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Principles of
Macroeconomics
Sixth Edition

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Measuring a Nation's
Income

Premium
PowerPoint
Slides by
Ron Cronovich

In this chapter,
look for the answers to these questions:

- 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?

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Micro vs. Macro

- *Microeconomics*: (Econ 2010)
  The study of how individual households and firms make decisions, interact with one another in markets.

- *Macroeconomics*: (Econ 2020)
  The study of the economy as a whole.

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First clicker question!!!

- Which course is this?
- 1. Microeconomics, Econ 2010
- 2. Macroeconomics, Econ 2020

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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.*

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The Circular-Flow Diagram

- a simple depiction of the macroeconomy
- illustrates GDP as spending, revenue, factor payments, and income
- Preliminaries:
  - **Factors of production** are inputs like labor, land, capital, and natural resources.
  - **Factor payments** are payments to the factors of production (e.g., wages, rent).

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The Circular-Flow Diagram

Households:
- own the factors of production, sell/rent them to firms for income
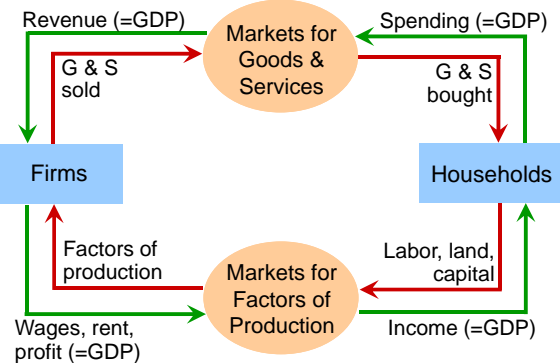- buy and consume goods & services

Firms   Households

Firms:
- buy/hire factors of production, use them to produce goods and services
- sell goods & services

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The Circular-Flow Diagram

Revenue (=GDP)   Markets for Goods & Services   Spending (=GDP)

G & S sold   G & S bought

Firms   Households

Factors of production   Markets for Factors of Production   Labor, land, capital

Wages, rent, profit (=GDP)   Income (=GDP)

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What This Diagram Omits

- The government
  - collects taxes, buys g&s

- The financial system
  - matches savers' supply of funds with borrowers' demand for loans

- The foreign sector
  - trades g&s, financial assets, and currencies with the country's residents

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Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

Goods are valued at their market prices, so:
- *All goods measured in the same units (e.g., dollars in the U.S.)*
- *Things that don't have a market value are excluded, e.g., housework you do for yourself.*

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Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

Final goods: *intended for the end user*

Intermediate goods: *used as components or ingredients in the production of other goods*

GDP only includes final goods—they already embody the value of the intermediate goods used in their production.

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Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

GDP includes tangible goods (like DVDs, mountain bikes, beer)

and intangible services (dry cleaning, concerts, cell phone service).

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Gross Domestic Product (GDP) Is...

...the market value of all final goods & services produced within a country in a given period of time.

GDP includes currently produced goods, not goods produced in the past.

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Gross Domestic Product (GDP) Is...

...the market value of all final goods & 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.

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Gross Domestic Product (GDP) Is...

...the market value of all final goods & services produced within a country in a given period of time.

Usually a year or a quarter (3 months)

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The Components of GDP

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

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

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Consumption (C)

- is total spending by households on g&s.
- 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.

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Investment (I)

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

  Note: *"Investment"* does not
  mean the purchase of financial
  assets like stocks and bonds.

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Government Purchases (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.
  They are not purchases of g&s.

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Net Exports (NX)

- **NX** = exports – 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.
- Adding up all the components of GDP gives:

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

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U.S. GDP and Its Components, 2010

|	billions	% of GDP	per capita
Y	$14,745	100.0	$47,459
C	10,366	70.3	33,365
I	1,907	12.9	6,139
G	3,022	20.5	9,727
NX	–550	–3.7	–1,772

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GDP and its components, OECD 2010

