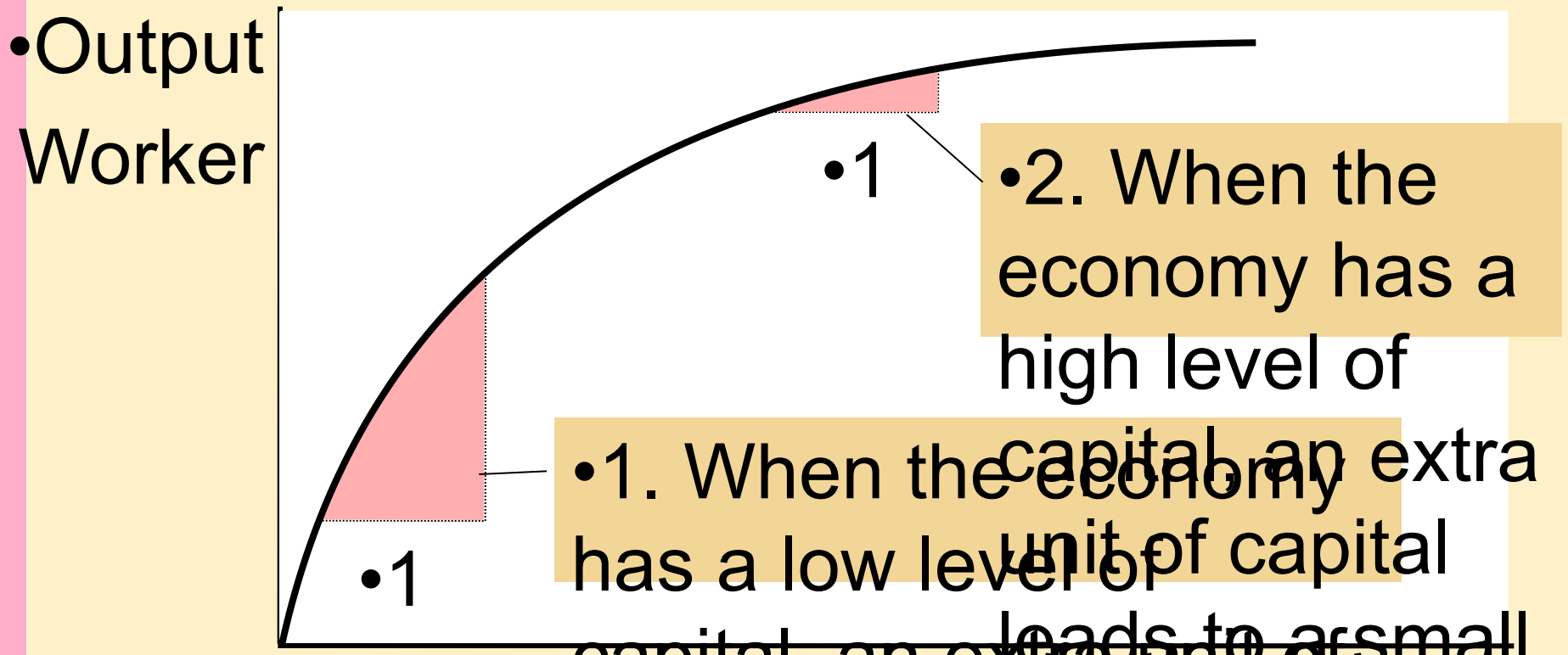
- Higher savings rate
  - Fewer resources – used to make consumption goods
  - More resources – to make capital goods
  - Capital stock increases
  - Rising productivity
  - More rapid growth in GDP

Diminishing Returns

- Diminishing returns
  - Benefit from an extra unit of an input
  - Declines as the quantity of the input increases
- In the long run, higher savings rate
  - Higher level of productivity
  - Higher level of income
  - Not higher growth in productivity or income

Figure 1

- Illustrating the Production Function



- This figure shows how the amount of capital per worker influences the amount of output per worker. Other determinants of output,

Diminishing Returns

- Catch-up effect
  - Countries that start off poor
  - Tend to grow more rapidly than countries that start off rich
- Poor countries
  - Low productivity
  - Even small amounts of capital investment
    - Increase workers' productivity substantially

