

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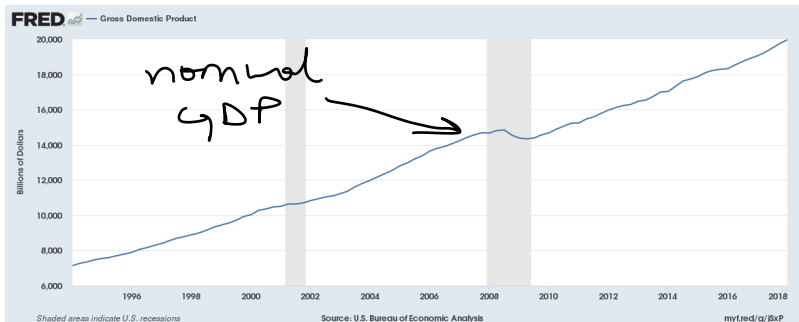
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- In a year's time, but also could be in a quarter.

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

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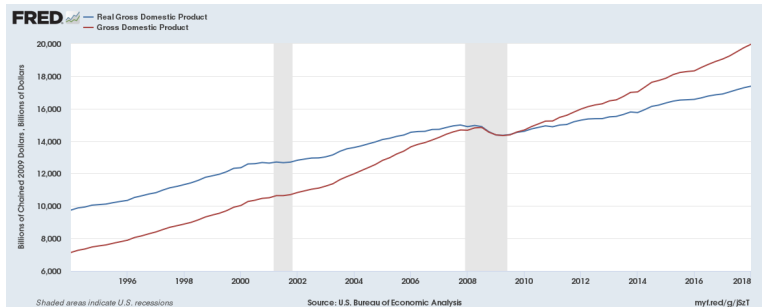
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GDP Deflator

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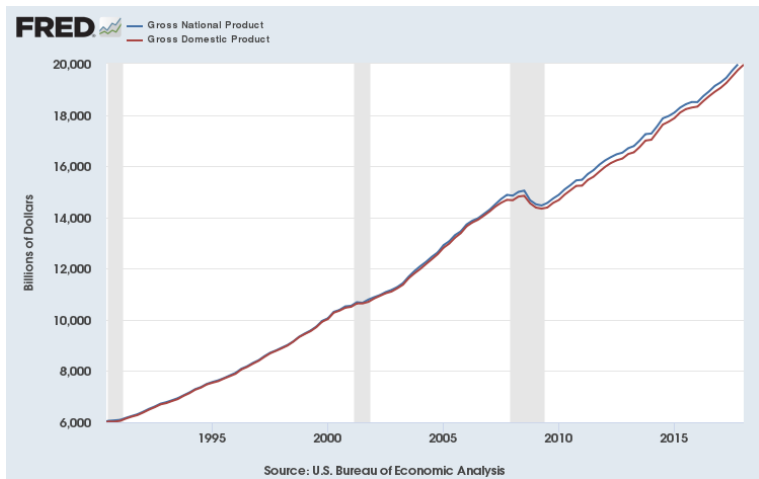
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- The sale of a EA Madden 2019 video game in the UK that was developed in Los Angeles.
- The purchase of a Airbus 220 airplane by Delta Airlines for \$80 million where 40% of the inputs are imported.

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

Detroit Cranberry Company sold \$10 million worth of cranberries it produced. In producing cranberries, it purchased \$1 million dollars worth of supplies from foreign countries and paid workers who reside in Canada but commute to the U.S. \$1 million. How much did these transactions add to U.S. GDP?

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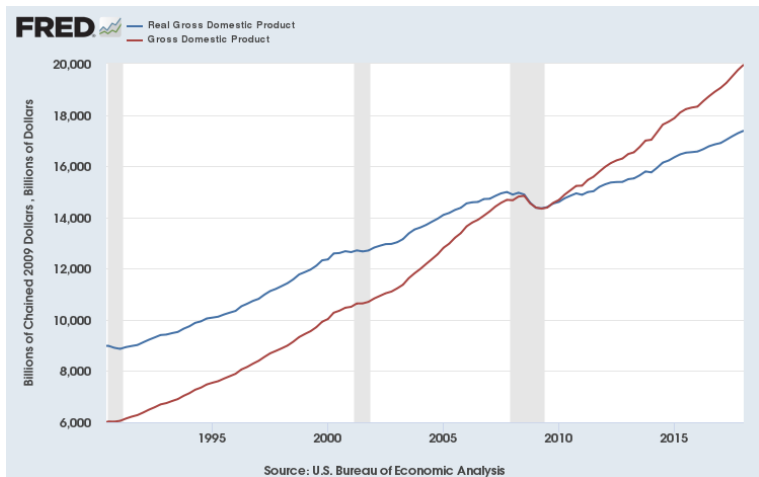
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This is our basket.

