Lecture 7: The Economy in the Long Run Production and Growth

Rob Godby
University of Wyoming
Long Run vs. The Short Run

- **Long Run**: Time periods greater than the immediate future or past.
  - Often refers to the underlying long term trends in the economy
- **Short Run**: Immediate future and past.
  - Often considers fluctuations around the long term trend
Long Run vs. Short Run

Long Run (trend)

Short Run (fluctuations from trend)
In the Long Run:

- A country’s standard of living depends on its ability to produce goods and services (which affect it).
- Within every country there are large changes in the standard of living over time.
Standard of Living

Measurement:

- Although it is an imperfect measure, real GDP per capita is usually used to measure changes in living standards over time.
- There is a high correlation between real GDP per capita and standard of living.
Economic Growth Around the World

- Living standards, as measured by per capita real GDP, vary significantly among nations and over time.
- Developed countries have real per capita GDP ten to twenty times greater than that of the poorest countries.
- The process of creating a high living standard is keyed to *productivity*. 
<table>
<thead>
<tr>
<th>Country</th>
<th>Time Period</th>
<th>Real GDP Per Person at Beginning of Period</th>
<th>Real GDP Per Person at End of Period</th>
<th>Growth Rate (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1890-1990</td>
<td>$842</td>
<td>$16,144</td>
<td>3.00 percent</td>
</tr>
<tr>
<td>Brazil</td>
<td>1900-1987</td>
<td>$436</td>
<td>$3,417</td>
<td>2.39</td>
</tr>
<tr>
<td>Canada</td>
<td>1870-1990</td>
<td>$1,330</td>
<td>$17,070</td>
<td>2.15</td>
</tr>
<tr>
<td>West Germany</td>
<td>1870-1990</td>
<td>$1,223</td>
<td>$14,288</td>
<td>2.07</td>
</tr>
<tr>
<td>United States</td>
<td>1870-1990</td>
<td>$2,244</td>
<td>$18,258</td>
<td>1.76</td>
</tr>
<tr>
<td>China</td>
<td>1900-1987</td>
<td>$401</td>
<td>$1,748</td>
<td>1.71</td>
</tr>
<tr>
<td>Mexico</td>
<td>1900-1987</td>
<td>$649</td>
<td>$2,667</td>
<td>1.61</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1870-1990</td>
<td>$2,693</td>
<td>$13,589</td>
<td>1.36</td>
</tr>
<tr>
<td>Argentina</td>
<td>1900-1987</td>
<td>$1,284</td>
<td>$3,302</td>
<td>1.09</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1900-1987</td>
<td>$499</td>
<td>$1,200</td>
<td>1.01</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1900-1987</td>
<td>$413</td>
<td>$885</td>
<td>0.88</td>
</tr>
<tr>
<td>India</td>
<td>1900-1987</td>
<td>$378</td>
<td>$662</td>
<td>0.65</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1900-1987</td>
<td>$349</td>
<td>$375</td>
<td>0.08</td>
</tr>
</tbody>
</table>
The Importance of Growth

- Differences in growth rates that seem small become large when compounded for many years.
  - **Compounding** refers to the accumulation of a rate over a period of time.
  - **Rule of 70:** The value of a variable will double in approximately
    \((70 \div \text{annual growth rate})\) years.
    - $5,000 invested at 7% interest/yr.,
      will double in 10 years \((70 \div 7 = 10)\)
The Power of Compounding

- Compare Germany’s income growth to the U.K. from 1870-1990
  - initially U.K. income 220% greater than Germany’s ($2693 vs. $1223)
  - U.K. growth rate 0.71%/yr. Less than Germany’s
  - now Germany’s income exceeds U.K.’s by 5.1% ($699/yr.)
Productivity: Its Role and Determinants

- To understand the large differences in living standards we must focus on the production of goods and services.

- **Productivity** refers to the quantity of goods and services that a worker can produce for each hour of work.

- The inputs used to produce goods and services are called *the factors of production*. 
How Productivity is Determined

Productivity depends on the Factors of Production, including:

- Capital
  - Physical or Human
- Labor
  - Technological Knowledge
- Natural Resources

*Note: Capital* is a produced factor of production, i.e. capital is an input into the production process that in the past was an output from production.
The Factors of Production: Physical Capital

- The stock of equipment and structures that are used to produce goods and services.

