A country’s standard of living depends on its ability to produce goods and services.
Within a country there are large changes in the standard of living over time.
In the United States over the past century, average income as measured by real GDP per person has grown by about 2 percent per year.

*Productivity* refers to the amount of goods and services produced for each hour of a worker’s time.
A nation’s standard of living is determined by the productivity of its workers.
A fishing tale-Throw Net fishing, how productive is it? Bring the throw net!
Economic Growth Around the World

- Living standards, as measured by real GDP per person, vary significantly among nations.
- The poorest countries have average levels of income that have not been seen in the United States for many decades.

Table 1 The Variety of Growth Experiences

<table>
<thead>
<tr>
<th>Country</th>
<th>Period</th>
<th>Real GDP per Person at Beginning of Period (in 2000 dollars)</th>
<th>Real GDP per Person at End of Period (in 2000 dollars)</th>
<th>Growth Rate (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1990-2000</td>
<td>$1,274</td>
<td>$26,469</td>
<td>2.81%</td>
</tr>
<tr>
<td>Brazil</td>
<td>1960-2000</td>
<td>2,530</td>
<td>7,335</td>
<td>4.29%</td>
</tr>
<tr>
<td>Mexico</td>
<td>1960-2000</td>
<td>968</td>
<td>8,810</td>
<td>2.23%</td>
</tr>
<tr>
<td>Canada</td>
<td>1870-2000</td>
<td>1,984</td>
<td>21,515</td>
<td>2.64%</td>
</tr>
<tr>
<td>Germany</td>
<td>1870-2000</td>
<td>1,395</td>
<td>21,515</td>
<td>2.63%</td>
</tr>
<tr>
<td>China</td>
<td>1960-2000</td>
<td>936</td>
<td>9,942</td>
<td>7.90%</td>
</tr>
<tr>
<td>Argentina</td>
<td>1990-2000</td>
<td>1,515</td>
<td>12,099</td>
<td>8.96%</td>
</tr>
<tr>
<td>United States</td>
<td>1970-2000</td>
<td>3,547</td>
<td>34,266</td>
<td>6.71%</td>
</tr>
<tr>
<td>India</td>
<td>1960-2000</td>
<td>566</td>
<td>2,300</td>
<td>4.43%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1960-2000</td>
<td>153</td>
<td>2,849</td>
<td>2.35%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1870-2000</td>
<td>4,117</td>
<td>23,550</td>
<td>3.35%</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1990-2000</td>
<td>676</td>
<td>1,960</td>
<td>1.16%</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1990-2000</td>
<td>520</td>
<td>1,850</td>
<td>1.16%</td>
</tr>
</tbody>
</table>

*Real GDP is measured in 2000 dollars.

Compounding and the Rule of 70

- Annual growth rates that seem small become large when compounded for many years.
- Compounding refers to the accumulation of a growth rate over a period of time.
Compounding and the Rule of 70

According to the rule of 70, if some variable grows at a rate of x percent per year, then that variable doubles in approximately $70/x$ years.

An Example of the Rule of 70

- $5,000$ invested at $7$ percent interest per year, will double in size in $10$ years

$$70/7 = 10$$

How Productivity is Determined

- The inputs used to produce goods and services are called the factors of production.
- The factors of production directly determine productivity.
Government Policies That Raise Productivity and Living Standards

- Encourage saving and investment.
- Encourage investment from abroad
- Encourage education and training.
- Establish secure property rights and maintain political stability.

Government Policies That Raise Productivity and Living Standards

- Promote free trade.
- Control population growth.
- Promote research and development.

The Importance of Saving and Investment

There is definitely a link between investment today and growth in the future.
The Importance of Saving and Investment

- As the stock of capital rises, the extra output produced from an additional unit of capital falls; this property is called diminishing returns.
- Because of diminishing returns, an increase in the saving rate leads to higher growth only for a while.
- Thus small countries can grow faster than big countries.

The Importance of Saving and Investment

- The catch-up effect refers to the condition that, other things being equal, it is easier for a country to grow fast if it starts out relatively poor.
- Once the country becomes richer, diminishing returns sets in.
Investment from Abroad

Investment from abroad takes several forms:

- **Foreign Direct Investment**
  - Capital investment owned and operated by a foreign entity.

- **Foreign Portfolio Investment**
  - Investments financed with foreign money but operated by domestic residents.

Education

- For a country’s long-run growth, education is at least as important as investment in physical capital.
  - **Human Capital**
  - In the United States, each year of schooling raises a person’s wage on average by about 10 percent.
  - Thus, one way the government can enhance the standard of living is to provide schools.

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.
  - Napster anyone?
Free Trade

◆ Trade is, in some ways, a type of technology.
◆ A country that eliminates trade restrictions will experience the same kind of economic growth that would occur after a major technological advance.
◆ Remember globalization?

Control of Population Growth

◆ Population is a key determinant of a country’s labor force.
  ◆ Large populations tend to produce greater total GDP.
  ◆ However, GDP per person is a better measure of economic well-being, and high population growth reduces GDP per person.
  ◆ Thomas Malthus theory of population growth and economic well-being.

Research and Development, Epilogue

◆ The advance of technological knowledge has led to higher standards of living.
  ◆ Most technological advance comes from private research by firms and individual inventors.
  ◆ Government can encourage the development of new technologies through research grants, tax breaks, and the patent system.
  ◆ There are pros and cons to productivity gains though, show Solman DVD video on productivity.
This is a tale of the self-cleaning bathroom. Think about what productivity means in terms of goods and services, jobs and wages. Journal Question-Can you think other examples where there was a major innovation that has impacted jobs?