

Econ 1115: Principles of Macroeconomics

Lecture 8: GDP, Living Standards and Growth

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Outline

- 1 Review
 - Real vs Nominal
- 2 Standard of Living and GDP

Gross Domestic Product

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- Increase in GDP is **Economic Growth!**

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- Final goods vs intermediate goods

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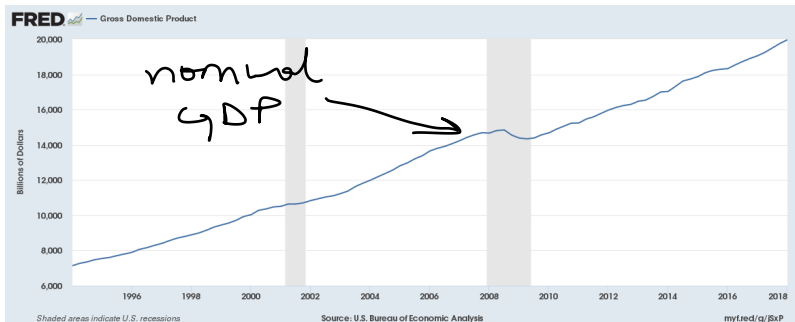
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- In a year's time, but also could be in a quarter.

US GDP in the last few decades

real ←————→ nominal



Three ways to measure GDP

1 Output

Three ways to measure GDP

- 1 Output / Production
- 2 Income

Three ways to measure GDP

1 Output

2 Income

3 Expenditure / Spending

Components of GDP

The components of GDP are

- Consumption (C)
- Investment (I)
- Government Spending (G)
- Net Exports = Exports - Imports (X-M)

These add up to GDP.

$$\text{GDP} = C + I + G + (X-M)$$

Consumption

Total spending by households.

It includes durables, don-durables and services purchased by households. Such as haircuts (services), ovens (durables), and kiwis (non-durables).

The following are other examples of consumption

- When Natasha pays rent on her apartment.
- When Evan buys an iPad.

Investment

Business spending

- Investment is the total spending to create more capital goods in the economy. Includes purchases of durables, non-durables and services by businesses.
- Includes business spending on factories, equipment etc.
- Also includes investment into building new houses.
- The storage of unsold goods in warehouse (inventory) is also considered investment.

Government Spending

All spending on goods and services by every level of government.
(Federal, State and Local).

Does not include transfer payments.

Net Exports

Net Exports = Exports - Imports

Exports:

Imports:

Example problem

If I am a strawberry producer in the US, and I sold my strawberries for \$100, then would that increase US GDP? If it did, what component of GDP is it?

- Ava purchases a \$200 Swiss watch.

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- I receive \$200 unemployment check from the state government.

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- Kelsey buys a new plot of land from the government for \$100,000.

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- The earlier TV which might have sold for \$750 in 2015 will be valued at \$750 if we are calculating real GDP at 2015 prices.
- 2015 is our base year.

| P_{Food} | P_{Coke} | Food | Coke | GDP |
|-------------------|-------------------|------|------|-------------------------|
| 10 | 100 | 10 | 5 | $100 + 500$ $= 600$ |
| 12 | 150 | 10 | 6 | $120 + 900$ $= 1020$ |

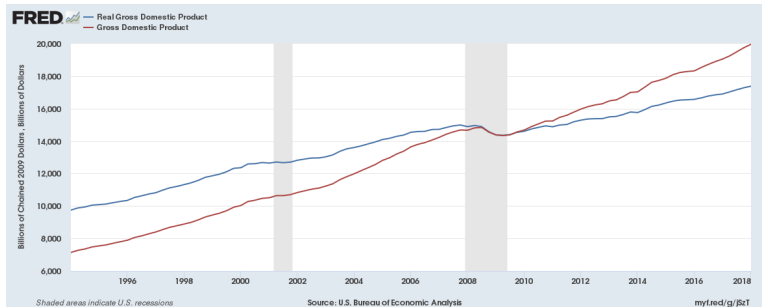
$$= 700$$

$$10 \times 10$$

$$+$$

$$100 \times 6$$

Real vs Nominal GDP



GDP Deflator

$$\text{GDP deflator} = \frac{\text{price of basket in year } t}{\text{price of basket in base year}}$$

GDP deflator: A measure of the overall level of prices.

$$\text{GDP Deflator} = 100 \times \text{Nominal GDP} / \text{Real GDP}$$

Measures the current level of prices relative to the level of prices in the base year.

