

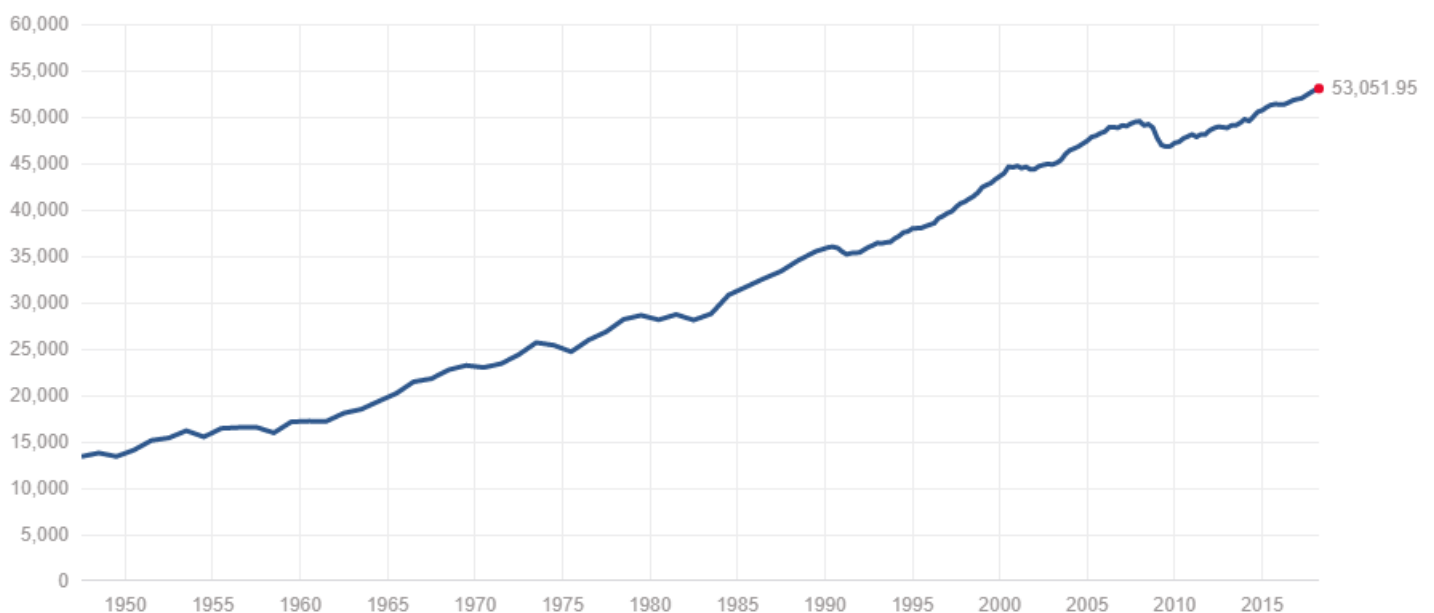
Chapter 8: Measuring a Nation's Income

Instructions: These are the notes for Chapter 8. Make sure you review the material presented here and read the corresponding chapters on the textbook: **Chapter 15 on Mankiw.**