- Examples:
  - Tools used to build or repair automobiles
  - Tools used to build homes or buildings
  - Buildings, e.g. office, schools, etc.
The Factors of Production: Human Capital

- The economist’s term for the knowledge and skills that workers acquire through education, training, and experience.
- Like physical capital, human capital raises a nation’s ability to produce goods and services.
The Factors of Production: Labor

- The human input required to create any goods and services.
- Labor productivity may be augmented (improved) by technical knowledge and education.
Labor and Technological Knowledge

- The understanding of the best ways to produce goods and services.

- *Technological Knowledge* refers to society’s understanding about how the world works.

- *Human Capital* refers to the resources expended transmitting this understanding to the labor force.
The Factors of Production: Natural Resources

- Inputs used in production that are provided by nature, such as land, rivers, and mineral deposits. They are not necessary for an economy to be highly productive.
  - Renewable Resources:
    - Trees, forests
  - Non-Renewable Resources:
    - Oil, coal
The Production Function

- This describes how much total output (measured in GDP) the economy can produce given the available factors of production (K (capital), L (labor) and R (resources)) in the economy.
- This relationship assumes production occurs without waste.
- Production occurs using best technology available.
Properties of Production Functions:

1. No production can occur without input (you get nothing for nothing).

2. Output increases as you add more of any or all of the factors of production.

3. Diminishing Returns: As you add more of a single input, the increase in output caused by the added input becomes smaller and smaller (not always true at low levels of production.)
Production and Productivity

- Since productivity is defined as total output divided by hours worked, total labor productivity in an economy is equal to GDP/(total labor hours worked)

- If more of K, L or R becomes available, production (GDP) increases but productivity only increases if GDP increases more than the labor hours worked.
Economic Growth and Public Policy

- Public policies, laws, traditions, and institutions are critical to transforming resources into useful output.
- Governments can do many things to encourage or impede the attainment of high living standards.
Economic Growth and Public Policy

- Government policies:
  - Encourage saving and investment
  - Encourage education and training
  - Establish secure property rights and political stability
  - Promote free trade policies
  - Control of population growth
  - Promote research and development
Saving and Investment

- One way to raise future productivity is to invest more current resources in the production of capital (Figure 12-1).
- Governments can encourage capital accumulation:
  - from domestic sources by imposing low taxes on interest and dividend income.
  - from foreign sources by making such capital secure and welcome domestically.
Saving and Investment

- Cautions and Notes:
  - As the stock of capital rises, the extra output produced from an additional unit of capital falls (diminishing returns.)
  - As the higher saving rate allows more capital to be accumulated, the benefits from additional capital become smaller over time, and so growth slows down.
Education and Training

- Education is at least as important as investment in physical capital.
- Many times it is necessary for countries to provide basic education so that the work force can acquire the specialized skills leading to higher productivity.
Secure Property Rights and Political Stability

- *Property rights* refer to the ability of people to exercise authority over the resources they own.
- An economy-wide respect for property rights is an important prerequisite for the price system to work.
- It is necessary for investors to feel that their investments are secure and safe from political instability.
Promoting Freer Trade

- To exploit comparative advantage and maximize production and efficiency, it is important for countries to have the opportunity to sell abroad and to be able to purchase from lower opportunity cost producers.

- Some countries engage in:
  - Inward-oriented trade policies
    - i.e. Argentina - little trade
  - Outward-oriented trade policies
    - actively encourage trade
Control of Population Growth

- Population is a key determinant of a country’s labor force. Large populations tend to produce greater total GDP, however.
  - Higher GDP doesn’t mean “higher well-being”, GDP per person is more accurate
  - High population growth rates than GDP growth rates reduce GDP per person.
Research and Development

- The advancement of technological knowledge has led to higher standards of living. Technological advancement comes from private firms and public agencies.
- Government’s role is to encourage the research and development of new technologies through research grants, tax breaks, and the patent system.
Summary:

- Living standards, (measured by real GDP per capita), vary substantially from country to country.
- Small differences in growth rates can have large effects when compounded for many years.
- Growth rates depend on Productivity (the quantity of goods and services that a worker can produce for each hour of work).
- Productivity depends on the Factors of Production available, as well as their quality.
- Government policies can help or hinder economic growth by impacting the factors of production and their productivity.