Can be used to calculate the inflation rate (the change in price levels from one year to the next).

GDP as a measure of well-being

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Thus,

Production = Income = Expenditure

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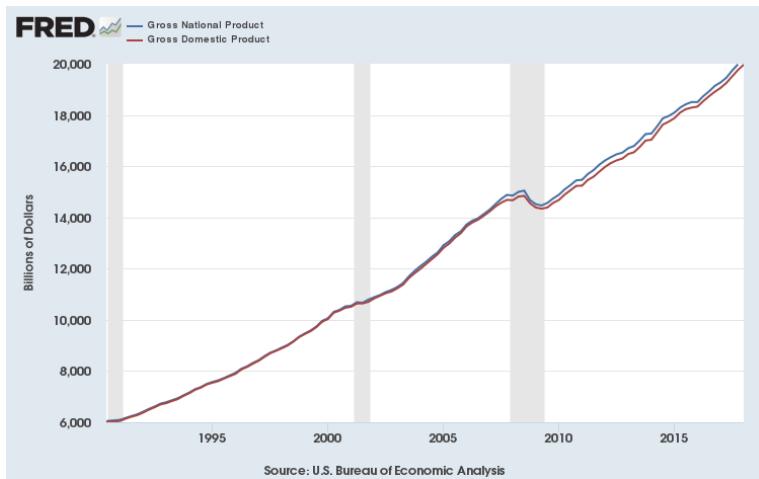
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- The farming of oranges in Puerto Rico by a worker from Guatemala
- The sale of a EA Madden 2019 video game in the UK that was developed in Los Angeles.
- The purchase of a Airbus 220 airplane by Delta Airlines for \$80 million where 40% of the inputs are imported.

Components of GDP

GDP vs. GNP

Gross National Product is a measure of the total value of all final goods and services produced by the citizens of a country, irrespective of location.

Gross National Product



U.S. GDP and U.S. GNP are related as follows:

- a. $GNP = GDP + \text{Value of exports} - \text{Value of imports}$.
- b. $GNP = GDP - \text{Value of exports} + \text{Value of imports}$.
- c. $GNP = GDP + \text{Income earned by foreigners in the U.S.} - \text{Income earned by U.S. citizens abroad}$.
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Answer: d

Sheri, a U.S. citizen, works only in Germany. The value she adds to production in Germany is included

- a. in both German GDP and U.S. GDP.
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Answer: b

