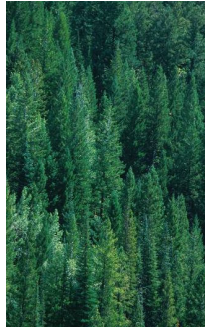


Chapter 8

GROWTH, PRODUCTIVITY, AND THE WEALTH OF NATIONS



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8-2

Today's lecture will:

- Define growth and relate it to living standards.
- Discuss the five important sources of growth.
- Distinguish diminishing marginal productivity from decreasing returns to scale.
- Explain the convergence hypothesis and four reasons why it has not occurred.
- Distinguish Classical growth theory from new growth theory.

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Economic Growth

- **Growth** is an increase in potential output.
- **Potential output** – the maximum output an economy can produce from the existing production function and existing resources.
- The long-run growth focus is on how to increase potential output.
 - Say's Law – supply creates its own demand – applies to the long run.
- The short-run focus is on how to get the economy operating at its potential.

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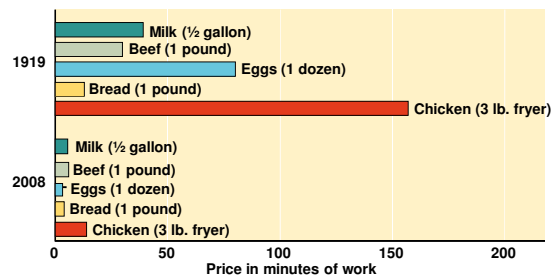
Importance of Growth for Living Standards

- Growth improves average living standards.
- Because of compounding, long-term growth rates can make huge differences.
- **Rule of 72** – # years to double= 72/ growth rate.
- If China's per capita income of \$2000 grows 9% per year and the U.S. per capita income of \$40,000 grows 1% per year:
 - China's per capita income will surpass that in the U.S.
 - China's per capita income will be \$128,000, significantly higher than that in the U.S. in 8 more years.

Markets, Specialization, and Growth

- Markets, specialization, and the division of labor increase productivity and growth.
 - **Specialization** – the concentration of individuals on certain aspects of production.
 - **Division of labor** – the splitting up of a task to allow for specialization of production.
- Markets may seem to be unfair because of the effect that they have on the distribution of income.

Economic Growth, Distribution, and Markets



Per Capita Growth

- Per capita output is total output divided by total population.
 - Per capita growth means producing more goods and services per person.
- Per capita growth =
 $\% \Delta \text{ in output} - \% \Delta \text{ in population}$
- Some suggest that median income is a better measure because it takes into account how income is distributed.

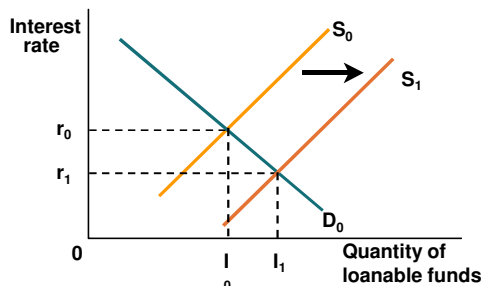
The Sources of Growth

- Growth-compatible institutions
- Capital accumulation – investment in productive capacity
- Available resources
- Technological development
- Entrepreneurship

Growth-Compatible Institutions

- Markets and private ownership of property foster economic growth.
- When individuals get much of the gains of growth themselves, they work harder.
- Corporations are a growth-compatible institution because of limited liability, which gives stockholders an incentive to invest their savings in large enterprises.

Investment and Accumulated Capital



Investment and Accumulated Capital

- Although capital is a key element in growth, capital accumulation does not necessarily lead to growth.
- Capital may become obsolete.
- Capital is much more than machines. It includes:
 - Human capital – skills that workers gain from experience, education, and on-the-job training.
 - Social capital – the habitual way of doing things that guides people in how they approach production.

Available Resources

- The growth in the U.S. in the 20th century was due in part to its large supply of natural resources.
- New technology can overcome a lack of resources.
- Greater participation in the market may increase the labor force participation rate.

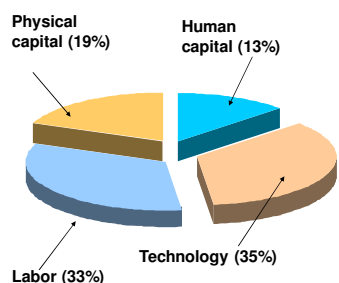
Technological Development

- **Technology** - changes in the way we make goods and supply services, and in the goods and services we buy.
- **Advances in technology** shift the production possibilities curve outward by making workers more productive.
- **Important developments in biotechnology, computers, and communications** have helped fuel U.S. growth.