Diminishing Returns

- Rich countries
  - High productivity
  - Additional capital investment
    - Small effect on productivity
- Poor countries
  - Tend to grow faster than rich countries

Investment from Abroad

- Investment from abroad
  - Another way for a country to invest in new capital
  - Foreign direct investment
    - Capital investment that is owned and operated by a foreign entity
  - Foreign portfolio investment
    - Investment financed with foreign money but operated by domestic residents

Investment from Abroad

- Benefits from investment
  - Some flow back to the foreign capital owners
  - Increase the economy's stock of capital
  - Higher productivity
  - Higher wages
  - State-of-the-art technologies

Investment from Abroad

- World Bank
  - Encourages flow of capital to poor countries
  - Funds from world's advanced countries
  - Makes loans to less developed countries
    - Roads, sewer systems, schools, other types of capital
  - Advice about how the funds might best be used

Investment from Abroad

- World Bank and the International Monetary Fund
  - Set up after World War II
  - Economic distress leads to:
    - Political turmoil, international tensions, and military conflict
  - Every country has an interest in promoting economic prosperity around the world

Education

- Education
  - Investment in human capital
  - Gap between wages of educated and uneducated workers
  - Opportunity cost: wages forgone
  - Conveys positive externalities
  - Public education - large subsidies to human-capital investment
- Problem for poor countries: Brain drain

Health and Nutrition

- Human capital
  - Education
  - Expenditures that lead to a healthier population
- Healthier workers
  - More productive
- Wages
  - Reflect a worker's productivity

Health and Nutrition

- Right investments in the health of the population
  - Increase productivity
  - Raise living standards
- Historical trends: long-run economic growth
  - Improved health – from better nutrition
  - Taller workers – higher wages – better productivity

Health and Nutrition

- Vicious circle in poor countries
  - Poor countries are poor
    - Because their populations are not healthy
  - Populations are not healthy
    - Because they are poor and cannot afford better healthcare and nutrition

Health and Nutrition

- Virtuous circle
  - Policies that lead to more rapid economic growth
  - Would naturally improve health outcomes
  - Which in turn would further promote economic growth

Property Rights, Political Stability

- To foster economic growth
  - Protect property rights
    - Ability of people to exercise authority over the resources they own
    - Courts – enforce property rights
  - Promote political stability
- Property rights
  - Prerequisite for the price system to work

Property Rights, Political Stability

- Lack of property rights
  - Major problem
  - Contracts are hard to enforce
  - Fraud goes unpunished
  - Corruption
    - Impedes the coordinating power of markets
    - Discourages domestic saving
    - Discourages investment from abroad

Property Rights, Political Stability

- Political instability
  - A threat to property rights
  - Revolutions and coups
  - Revolutionary government might confiscate the capital of some businesses
  - Domestic residents - less incentive to save, invest, and start new businesses
  - Foreigners - less incentive to invest

Free Trade

- Inward-oriented policies
  - Avoid interaction with the rest of the world
  - Infant-industry argument
    - Tariffs
    - Other trade restrictions
  - Adverse effect on economic growth

Free Trade

- Outward-oriented policies
  - Integrate into the world economy
  - International trade in goods and services
  - Economic growth
- Amount of trade – determined by
  - Government policy
  - Geography
    - Easier to trade for countries with natural seaports

Research and Development

- Knowledge – public good
  - Government – encourages research and development
    - Farming methods
    - Aerospace research (Air Force; NASA)
    - Research grants
      - National Science Foundation
      - National Institutes of Health
    - Tax breaks
    - Patent system

Population Growth

- Large population
  - More workers to produce goods and services
    - Larger total output of goods and services
  - More consumers
- Stretching natural resources
  - Malthus: an ever-increasing population
    - Strain society's ability to provide for itself
    - Mankind - doomed to forever live in poverty

Population Growth

- Diluting the capital stock
  - High population growth
    - Spread the capital stock more thinly
    - Lower productivity per worker
    - Lower GDP per worker
- Reducing the rate of population growth
  - Government regulation
  - Increased awareness of birth control
  - Equal opportunities for women

Population Growth

- Promoting technological progress
  - World population growth
    - Engine for technological progress and economic prosperity
    - More people = More scientists, more inventors, more engineers