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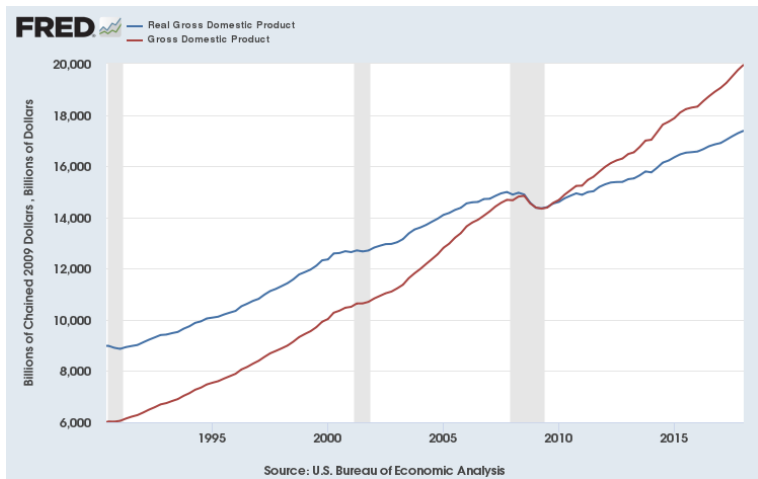
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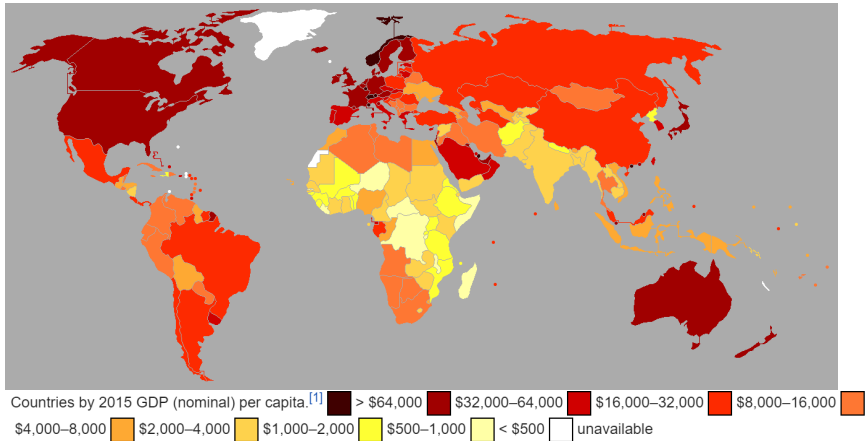
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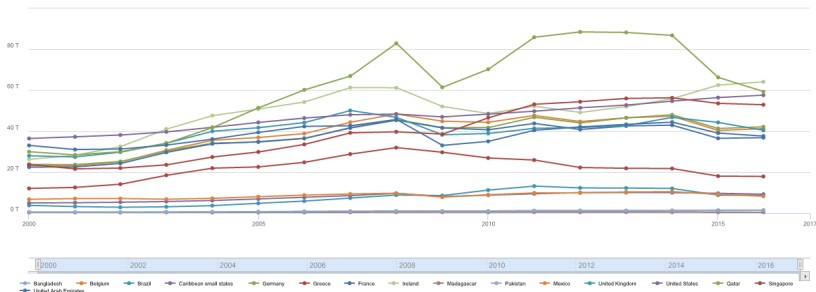
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- We thus divide GDP by population to get GDP per capita
- This essentially gives us the income of an "average" citizen in that country.



Source: Wikipedia



Series : GDP per capita (current US\$)
Source: World Development Indicators
Created on: 05/20/2018

You can make your own charts here at the World Bank website

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When making comparisons across countries, one must also take into account the cost of living.

Explain how you think they affect GDP and well-being over time (Focus on where they diverge).

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- The enormous success of Netflix, Spotify and other streaming services.
- Illegal streaming websites that allow you to watch TV shows, or live sports for free (with some advertisement)
- In the 80s, 21-inch CRT televisions were big machines allowing you to watch up to ten channels at the most and were of relatively poor quality. They also cost \$200. These days you can get a cheap 32-inch HDTV for about the same price.

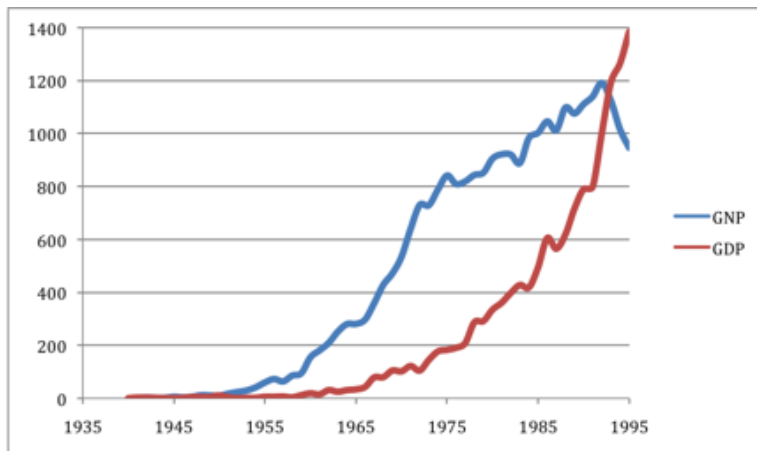


Figure: Ireland's GDP vs GNP

GDP is not a perfect measure of well-being; for example,

- a. GDP excludes the value of volunteer work.
- b. GDP does not address the distribution of income.
- c. GDP does not address environmental quality.
- d. All of the above are correct.

