Measuring National Income (GDP)

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January 11, 2025

Chapter 10 (GDP): Lesson Objectives ◁

In this chapter, you will be able to answer the following:

- What is Gross Domestic Product (GDP) & How is GDP related to a nation's total income and spending?
- What are the components of GDP?
- How is GDP corrected for inflation?
- Does GDP measure society's well-being?
- How is Inflation Measured?

Review

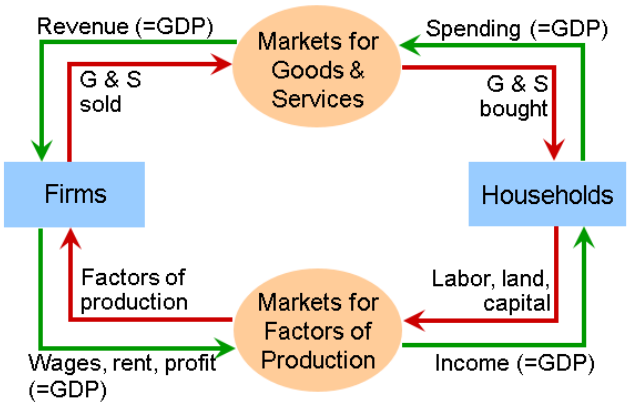
- ***Microeconomics***: The study of how individual households and firms make decisions, interact with one another in markets.
- ***Macroeconomics***: The study of the economy as a whole.

We begin our study of macroeconomics with the discussion of country's total income and expenditure.

Income and Expenditure

- ***Gross Domestic Product (GDP)*** measures total income of everyone in the economy.
- GDP also measures total expenditure on the economy's output of g&s.
- For the economy as a whole, income equals expenditure because every dollar a buyer spends is a dollar of income for the seller

The Circular-Flow Diagram ◁



Gross Domestic Product (GDP) Is . . . ◁

The market value of

all final

goods & services

produced

within a country

in a given period of time.

Three Ways of Calculating GDP

1. *Value Added Method:*
   - Sums up all the value added at each stage of production for all firms.

Value added = (Value of output) −
(Value of the intermediate goods used to produce that output)

- It is not the same as profit

NOW YOU TRY: Identifying value added ◁

- A farmer grows a bushel of wheat and sells it to a miller for $1.00.
- The miller turns the wheat into flour and sells it to a baker for $3.00.
- The baker uses the flour to make a loaf of bread and sells it to an engineer for $6.00.
- The engineer eats the bread.

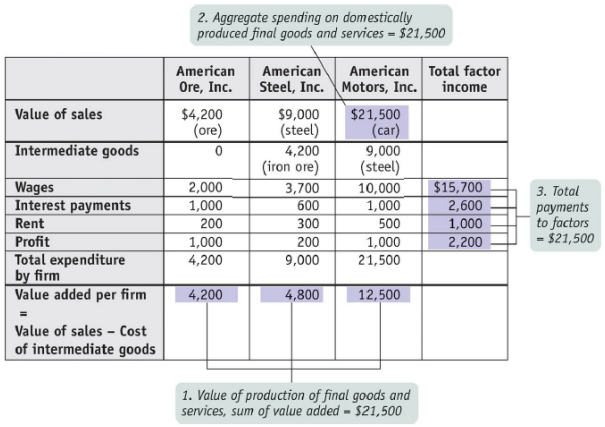
Compute value added at each stage of production and GDP

Three Ways of Calculating GDP

2. **Expenditure Method:** Sums up all the spending on domestic g&s (more on this later)
3. **Income Method:**

Sums up all payments to factors of production in the economy (wages & salaries, rent, interest payments and profits)

Example: Three Way of Measuring GDP ◁



	American Ore, Inc.	American Steel, Inc.	American Motors, Inc.	Total factor income
Value of sales	$4,200 (ore)	$9,000 (steel)	$21,500 (car)	
Intermediate goods	0	4,200 (iron ore)	9,000 (steel)	
Wages	2,000	3,700	10,000	$15,700
Interest payments	1,000	600	1,000	2,600
Rent	200	300	500	1,000
Profit	1,000	200	1,000	2,200
Total expenditure by firm	4,200	9,000	21,500	
Value added per firm = Value of sales – Cost of intermediate goods	4,200	4,800	12,500	

The Expenditure Components of GDP

- Recall: GDP is total spending.
- Four components:
  - Consumption (C)
  - Investment (I)
  - Government Purchases (G)
  - Net Exports (NX)
- These components must add up to GDP (denoted Y):

$$Y = C + I + G + NX = C + I + G + (X - M)$$

Consumption (C)

- is total spending by households on newly produced g&s except the purchase of a house, which falls under investment.
- Note on housing costs:
  - For renters, consumption includes rent payments.
  - For homeowners, consumption includes the imputed rental value of the house, but not the purchase price or mortgage payments.
- Consumption goods are sometimes divided into durable and nondurables based on whether goods last for more than two years or less.