Country	GDP, $billions	C as % of GDP	I as % of GDP	G as % of GDP	Exports as % of GDP	Imports as % of GDP	NX as % of GDP
OECD - Total	41769.11	62.9	18.2	19.2	27.1	27.8	-0.8
United States	14447.10	70.9	14.7	17.5	12.7	16.3	-3.6
Japan	4301.85	58.6	20.5	20.0	15.2	14.1	1.1
Germany	3044.24	57.5	17.5	19.7	46.8	41.4	5.5
United Kingdom	2233.88	65.7	14.7	23.1	29.4	32.8	-3.4
France	2194.12	58.2	19.3	24.8	25.5	27.8	-2.3
Italy	1908.57	60.4	19.5	21.2	26.8	28.5	-1.8
Mexico	1644.48	64.7	20.3	11.6	30.3	31.8	-1.4
Spain	1477.84	58.4	22.5	20.8	26.3	28.4	-2.2
Korea	1417.55	52.5	28.6	15.4	52.4	49.6	2.8
Canada	1329.86	57.9	22.1	21.8	29.4	31.3	-1.9
Turkey	1114.63	71.3	18.7	14.3	21.1	26.6	-5.5
Australia	916.70	52.7	27.4	18.3	20.9	19.8	1.1
Poland	755.47	61.4	19.9	18.9	42.3	43.5	-1.2
Netherlands	701.95	45.4	18.2	28.5	78.0	70.6	7.5
Belgium	409.06	52.9	20.2	24.2	80.0	77.3	2.7

- هزینه ناخالص ملی به قیمت‌های ثابت سال ۱۳۸۳عبارت است از ارزش بازار کلیه کالاها و خدماتی که در قلمرو داخلی اقتصاد توسط تولیدکنندگان مقیم تولید می شوند. بر اساس روش هزینه، هزینه ناخالص ملی از حاصل جمع هزینه های مصرفی نهایی خصوصی، هزینه های مصرفی نهایی دولتی، تشکیل سرمایه ثابت ناخالص، تغییر در موجودی انبار، خالص صادرات و واردات و اشتباهات آماری، خالص درآمد عوامل تولید از خارج و نتیجه رابطه مبادله بازرگانی بدست می آید.

هزینه های مصرفی خصوصی (میلیارد ریال)
هزینه های مصرفی دولتی (میلیارد ریال)
خالص صادرات کالاها و خدمات (میلیارد ریال)

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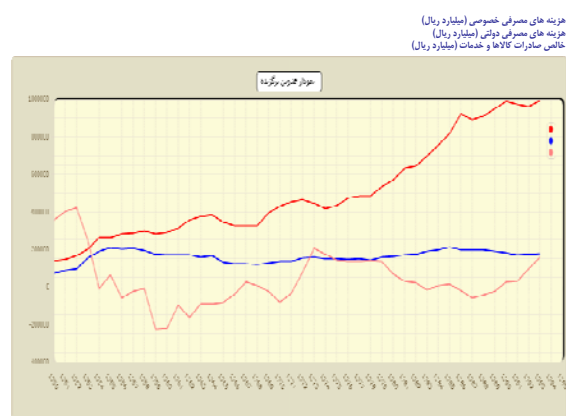
GDP and its components

In each of the following cases, determine how much GDP and each of its components is affected (if at all).

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. General Motors builds $500 million worth of cars, but consumers only buy $470 million worth of them.

Answers

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

Consumption and GDP rise by $200.

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

Investment rises by $1800, net exports fall by $1800, GDP is unchanged.

Answers

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.

Current GDP and investment do not change, because the computer was built last year.

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

Consumption rises by $470 million, inventory investment rises by $30 million, and GDP rises by $500 million.

Real vs. Nominal GDP

- If output doubles and prices stay the same, GDP doubles
- If output stays the same and prices double, GDP doubles
- Do we prefer one way of doubling GDP to the other?

Second clicker question:

Of these two ways in which to double GDP, which do we prefer?

1. Output doubles and prices stay the same
2. Output stays the same and prices double

Real versus Nominal GDP

- Inflation can distort economic variables like GDP, so we have two versions of GDP:

- **Nominal GDP**
  - values output using current prices
  - <u>not</u> corrected for inflation

- **Real GDP**
  - values output using the prices of a *base year*
  - <u>is</u> corrected for inflation

EXAMPLE:

	Pizza		Butter	
year	**P**	**Q**	**P**	**Q**
2011	$10	400	$2.00	1000
2012	$11	500	$2.50	1100
2013	$12	600	$3.00	1200

Compute nominal GDP in each year:

Increase:

2011: $10 x 400 + $2 x 1000 = $6,000

37.5%

2012: $11 x 500 + $2.50 x 1100 = $8,250

30.9%

2013: $12 x 600 + $3 x 1200 = $10,800

EXAMPLE:

	Pizza		Butter	
year	**P**	**Q**	**P**	**Q**
→ 2011	$10	400	$2.00	1000
2012	$11	500	$2.50	1100
2013	$12	600	$3.00	1200

Compute real GDP in each year, using 2011 as the base year:

Increase:

2011: $10 x 400 + $2 x 1000 = $6,000

20.0%

2012: $10 x 500 + $2 x 1100 = $7,200

16.7%

2013: $10 x 600 + $2 x 1200 = $8,400

EXAMPLE:

year	Nominal GDP	Real GDP
2011	$6000	$6000
2012	$8250	$7200
2013	$10,800	$8400

In each year,

- nominal GDP is measured using the (then) current prices.
- real GDP is measured using constant prices from the base year (2011 in this example).