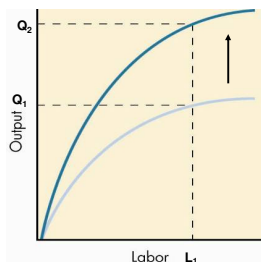
Entrepreneurship

- **Entrepreneurship** is the ability to get things done using creativity, vision, and a talent for translating vision into reality.
- **Examples of American entrepreneurs include:**
 - **Thomas Edison** – generation and use of electricity
 - **Henry Ford** – automobile production
 - **Bill Gates** – computers and software

Sources of Real U.S. Growth, 1928-2007



The Production Function



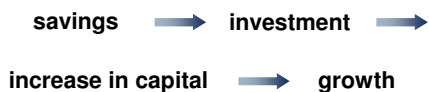
- Production function shows the relationship between inputs and outputs.
- Growth is shown by a shift in the production function.
- Output = $A \cdot f(\text{labor, capital, land})$

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The Classical Growth Model

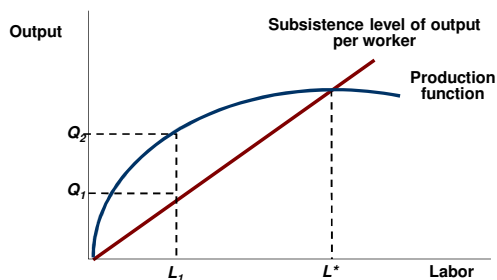
- According to the Classical growth model, the more capital an economy has, the faster it will grow.
- Classical economists focused their analysis and their policy advice on how to increase investment:



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Diminishing Returns and Population Growth



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Diminishing Marginal Productivity of Capital

- The predictions for the long term were incorrect because increases in technology and capital overwhelmed diminishing marginal productivity.
- The focus became the diminishing marginal productivity of capital, not labor.

Capital grows faster than labor →

Capital is less productive →

Slower growth of output →

Per capita growth stagnates

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The Convergence Hypothesis

- The diminishing marginal productivity of capital leads to the **convergence hypothesis** – per capita income in countries with similar institutional structures will converge to the higher level.
- The U.S. will grow slower because the marginal product of capital is higher in developing countries, hence costs of production are lower.
- This difference causes capital investment flows and production to move from the U.S. to developing countries.

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The Convergence Hypothesis

- As of the early 2000s the predictions of convergence have not come true.
- Economists have several explanations of why convergence has not taken place:
 - Lack of factor mobility
 - Differing institutional structure
 - Incomparable factors of production
 - Technological agglomeration effects

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New Growth Theory

- Unlike Classical growth theory, which left technology outside of economic analysis, new growth theory emphasizes the role of technology rather than capital in the growth process.

Technological advance → Investment →

Further technological advance → Growth

Learning by Doing

- New growth theory also highlights learning by doing.
- **Learning by doing** – improving the methods of production through experience.
- Learning by doing overcomes the law of diminishing marginal productivity.
- Learning by doing leads to increasing returns to scale.

Does an Economy Always Use the Best Technology?

- **Technological lock-in** occurs when old technologies become entrenched in the market.
- More efficient technologies may be available.
- **Network externalities** (the use by one individual makes a technology more valuable to others) lead to technological lock-in.

Economic Policies to Encourage Per Capita Growth

- Encouraging saving and investment.
- Formalizing property rights and reducing bureaucracy and corruption.
- Providing more of the right kind of education.
- Promoting policies that encourage technological innovation.
- Promoting policies that allow taking advantage of specialization.

Summary

- Growth is an increase in the amount of goods and services an economy can produce when both labor and capital are fully employed.
- Growth increases potential output and shifts the production possibility curve out, allowing an economy to produce more goods.
- Per capita growth means producing more goods and services per person.
- Five sources of growth are (1) growth compatible institutions (2) capital accumulation (3) available resources (4) technological development and (5) entrepreneurship.

Summary

- The loanable funds market translates savings into investment that is necessary for growth. The interest rate equilibrates saving and investment.
- The production function shows the relationship between the quantity of resources and the output.
- The law of diminishing marginal productivity states that increasing one input, keeping all others constant, will lead to smaller and smaller gains in output.
- Returns to scale describes what happens to output when all inputs increase proportionately.

Summary

- The convergence hypothesis is that per capita income in countries with similar institutional structures will converge.
- Convergence has not taken place because of:
 - the lack of factor mobility.
 - differing institutional structures.
 - incompatible factors of production.
 - technological agglomeration.

Summary

- The Classical growth model focuses on the role of capital accumulation in the growth process.
- The law of diminishing productivity limits growth of per capita income.
- New growth theory emphasizes the role of technology in the growth process.
- Advances in technology, which account for 35% of growth, have overwhelmed the effects of diminishing returns.

Review Question 8-1 Explain the difference between the Classical growth theory and new growth theory.

Classical growth theory is a model of growth that focuses on the role of capital accumulation in growth. According to the Classical theory, the more capital an economy has, the faster it will grow. New growth theory emphasizes the role of technology rather than capital in the growth process. Increases in technology can shift the production possibilities curve out and allow the society to produce more output without new resources.

Review Question 8-2 List five sources of growth.

Sources of growth include: (1) growth compatible institutions (2) capital accumulation (3) available resources (4) technological development and (5) entrepreneurship.