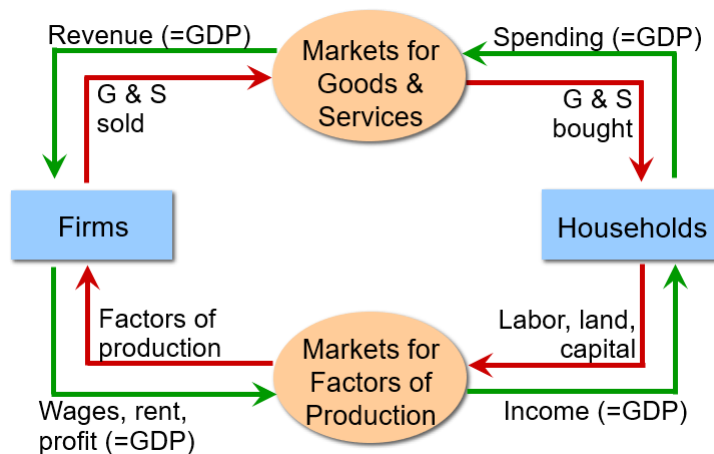
Gross Domestic Product

- How to measure a nation's income: Gross Domestic Product (GDP).
- GDP is the total income for everyone in the economy.
 - GDP also is the total expenditure on the economy's output of goods and services.
 - Income equals expenditure for any economy because every dollar a buyer spends is a dollar of income for a seller.
- What GDP is used for?
 - Explore short-run recessions or expansions in the economy
 - Explore long-run economic growth
 - Show and compare standards of living
- GDP per-capita in the U.S. is \$53,000. This is \$42,000 Canada; \$8,000 in China; \$500 in North Korea.

US Real GDP Per Capita



Circular Flow Diagram and the Gross Domestic Product



Gross Domestic Product definition

- GDP also is the *market value* of all final goods and services produced within a country in a given period of time.
 - Market value is a monetary measure, i.e. price in U.S. dollars to represent its value.

Gross Domestic Product definition (cont).

- GDP also is the market value of all *final goods and services* produced within a country in a given period of time.
 - Final goods are goods that are sold to the "final" user. On the contrary, intermediate goods are those that are used in production of final goods. GDP only includes the final goods.

Gross Domestic Product definition (cont).

- GDP also is the market value of all final *goods and services* produced within a country in a given period of time.
 - Goods and services include tangible goods such as DVDs, mountain bikes, beer; and intangible services such as dry cleaning, concerts, cell phone service.

Gross Domestic Product definition (cont).

- GDP also is the market value of all final goods and services produced within a country *in a given period of time*.
 - GDP includes only the currently produced goods, not goods produced in the past.
 - Second hand sales do not contribute to GDP, because they are not in the current production and are included in GDP of the year that they were sold in.

Gross Domestic Product definition (cont).

- GDP also is the market value of all final goods and services *produced* within a country in a given period of time.
 - The sales of stock and bonds are also excluded from GDP as they simply transfer pieces of paper that represent company ownership or loans.
 - Transfer payments such as pension or unemployment insurance are also excluded, because they simply transfer money from tax payers to other people.

Gross Domestic Product definition (cont).

- GDP also is the market value of all final goods and services produced *within a country* in a given period of time.
 - GDP measures the value of production that occurs within a country's borders, whether done by its own citizens or by foreigners located there.
 - Production from factories in China (owned by U.S. citizens) is not included. However, production from BMW factories in South Carolina is included.

Gross Domestic Product definition (cont).

- GDP also is the market value of all final goods and services produced within a country in a given *period of time*.
 - Time-span used by the U.S. Department of Commerce, Bureau of Economic Analysis is usually a year or a quarter (3 months).

Question

- A farmer produces apples. He sells \$25,000 worth of apples at the farmer's market to individuals; \$50,000 worth of apples to a company that uses them to produce apple cider; \$75,000 worth of apples to a grocery store that will sell them to households. How much of the farmer's sales will be included in GDP?
 - a. \$25,000
 - b. \$100,000
 - c. \$125,000
 - d. \$150,000

Question

- Which of the following is included in GDP?
 - a. Used cars purchased by consumers on Craigslist.
 - b. Social Security payments
 - c. Internet service for a home.
 - d. Bread for a restaurant.

Components of GDP

- GDP can be expressed as

$$Y = C + I + G + NX \quad (1)$$

where Y is GDP; C is Consumption; I is Investment; G is Government spending; NX is Net exports.

- Note that this shows income = expenditure.
- **Consumption (C)** is the total spending by households on goods and services (final goods).
 - Includes tangible goods and intangible goods.
- **Investment (I)** is total private spending on goods that will be used in the future to produce more goods.
 - Includes spending on capital equipment (machines, tools..), structures (factories, office buildings..), and inventories (goods purchased but not yet sold, such as intermediate goods held in stock).
 - Note that in economics, investment is not the purchase of financial assets like stocks and bonds (recall stocks and bonds are not in GDP since they are simply transfers).

