

CHAPTER 25

Production and Growth

PRINCIPLES OF
Economics
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Premium PowerPoint Slides
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**In this chapter,
look for the answers to these questions:**

- § What are the facts about living standards and growth rates around the world?
- § Why does productivity matter for living standards?
- § What determines productivity and its growth rate?
- § How can public policy affect growth and living standards?

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Incomes and Growth Around the World

	GDP per capita, 2005	Growth rate, 1960-2005
China	\$6,572	5.8%
Singapore	29,921	5.4%
Japan	30,821	3.8%
Spain	26,125	3.2%
India	3,486	2.7%
Israel	25,670	2.7%
United States	41,854	2.2%
Canada	32,886	2.1%
Colombia	7,769	1.8%
New Zealand	22,511	1.4%
Philippines	4,920	1.4%
Argentina	14,421	1.0%
Saudi Arabia	14,729	0.8%
Rwanda	1,333	0.3%
Haiti	1,836	-1.2%

Incomes and Growth Around the World

Since growth rates vary, the country rankings can change over time:

- § Poor countries are not necessarily doomed to poverty forever – e.g., Singapore, incomes were low in 1960 and are quite high now.
- § Rich countries can't take their status for granted: They may be overtaken by poorer but faster-growing countries.

Incomes and Growth Around the World

Questions:

- § Why are some countries richer than others?
- § Why do some countries grow quickly while others seem stuck in a poverty trap?
- § What policies may help raise growth rates and long-run living standards?

Productivity

§ Recall one of the Ten Principles from Chap. 1:

A country's standard of living depends on its ability to produce g&s.

§ This ability depends on **productivity**

§ Y = real GDP = quantity of output produced

L = quantity of labor

so productivity =

Why Productivity Is So Important

§ When a nation's workers are very productive,

§ When productivity grows rapidly,

§ What, then, determines productivity and its growth rate?

Physical Capital Per Worker

§ Recall: The stock of equipment and structures used to produce g&s is called **[physical] capital**, denoted **K**.

§

§ Productivity is higher when the average worker has more capital (machines, equipment, etc.).

§ *i.e.*,

Human Capital Per Worker

§ **Human capital (H)**:

§ H/L = the average worker's human capital

§ Productivity is higher when the average worker has more human capital (education, skills, etc.).

§ *i.e.*,

Natural Resources Per Worker

§ **Natural resources (N):**

§ Other things equal, more **N** allows a country to produce more **Y**. In per-worker terms,

§ Some countries are rich because they have abundant natural resources (e.g., Saudi Arabia has lots of oil).

§ But countries need not have much **N** to be rich (e.g., Japan imports the **N** it needs).

Technological Knowledge

§ **Technological knowledge:**

§ Technological progress does not only mean a faster computer, a higher-definition TV, or a smaller cell phone.

§ It means

Tech. Knowledge vs. Human Capital

§ Technological knowledge refers to

§ Human capital results from

§ Both are important for productivity.

The Production Function

§ The production function is

$F()$ – a function that shows how inputs are combined to produce output

“ A ” –

§ “ A ” multiplies the function $F()$, so improvements in technology (increases in “ A ”)

The Production Function

$$Y = A F(L, K, H, N)$$

§ The production function has the property **constant returns to scale**:

§ Doubling all inputs (multiplying each by 2) causes output to double:

$$2Y = A F(2L, 2K, 2H, 2N)$$

The Production Function

$$Y = A F(L, K, H, N)$$

§ If we multiply each input by $1/L$, then

§ This equation shows that productivity (output per worker) depends on:

ACTIVE LEARNING 1
Discussion Question

Which of the following policies do you think would be most effective at boosting growth and living standards in a poor country over the long run?

- a. Offer tax incentives for investment by local firms
- b. " " " " " " by foreign firms
- c. Give cash payments for good school attendance
- d. Crack down on govt corruption
- e. Restrict imports to protect domestic industries
- f. Allow free trade
- g. Give away condoms

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ECONOMIC GROWTH
AND PUBLIC POLICY

Next, we look at the ways public policy can affect long-run growth in productivity and living standards.

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Saving and Investment

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- § Since resources scarce, producing more capital requires producing fewer consumption goods.
- § Reducing consumption = increasing saving. This extra saving funds the production of investment goods. *(More details in the next chapter.)*
- § Hence, a tradeoff between current and future consumption.

