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Principles of
Economics
Sixth Edition



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Production and Growth

Premium
PowerPoint
Slides by
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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, 2009	Growth rate, 1970–2009
China	\$6,828	7.4%
Singapore	\$50,633	4.7%
India	\$3,296	3.3%
Japan	\$32,418	2.2%
Spain	\$32,150	2.1%
Israel	\$27,656	2.1%
Colombia	\$8,959	1.9%
United States	\$45,989	1.8%
Canada	\$37,808	1.7%
Philippines	\$3,542	1.3%
Rwanda	\$1,136	1.1%
New Zealand	\$28,993	1.1%
Argentina	\$14,538	1.0%
Saudi Arabia	\$23,480	0.6%
Chad	\$1,300	0.4%

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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.

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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?

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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 =

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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?

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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.,

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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.,

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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).

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Technological Knowledge

§ **Technological knowledge:**

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

§ It means

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Tech. Knowledge vs. Human Capital

§ Technological knowledge

§ Human capital

§ Both are important for productivity.

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The Production Function

§ The production function

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

“ A ”

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

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The Production Function

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

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

§ For example, doubling all inputs (multiplying each by 2) causes output to double:

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

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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:

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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

ECONOMIC GROWTH AND PUBLIC POLICY

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

Saving and Investment

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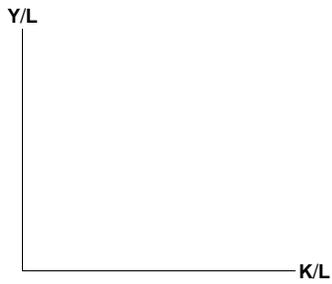
- § Since resources scarce, producing more capital requires producing fewer consumption goods.
- § Reducing consumption = increasing saving. This extra saving funds the production of investment goods. *(More details in the next chapter.)*
- § Hence, a tradeoff between current and future consumption.

Diminishing Returns and the Catch-Up Effect

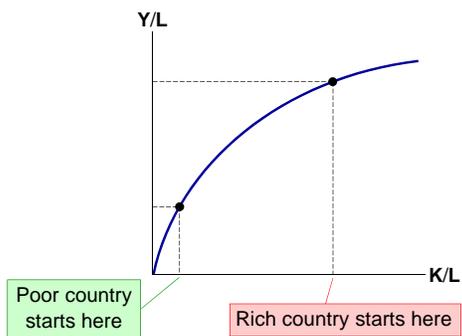
§ The govt can implement policies that raise saving and investment. *(Details in next chapter.)*
Then **K** will rise, causing productivity and living standards to rise.

§ 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:

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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

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Investment from Abroad

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

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Education

§ Govt can increase productivity by

§ Education has significant effects: In the U.S.,

§ 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

§

§ 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.

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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

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Free Trade

- § **Inward-oriented policies**
-
- § **Outward-oriented policies**

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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

§

§ 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

§

§ 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.

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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