Question

- James owns two houses. He lives in one of them and rents his other house to the Wilson family for \$10,000 per year. If he were to rent the house that he lives in, he could earn \$12,000 per year in rent. How much do the housing services provided by the two houses contribute to GDP?
 - a. \$0
 - b. \$10,000
 - c. \$12,000
 - d. \$22,000

Question

- Rocket Energy Drink Company buys sugar to produce energy drinks. At the end of a quarter, both its inventory of sugar and its inventory of energy drinks has increased. Investment for the quarter will include
 - a. both the increased inventory of sugar and the increased inventory of energy drinks.
 - b. the increased inventory of sugar, but not the increased inventory of energy drinks.
 - c. the increased inventory of energy drinks, but not the increased inventory of sugar.
 - d. neither the increased inventory of sugar nor the increased inventory of energy drinks.

Components of GDP (cont.)

- **Government Spending (G)** is all spending on the goods & services purchased by the government at the federal, state, and local levels.
 - Includes government employee wages, roads, public education, weapons..
 - Excludes transfer payments –such as social security or unemployment insurance benefits, since these are just transfers between individuals.
- **Net Exports, $NX = Exports - Imports$**
 - Exports represent foreign spending on the economy's goods & services.
 - Imports are any C, I, and G that are spent on goods & services produced abroad.

Components of GDP: Adding it up

$$Y = C + I + G + NX$$

	<i>billions</i>	<i>% of GDP</i>	<i>per capita</i>
Y	\$16,912	100.0	\$53,350
C	11,537	68.2	36,394
I	2,738	16.2	8,637
G	3,137	18.5	9,895
NX	–500	–2.9	–1,577

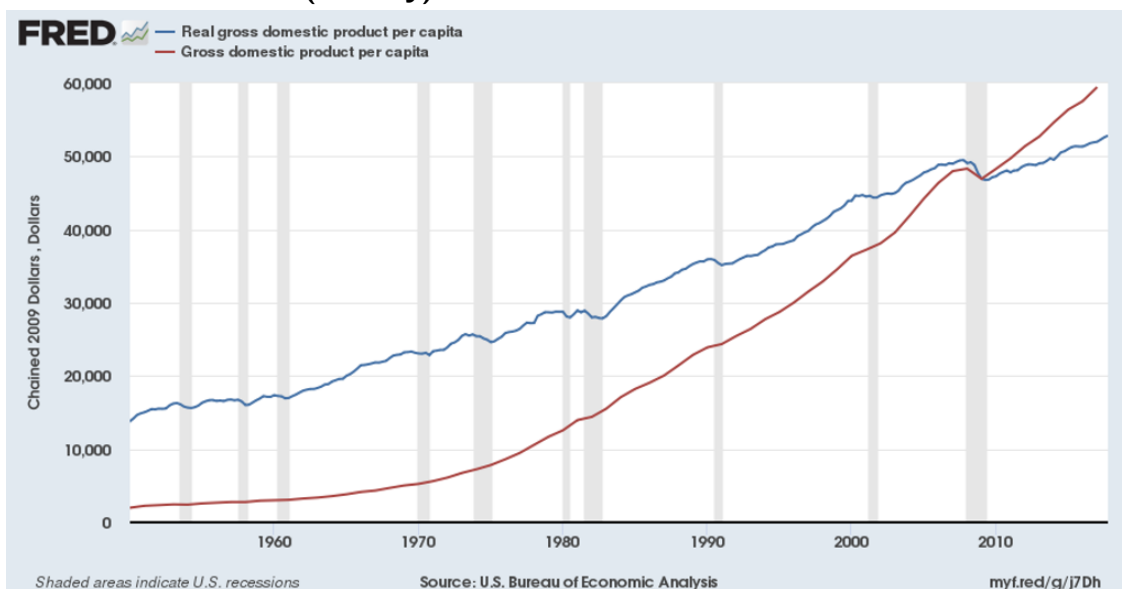
Question

- In each of the following cases, determine how much GDP and each of its components is affected (if at all).
 1. Debbie spends \$300 to buy her husband dinner at the finest restaurant in Columbia.
 2. Sarah spends \$1200 on a new laptop to use in her publishing business. The laptop was built in China.
 3. Jane spends \$800 on a computer to use in her editing business. She got the last year's model on sale for a great price from BestBuy.
 4. General Motors builds \$500 million worth of cars, but consumers only buy \$470 million of them.