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EXAMPLE:

year	Nominal GDP		Real GDP	
2011	$6000		$6000	
2012	$8250	37.5%	$7200	20.0%
2013	$10,800	30.9%	$8400	16.7%

- The change in nominal GDP reflects both prices and quantities.
- The change in real GDP is the amount that GDP would change if prices were constant (i.e., if zero inflation).
  Hence, real GDP is corrected for inflation.
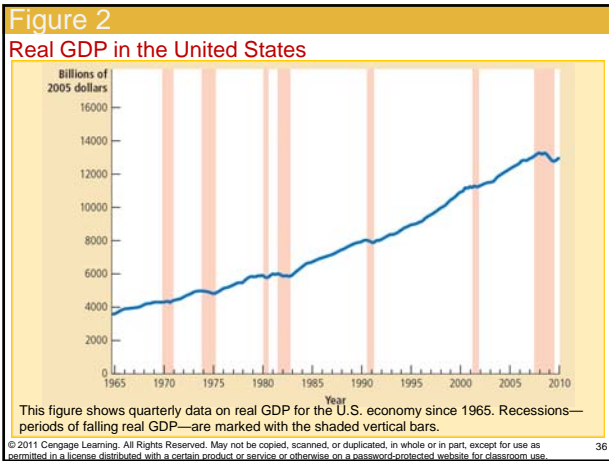
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Nominal and Real GDP in the U.S., 1965–2010
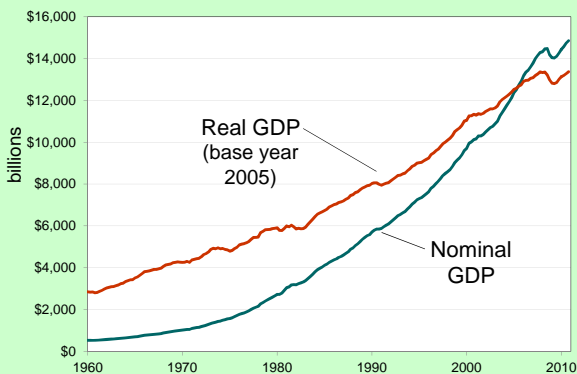
Real GDP over recent history

- Recession
  - Roughly speaking, two consecutive quarters of falling GDP
  - Real GDP declines
  - Lower income
  - Rising unemployment
  - Falling profits
  - Increased bankruptcies

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Figure 2
Real GDP in the United States

This figure shows quarterly data on real GDP for the U.S. economy since 1965. Recessions—periods of falling real GDP—are marked with the shaded vertical bars.

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The GDP Deflator

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

- Definition:

$$\text{GDP deflator} = 100 \times \frac{\text{nominal GDP}}{\text{real GDP}}$$

- One way to measure the economy's **inflation rate** is to compute the percentage increase in the GDP deflator from one year to the next.

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EXAMPLE:

year	Nominal GDP	Real GDP	GDP Deflator	
2011	$6000	$6000	100.0	14.6%
2012	$8250	$7200	114.6	
2013	$10,800	$8400	128.6	12.2%

Compute the GDP deflator in each year:

2011:   100 x (6000/6000) =   100.0

2012:   100 x (8250/7200) =   114.6

2013:   100 x (10,800/8400) =   128.6

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ACTIVE LEARNING   2
Computing GDP

	2011 (base yr)		2012		2013	
	P	Q	P	Q	P	Q
Good A	$30	900	$31	1000	$36	1050
Good B	$100	192	$102	200	$100	205

Use the above data to solve these problems:

A. Compute nominal GDP in 2011.

B. Compute real GDP in 2012.

C. Compute the GDP deflator in 2013.

Clicker question!

	2011 (base yr)		2012		2013	
	P	Q	P	Q	P	Q
Good A	$30	900	$31	1000	$36	1050
Good B	$100	192	$102	200	$100	205

Nominal GDP in 2011 was

1. $130
2. $27,000
3. $19,200
4. $46,200

Another clicker question!