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Answer: d

| Rank | Country | GDP per capita |
|------|---------------|----------------|
| 1 | Liechtenstein | \$139,100 |
| 2 | Qatar | \$124,900 |
| 3 | Monaco | \$115,700 |
| 4 | Macau | \$114,400 |
| 5 | Luxembourg | \$109,100 |
| 7 | Singapore | \$90,500 |
| 11 | Ireland | \$72,600 |
| 14 | U.A.E. | \$68,200 |
| 20 | United States | \$59,500 |
| 26 | Sweden | \$51,300 |
| 27 | Germany | \$50,200 |
| 28 | Australia | \$49,900 |
| 34 | Canada | \$48,100 |

Table: GDP per capita for select countries, CIA World Factbook

| Rank | Corporation | Sales (millions) |
|------|--------------------|------------------|
| 1 | Walmart | \$485,873 |
| 2 | State Grid | \$315,199 |
| 3 | Sinopec Group | \$267,518 |
| 4 | China National | \$262,573 |
| 5 | Toyota Motor | \$254,694 |
| 6 | Volkswagen Group | \$240,264 |
| 7 | Royal Dutch Shell | \$240,033 |
| 8 | Berkshire Hathaway | \$223,604 |
| 9 | Apple | \$215,639 |
| 10 | Exxon Mobil | \$205,004 |

Table: Sales revenues for corporations

| Rank | Country | GDP (millions) |
|------|-------------|----------------|
| 20 | Switzerland | \$702,736 |
| 21 | Argentina | \$631,621 |
| 22 | Sweden | \$578,742 |
| 23 | Iran | \$570,039 |
| 24 | Nigeria | \$568,496 |
| 25 | Taiwan | \$566,757 |

Table: GDP of a few other countries

Suppose that over the last twenty-five years a country's nominal GDP grew to three times its former size. In the meantime, population grew by 40 percent and prices rose by 100 percent. What happened to real GDP per person?

- a. It more than doubled.
- b. It increased, but it less than doubled.
- c. It was unchanged.
- d. It decreased.

Answer: b

One can argue that the average American today is richer than the richest American 100 years ago, given that 100 years ago,

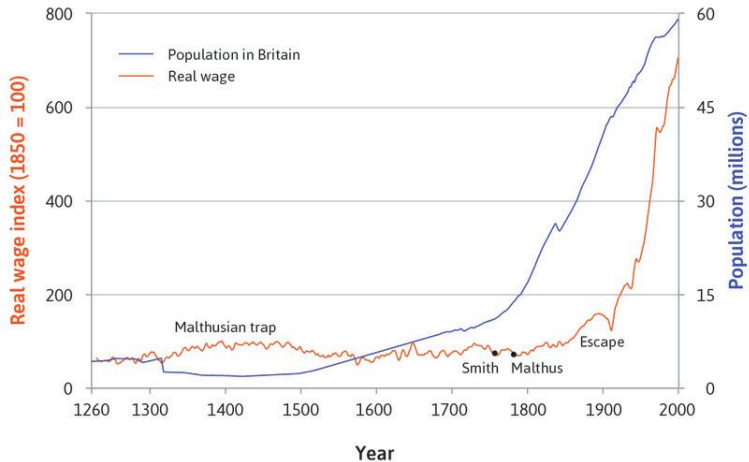
- a. peoples nominal incomes were, on average, much lower than they are today.
- b. personal fortunes were not accurately measured.
- c. many of the goods and services that we now take for granted were not available.
- d. international trade had not yet begun to flourish.

Answer: c

Economic Growth

Economic growth is an increase in the real GDP per capita.

- Adam Smith
- Malthus
- Keynes



Source: Core-econ

Growth Accounting

Keynes and Kuznets are two economists from the Great Depression era who redefined macroeconomics and GDP statistics.

Before them, no one really tracked macroeconomic statistics.