Real vs. Nominal GDP?

- **Inflation** is the rise in the general level of prices.
 - Reduces the purchasing power of money.
 - Can distort GDP calculations so we need to use real GDP!
- **Nominal GDP** uses the current prices of goods (or nominal prices, dollar price of that year). This is not corrected for inflation!
- Nominal GDP grows for 2 reasons:
 - Prices are rising.
 - The economy is producing more goods.
- **Real GDP** uses the prices based on a given year, and is corrected for inflation.
 - E.g. Real GDP in 2018 based on 2005 prices.

Real vs. Nominal GDP (visually)



Calculating Real and Nominal GDP

	Pizza		Latte	
<i>year</i>	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
2011	\$10	400	\$2.00	1000
2012	\$11	500	\$2.50	1100
2013	\$12	600	\$3.00	1200

- How to calculate the nominal GDP for each year?
 - **2011:** $\$10 \times 400 + \$2 \times 1000 = \$6,000$
 - **2012:** $\$11 \times 500 + \$2.5 \times 1100 = \$8,250$
 - **2013:** $\$12 \times 600 + \$3 \times 1200 = \$10,800$
- How to calculate the real GDP for each year using 2011 as the base year?
 - **2011:** $\$10 \times 400 + \$2 \times 1000 = \$6,000$
 - **2012:** $\$10 \times 500 + \$2 \times 1100 = \$7,200$
 - **2013:** $\$10 \times 600 + \$2 \times 1200 = \$8,400$

Growth in GDP

<i>year</i>	<i>Nominal GDP</i>		<i>Real GDP</i>	
2011	\$6000	} 37.5%	\$6000	} 20.0%
2012	\$8250		\$7200	
2013	\$10,800		\$8400	

- We can calculate the growth in GDP via

$$GrowthRate_{2012-2011} = \frac{GDP_{2012} - GDP_{2011}}{GDP_{2011}} \times 100 \quad (2)$$

GDP Deflator

- **GDP deflator** is a measure of the overall level of prices.

$$GDP Deflator = \frac{Nominal GDP}{Real GDP} \times 100 \quad (3)$$

- It gets its name because it "deflates" (i.e., take the inflation out of) nominal GDP to get real GDP.
- This also means we can calculate the inflation rate using the deflator.

GDP Deflator

<i>year</i>	<i>Nominal GDP</i>	<i>Real GDP</i>	<i>GDP Deflator</i>
2011	\$6000	\$6000	100.0
2012	\$8250	\$7200	114.6
2013	\$10,800	\$8400	128.6
2011:	100 x (6000/6000) =		100.0
2012:	100 x (8250/7200) =		114.6
2013:	100 x (10,800/8400) =		128.6

$$InflationRate_{2012-2011} = \frac{Deflator_{2012} - Deflator_{2011}}{Deflator_{2011}} \times 100 \quad (4)$$

GDP and Welfare

- Real GDP increases due to
 - An increase in population (labor)
 - An increase in productivity
- Real GDP per capita is the main indicator of the average person's standard of living.
- But GDP is not a perfect measure of well-being.

GDP and Welfare

"... does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our courage, nor our wisdom, nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile, and it can tell us everything about America except why we are proud that we are Americans."

Senator Robert Kennedy, 1968

GDP and Welfare

- GDP does not take into account
 - The quality of the environment
 - Leisure time

- Non-market activity, such as the child care a parent provides at home, volunteer work.
 - Underground Economy: legal activities: baby sitting, etc.; illegal activities: drug dealing, etc.
 - Income distribution
- Then why care about GDP?
 - Many indicators of the quality of life are positively correlated with GDP.