	2011 (base yr)		2012		2013	
	P	Q	P	Q	P	Q
Good A	$30	900	$31	1000	$36	1050
Good B	$100	192	$102	200	$100	205

Real GDP in 2012 was (will be)

1. $133
2. $50,000
3. $31,000
4. $51,400

ACTIVE LEARNING 2
Answers

	2011 (base yr)		2012		2013	
	P	Q	P	Q	P	Q
Good A	$30	900	$31	1,000	$36	1050
Good B	$100	192	$102	200	$100	205

A. Compute nominal GDP in 2011.

$30 x 900 + $100 x 192 = $46,200

B. Compute real GDP in 2012.

$30 x 1000 + $100 x 200 = $50,000

ACTIVE LEARNING 2
Answers

	2011 (base yr)		2012		2013	
	P	Q	P	Q	P	Q
Good A	$30	900	$31	1,000	$36	1050
Good B	$100	192	$102	200	$100	205

C. Compute the GDP deflator in 2013.

Nom GDP = $36 x 1050 + $100 x 205 = $58,300

Real GDP = $30 x 1050 + $100 x 205 = $52,000

GDP deflator = 100 x (Nom GDP)/(Real GDP)
= 100 x ($58,300)/($52,000) = 112.1

GDP and Economic Well-Being

- *Nominal GDP is often discussed but not very useful*
- *Real GDP per capita is much more important*
- *Chinese GDP recently became greater than Japanese GDP for the first time*
- *But GDP per capita in Japan is more than 10 time GDP per capita in China*
- *So which would you rather be? Chinese or Japanese?*

GDP and Economic Well-Being

- *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:

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Gross Domestic Product…

"… 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 Does Not Value:

- the quality of the environment
  - Degradation of the environment is like depreciation
  - We should take the cost of repairing the environment as a reduction in GDP
- leisure time
- non-market activity, such as the child care a parent provides his or her child at home
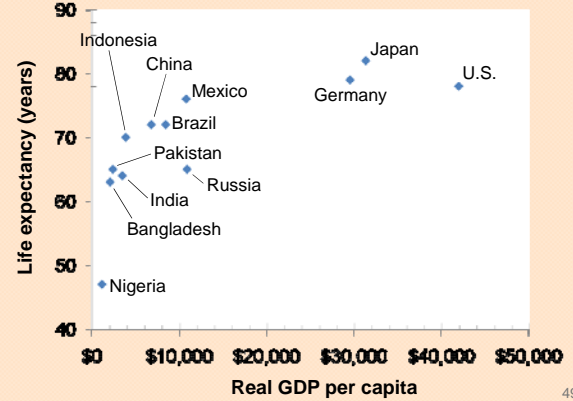- an equitable distribution of income

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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…
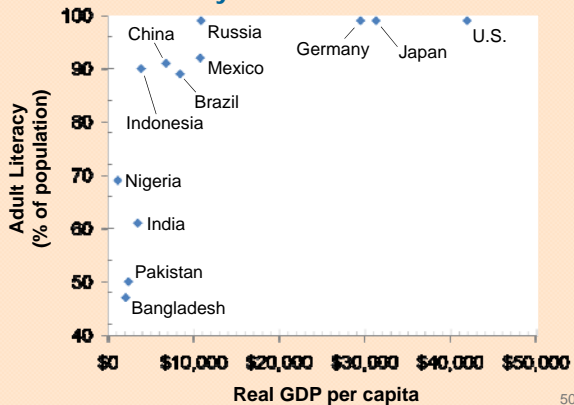
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GDP and Life Expectancy in 12 countries
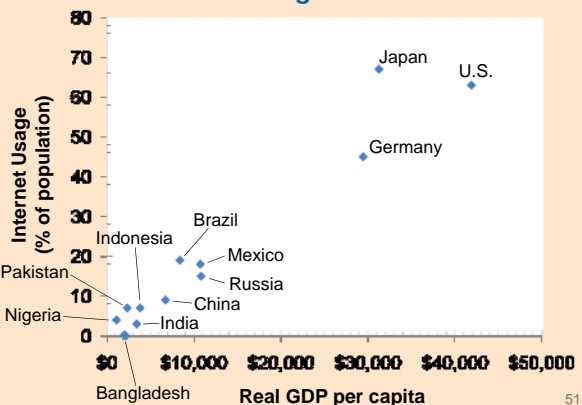

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GDP and Literacy in 12 countries

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GDP and Internet Usage in 12 countries

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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.