Investment (I)

- is total spending on goods that will be used in the future to produce more g&s.
  includes spending on
  1. capital equipment (e.g., machines, tools)
  2. structures (factories, office buildings, residential houses)
  3. inventories (goods produced but not yet sold)

Government Purchase (G)

- is all spending on the g&s purchased by govt at the federal, state, and local levels.
- **G** excludes **transfer payments**, such as Social Security or unemployment insurance benefits because they are not purchases of g&s.

Net Exports (NX)

NX = Value of Exports - Value of Imports

- ***Exports*** represent foreign spending on the economy's g&s.
- ***Imports*** are the portions of $C, I,$ and G that are spent on g&s produced abroad, so they are subtracted from these components of GDP to avoid double counting.

Adding up all the components of GDP gives:

$$Y = C + I + G + NX = C + I + G + (X - M)$$

U.S. GDP and Its Components, 2019 ◁

	Billion of $	Per capita	% of GDP
Y	21,433	65,305	100
C	14,544	44,316	68
I	3,751	11,429	18
G	3,751	11,429	18
NX	-610	-1,860	-3

China and U.S. GDP Components, 2017 ◁

	China	U.S.
Y	100.0	100.0
C	32.2	71.4
I	49.8	20.1
G	13.0	12.2
NX	5.0	-3.8

Active Learning: GDP and its components ◁

In each of the following cases, determine how much GDP and each of its components is affected.

A. Debbie spends $200 to buy her husband dinner at the finest restaurant in Boston.

B. Sarah spends $1800 on a new laptop to use in her publishing business. The laptop was built in China.

C. Jane spends $1200 on a computer to use in her editing business. She got last year's model on sale for a great price from a local manufacturer.

D. GM builds $500 million worth of cars, but consumers only buy $470 million worth of them.

Real versus Nominal GDP

- Inflation can distort economic variables like GDP, so we have two versions of GDP:
  One is corrected for inflation, the other is not.
- **Nominal GDP** values output using current prices. It is not corrected for inflation.
- **Real GDP** values output using the prices of a *base year*. Real GDP is corrected for inflation

EXAMPLE: Calculating Nominal GDP ◁

	Pizza		Latte	
year	P_1	Q_1	P_2	Q_2
2015	$10	400	$2.00	1000
2016	$11	408	$2.50	1020
2017	$12	420	$3.00	1051

Compute nominal GDP in each year:

Increase:

2015:

2016:

2017:

EXAMPLE: Calculating Real GDP ◁

	Pizza		Latte	
year	*P*	*Q*	*P*	*Q*
→ 2015	$10	400	$2.00	1000
2016	$11	408	$2.50	1020
2017	$12	420	$3.00	1051

Compute real GDP in each year,
using 2015 as the base year:

Increase:

2015:

2016:

2017:

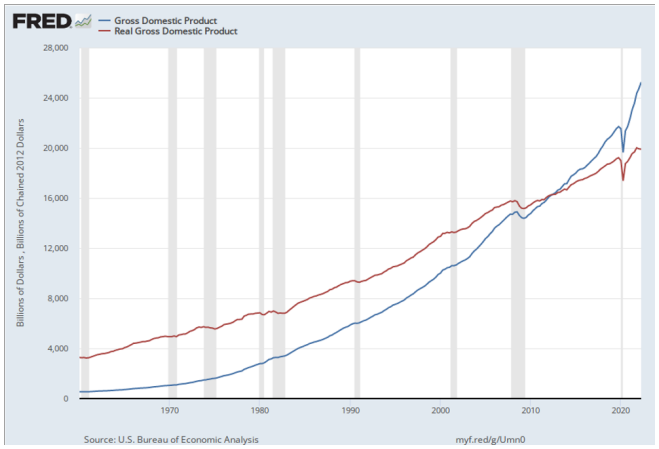
SUMMARY

year	Nominal GDP	Real GDP
2015	$6000	$6000
2016	$7038	$6120
2017	$8193	$6302

In each year,

- nominal GDP is measured using the (then) current prices.
- real GDP is measured using constant prices from the base year (2005 in this example).