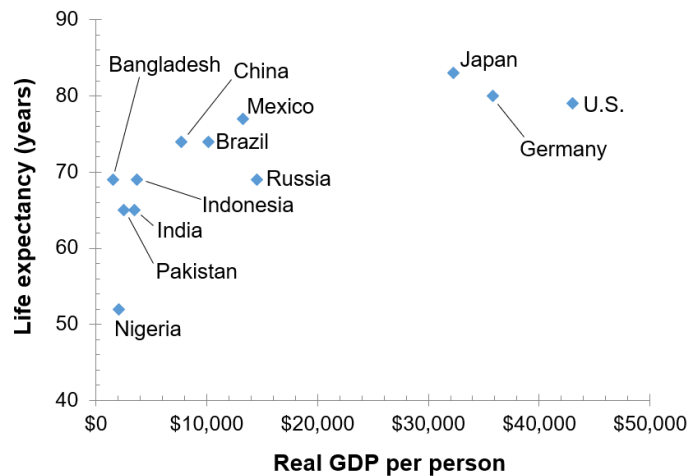


Figure 1: GDP and life expectancy in 12 countries

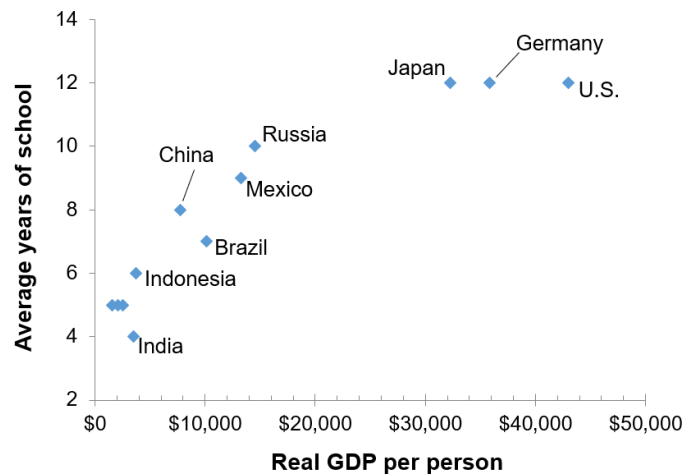


Figure 2: GDP and average schooling in 12 countries

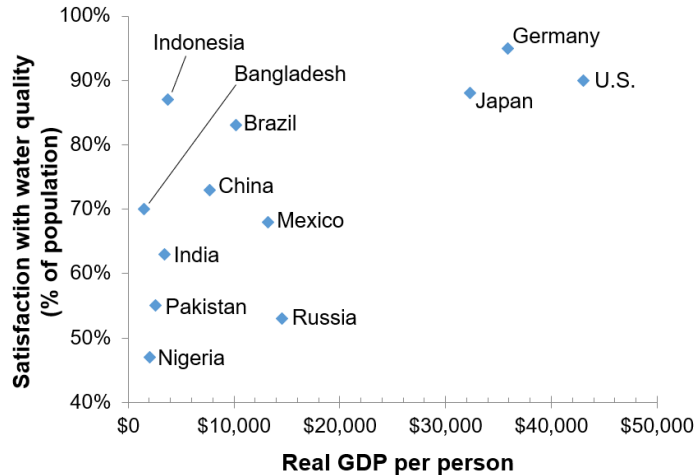


Figure 3: GDP and water quality in 12 countries

Summary

- Gross Domestic Product (GDP) measures a country's total income and expenditure.
- The four spending components of GDP include: Consumption, Investment, Government Purchases, and Net Exports.
- Nominal GDP is measured using current prices. Real GDP is measured using the prices of a constant base year and is corrected for inflation.
- GDP is the main indicator of a country's economic well-being, even though it is not perfect.

Question

- A country's real GDP rose from \$500 to \$530 while its nominal GDP rose from \$600 to \$700. What was this country's inflation rate?
 - a. 16.7%
 - b. 10.0%
 - c. 15.0%
 - d. -9.1%