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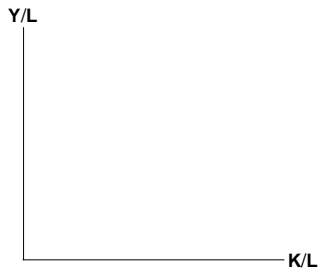
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Diminishing Returns and the Catch-Up Effect

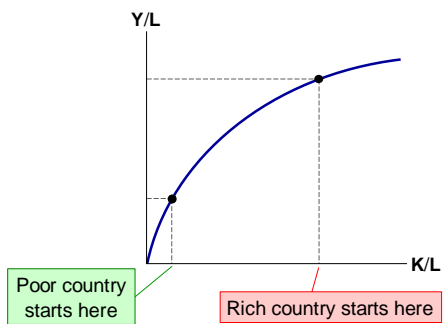
§ The gov't can implement policies that raise saving and investment. *(Details in next chapter.)*
Then **K** will rise, causing productivity and living standards to rise.

§ But

The Production Function & Diminishing Returns



The catch-up effect:



Example of the Catch-Up Effect

§ Over 1960-1990, the U.S. and S. Korea devoted a similar share of GDP to investment, so you might expect they would have similar growth performance.

§ But growth was >6% in Korea and only 2% in the U.S.

§ Explanation:

Investment from Abroad

§ To raise K/L and hence productivity, wages, and living standards, the govt can also encourage

§ **foreign direct investment:**

§ **foreign portfolio investment:**

§ Some of the returns from these investments

Investment from Abroad

§ Especially beneficial in poor countries that cannot generate enough saving to fund investment projects themselves.

§ Also

Education

§ Govt can increase productivity by

§ Education has significant effects: In the U.S., each year of schooling

§ But investing in H also involves a tradeoff between the present & future: Spending a year in school requires sacrificing a year's wages now to have higher wages later.

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Health and Nutrition

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§ In countries with significant malnourishment, raising workers' caloric intake raises productivity:

§ Over 1962-95, caloric consumption rose 44% in S. Korea, and economic growth was spectacular.

§ Nobel winner Robert Fogel: 30% of Great Britain's growth from 1790-1980 was due to improved nutrition.

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Property Rights and Political Stability

§ Recall:

Markets are usually a good way to organize economic activity.

The price system allocates resources to their most efficient uses.

§ This requires

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Property Rights and Political Stability

- § In many poor countries, the justice system doesn't work very well:
 - § Contracts aren't always enforced
 - § Fraud, corruption often go unpunished
 - § In some, firms must bribe govt officials for permits
- § Political instability (e.g., frequent coups) creates uncertainty over whether property rights will be protected in the future.

Property Rights and Political Stability

- § When people fear their capital may be stolen by criminals or confiscated by a corrupt govt,

Result:
 - § Economic stability, efficiency, and healthy growth require

Free Trade

§ Inward-oriented policies

§ Outward-oriented policies

Free Trade

§ Recall: *Trade can make everyone better off.*

§

§ Countries with inward-oriented policies have generally failed to create growth.

§ *E.g.*, Argentina during the 20th century.

§ Countries with outward-oriented policies have often succeeded.

§ *E.g.*, South Korea, Singapore, Taiwan after 1960.

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Research and Development

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§ One reason is that knowledge is a **public good**: Ideas can be shared freely, increasing the productivity of many.

§ Policies to promote tech. progress:

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Population Growth

...may affect living standards in 3 different ways:

1. Stretching natural resources

§ 200 years ago, Malthus argued

§ Since then, the world population has increased sixfold. If Malthus was right, living standards would have fallen. Instead, they've risen.

§ Malthus failed to account for

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Population Growth

2. Diluting the capital stock

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§ This applies to **H** as well as **K**:

§ Countries with fast pop. growth tend to have lower educational attainment.

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Population Growth

2. Diluting the capital stock

To combat this, many developing countries

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Population Growth

3. Promoting tech. progress

§

§ Evidence from Michael Kremer:

Over the course of human history,

§ growth rates increased as the world's population increased

§ more populated regions grew faster than less populated ones

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ACTIVE LEARNING 2
Review productivity concepts

- § List the determinants of productivity.
- § List three policies that attempt to raise living standards by increasing one of the determinants of productivity.

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Are Natural Resources a Limit to Growth?

- § Some argue that population growth is depleting the Earth's non-renewable resources, and thus will limit growth in living standards.
- § But
 - § Hybrid cars use less gas.
 - § Better insulation in homes reduces the energy required to heat or cool them.
- § As a resource becomes scarcer,

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CONCLUSION

- § In the long run, living standards are determined by productivity.
- § Policies that affect the determinants of productivity will therefore affect the next generation's living standards.
- § One of these determinants is saving and investment.
- § In the next chapter, we will learn how saving and investment are determined, and how policies can affect them.

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