Growth Accounting

$$Y = A.F(K,N)$$

$$Y = AK^\alpha N^\beta$$

This is called the production function

$$\text{GDP Growth Rate} = \delta Y/Y$$

In fact for any variable x , growth rate of $x = \delta x/x$

Growth accounting equation:

$$\delta Y/Y = \delta A/A + \alpha \times \delta K/K + \beta \times \delta N/N$$

Thus output can grow if

- Growth in factor productivity or **technological change**
- Growth in capital stock
- Growth in labor force, participation rates, hours worked

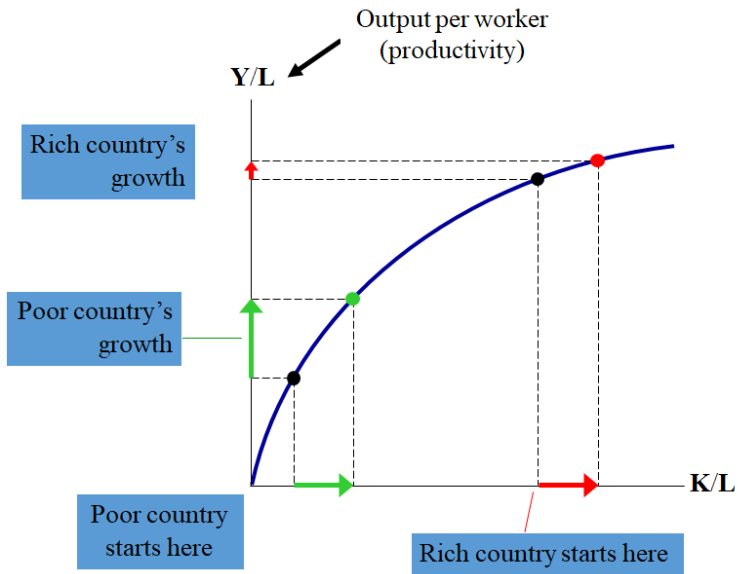
Convergence

What is convergence?

Growth theories suggest that the incomes for different countries will converge over time.

Absolute convergence vs. Conditional convergence

Thus growth rate should be inversely related to income levels.



| Country | Period | Real GDP per Person | | Growth Rate (per year) |
|----------------|-----------|--|----------------------------------|---------------------------|
| | | At Beginning of Period ^a | At End of Period ^a | |
| Brazil | 1900–2014 | \$ 828 | \$15,590 | 2.61% |
| Japan | 1890–2014 | 1,600 | 37,920 | 2.59 |
| China | 1900–2014 | 762 | 13,170 | 2.53 |
| Mexico | 1900–2014 | 1,233 | 16,640 | 2.31 |
| Germany | 1870–2014 | 2,324 | 46,850 | 2.11 |
| Indonesia | 1900–2014 | 948 | 10,190 | 2.10 |
| Canada | 1870–2014 | 2,527 | 43,360 | 1.99 |
| India | 1900–2014 | 718 | 5,630 | 1.82 |
| United States | 1870–2014 | 4,264 | 55,860 | 1.80 |
| Pakistan | 1900–2014 | 785 | 5,090 | 1.65 |
| Argentina | 1900–2014 | 2,440 | 12,510 | 1.44 |
| Bangladesh | 1900–2014 | 663 | 3,330 | 1.43 |
| United Kingdom | 1870–2014 | 5,117 | 39,040 | 1.42 |

^aReal GDP is measured in 2014 dollars.

Source: Mankiw, Cengage

| | US | Euro | China |
|-------------------------|-----|------|-------|
| Consumption (C) | 68% | 55% | 37% |
| Government spending (G) | 15% | 21% | 14% |
| Investment (I) | 19% | 19% | 47% |
| Exports (X) | 14% | 44% | 26% |
| Imports (M) | 16% | 41% | 24% |

Table: Decomposition of the GDP, Source: core-econ

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- Why do some countries grow quickly? There isn't just one answer.
- Resources vs Market reforms vs Institutions

Countries that have lower levels of real GDP per person than the United States

- a. tend to have growth rates that are higher than that of the United States.
- b. tend to have growth rates that are about the same as that of the United States.
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- d. in some cases have growth rates that are higher than that of the United States and in other cases lower than that of the United States.

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Answer: d

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- A very strong hurricane in the Caribbean significantly damages a million homes. The central government spends \$100 billion dollars repairing the houses this year. Last year, the government spent \$90 billion building new houses.