U.S. GDP, 1947-2020 ◁



GDP Deflator ◁

- Measures the current level of prices relative to the level of prices in the base year:

$$\text{GDP deflator} = 100 \times \frac{\text{Nominal GDP}}{\text{Real GDP}}$$

- Can be used to take inflation out of nominal GDP ("deflate'' nominal GDP)
- Can be used to measure inflation (which is a percentage change in some measure of the price level from one period to the next):

Example: Calculating the deflator ◁

year	Nominal GDP	Real GDP	GDP Deflator
2015	$6000	$6000	
2016	$7038	$6120	
2017	$8193	$6302	

Compute the GDP deflator in each year:

2015:

2016:

2017:

GDP and Economic WellBeing

- 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.
- Robert Kennedy issued a very eloquent yet harsh criticism of GDP:

. . . does not allow for the health of our children, the quality of their education, or the joy of their play. . . .

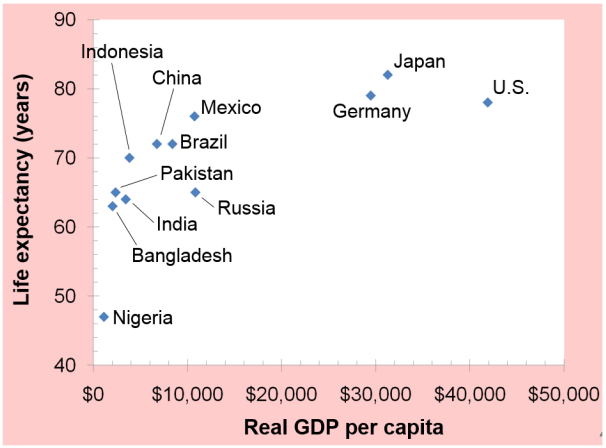
GDP Does Not Value

- the quality of the environment
- leisure time
- non−market activity, such as the child care a parent provides his or her child at home
- an equitable distribution of income

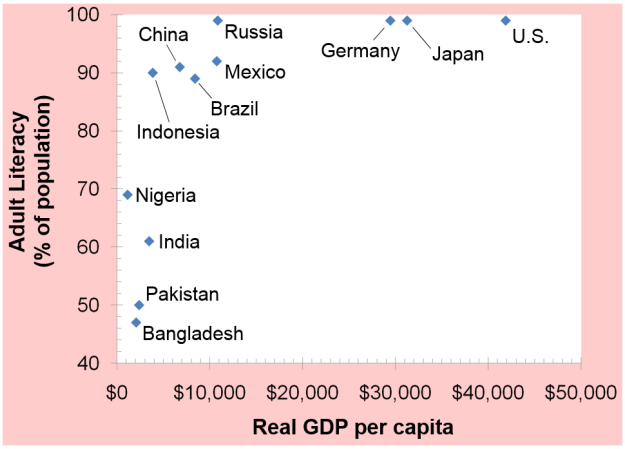
Then Why Do We Care About GDP?

- Having a large GDP enables a country to afford better schools, a cleaner environment, health care, etc.
- Many indicators of the quality of life are positively correlated with GDP. For example . . .

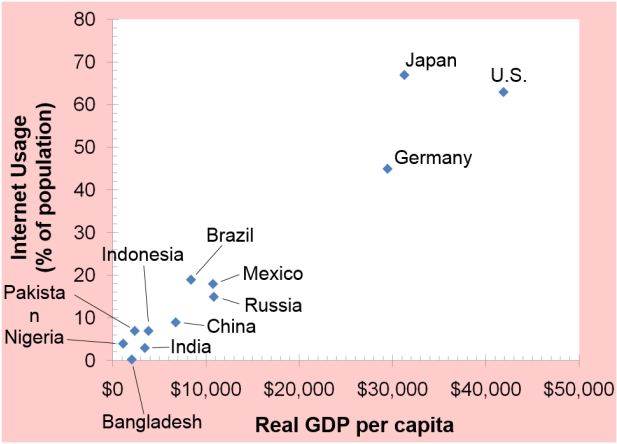
GDP and Life Expectancy in 12 countries ◁



GDP and Literacy in 12 countries ◁



GDP and Internet Usage 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.