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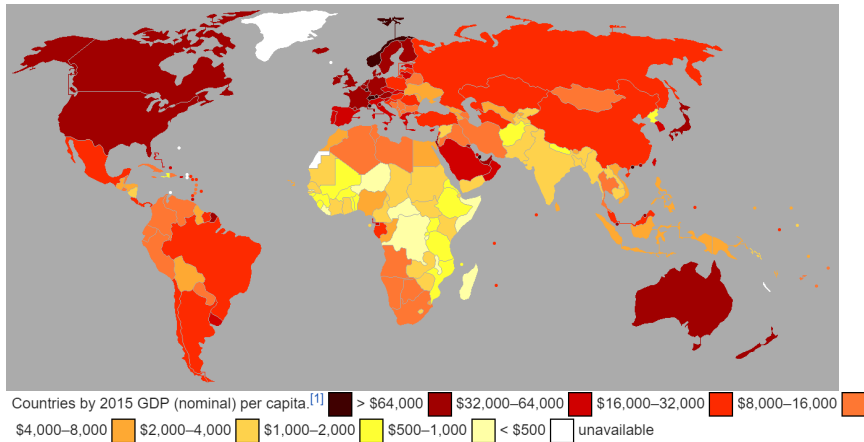
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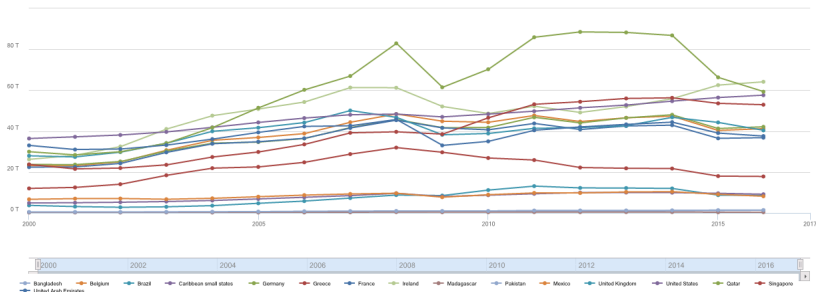
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- We thus divide GDP by population to get GDP per capita
- This essentially gives us the income of an "average" citizen in that country.



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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- 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.

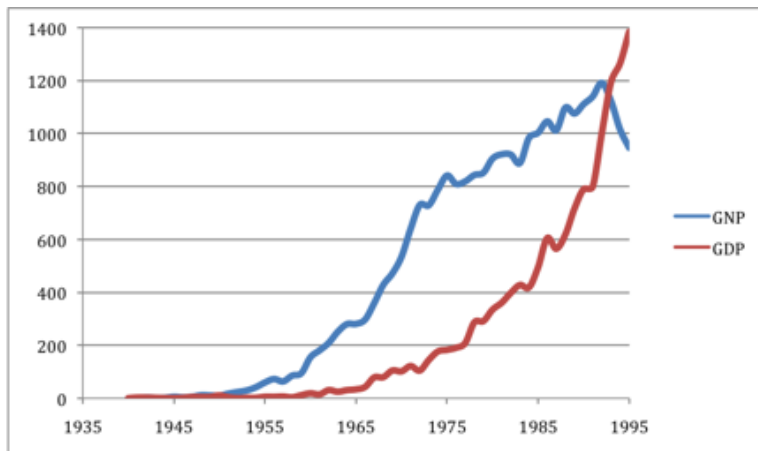


Figure: Ireland's GDP vs GNP

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,

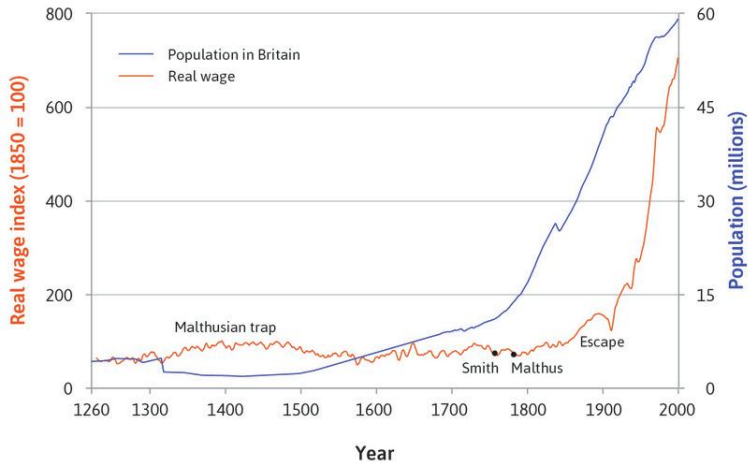
- a. peoples nominal incomes were, on average, much lower than they are today.
- b. personal fortunes were not accurately measured.
- c. many of the goods and services that we now take for granted were not available.
- d. international trade had not yet begun to flourish.

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

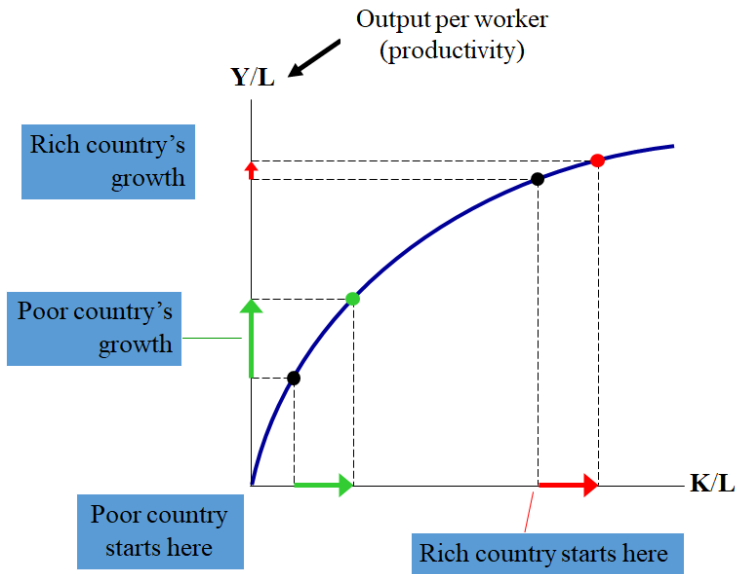
Convergence

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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- 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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