Class 23: Economic Growth and Productivity

1. The remarkable economic growth in the industrialized countries, as measured by real GDP per person, can be attributed to continuing increases in average labor productivity.
   a. Cross time comparisons show remarkable rises in living standards for developed economies.
   b. Cross country comparisons show remarkable differences in living standards across nations.

2. Labor Productivity plays a crucial role in growth and increases in the standard of living
   a. Real GDP per person can be expressed as the product of two terms: average labor productivity and the share of the population that is working.
   b. In recent decades, growth in the US is in part attributable to a large increase in the percentage of the population that is employed.
   c. In the long run, increases in output per person arise primarily from increases in average labor productivity.
   d. The Determinants of Average Labor Productivity include growth in human capital, physical capital, natural resources, and technology. They also include the climate for entrepreneurship and the political and legal infrastructure.

3. The Costs of Economic Growth include the cost of creating new capital. Of course, higher growth should be pursued only if the benefits outweigh the costs.
   a. Resources used to produce capital could have been used for production.
   b. The growth process often entails externalities.
   c. Some argue that rising inequality is an important cost of growth.

Exercises
1. International Comparisons in Economic Growth.

The first display is a table that shows changes in real GDP per capita that have occurred in developed economies.

Real GDP per Person In Selected Countries, 1870-2003 (in 2000 U.S. Dollars)

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>5,512</td>
<td>7,236</td>
<td>9,369</td>
<td>17,670</td>
<td>28,312</td>
<td>1.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Canada</td>
<td>2,328</td>
<td>5,509</td>
<td>8,906</td>
<td>19,882</td>
<td>29,201</td>
<td>1.9</td>
<td>2.3</td>
</tr>
<tr>
<td>France</td>
<td>2,291</td>
<td>4,484</td>
<td>6,164</td>
<td>18,138</td>
<td>26,176</td>
<td>1.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Germany</td>
<td>1,152</td>
<td>2,218</td>
<td>4,785</td>
<td>17,222</td>
<td>25,271</td>
<td>2.3</td>
<td>3.2</td>
</tr>
<tr>
<td>Italy</td>
<td>2,852</td>
<td>4,018</td>
<td>5,128</td>
<td>16,912</td>
<td>25,458</td>
<td>1.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Japan</td>
<td>931</td>
<td>1,763</td>
<td>2,141</td>
<td>16,329</td>
<td>26,636</td>
<td>2.6</td>
<td>4.9</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3,892</td>
<td>5,976</td>
<td>8,709</td>
<td>16,557</td>
<td>26,852</td>
<td>1.5</td>
<td>2.1</td>
</tr>
<tr>
<td>United States</td>
<td>2,887</td>
<td>6,852</td>
<td>12,110</td>
<td>22,835</td>
<td>35,488</td>
<td>1.9</td>
<td>2.0</td>
</tr>
</tbody>
</table>
The second display is from the CIA Fact Book. It shows how growth varied across nations in 2010. What themes are revealed?

2. **Small changes in the average annual growth rate matter a lot in the long run.**

   On average between 1870 and 2003, US Real GDP per capita grew at an annual rate of 2 percent (see the table above). The following graph shows the sensitivity of Real GDP per capita to changes in the average growth rate.

3. **What accounts for differences in growth rates across nations?**
The first display is a scatter plot that compares real GDP in different nations with the capital per worker in those same nations. The data is from the Penn World Tables.

The second display is a chart that compares GDP per capita with education levels in various nations. What themes do these data support?
4. In 1989, the poorest one fifth of American families earned $16,003 or less, the richest one fifth of families earned $59,551 or more, and the median family (50th percentile) earned $34,213. The shape of the US income distribution has not changed greatly since 1949. See [http://www.econlib.org/library/enc/DistributionofIncome.html](http://www.econlib.org/library/enc/DistributionofIncome.html) for the details. Some argue that the above degree of income inequality is beneficial to rich and poor alike because it creates incentives that raise the growth rate of GDP per capital. If you were a poor person, in which sort of nation would you prefer to live?

a. A nation where real GDP per capita grew at the rate of 2.0 percent per year and the income distribution was that given above.

b. A nation where real GDP per capita grew at a rate of 1.0 percent per year and the income distribution was far more equal (for example, the ratio of the break points for the first and fifth quintiles was 0.6 rather than .27 as it is in the US)

5. The following diagram provides shows labor productivity between 1990 and the present.

![Output per Hour in Non-Farm Business Sector](image)

a. What, approximately, was the average annual growth in labor productivity between 1990 and the present?

b. What, approximately, was the average annual rate of productivity growth between 1996 and 2004?

c. What might account for the higher rate of productivity growth between 1996 and 2004?

b. How high would output per hour be in 2011 if the higher rate of productivity growth could have been sustained after 2004?