CHAPTER 23

# Measuring a Nation's Income

PRINCIPLES OF Economics

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## Micro vs. Macro

- ***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 country's total income and expenditure.

# Income and Expenditure

- **( ) 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,*
*( )*
*because every dollar a buyer spends*
*is a dollar of income for the seller.*



# 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).

## The Circular-Flow Diagram

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

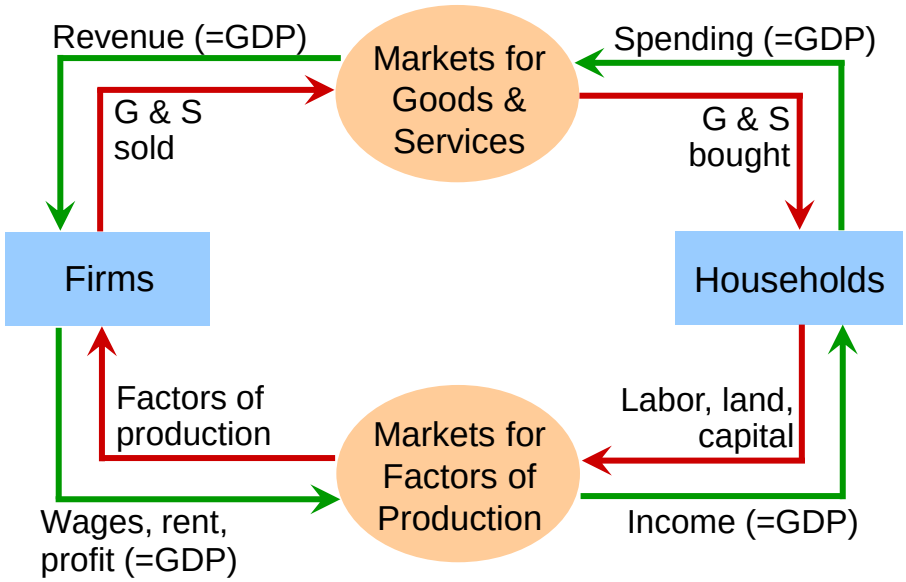
Firms

Households

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



## The Circular-Flow Diagram



## What This Diagram Omits

- The ( )
  - collects taxes, buys g&s
- The ( )
  - 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



## Gross Domestic Product (GDP) Is…

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

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*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.*

## Gross Domestic Product (GDP) Is…

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

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***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.*



## Gross Domestic Product (GDP) Is…

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

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

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

## 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.*



## 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.*

## 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)*



## 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**):

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

# 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.



# Investment (I)

- is total ( ) 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.*

## Government Purchases (G)

- is all spending on the g&s purchased by govt at the federal, state, and local levels.
- **G** excludes ( ), such as Social Security or unemployment insurance benefits.

  They are not purchases of g&s.



## Net Exports (NX)

- **NX** = ( )
- 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:

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

# U.S. GDP and Its Components, 2007

| | *billions* | *% of GDP* | *per capita* |
|---|---|---|---|
| **Y** | $13,841 | 100.0 | $45,825 |
| **C** | 9,734 | 70.3 | 32,228 |
| **I** | 2,125 | 15.4 | 7,037 |
| **G** | 2,690 | 19.4 | 8,905 |
| **NX** | –708 | –5.1 | –2,344 |



ACTIVE LEARNING *1*

## 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.

ACTIVE LEARNING 1

## 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.*

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ACTIVE LEARNING 1

## 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.*

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# 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.
- **(  ) GDP** values output using current prices. It is not corrected for inflation.
- **(  ) GDP** values output using the prices of a ***base year***. Real GDP is corrected for inflation.



## EXAMPLE:

| | Pizza | | Latte | |
|---|---|---|---|---|
| *year* | ***P*** | ***Q*** | ***P*** | ***Q*** |
| 2005 | $10 | 400 | $2.00 | 1000 |
| 2006 | $11 | 500 | $2.50 | 1100 |
| 2007 | $12 | 600 | $3.00 | 1200 |

Compute nominal GDP in each year:

*Increase:*

2005: $10 x 400 + $2 x 1000 = $6,000

2006: $11 x 500 + $2.50 x 1100 = $8,250 — 37.5%

2007: $12 x 600 + $3 x 1200 = $10,800 — 30.9%

# EXAMPLE:

| | Pizza | | Latte | |
|---|---|---|---|---|
| *year* | ***P*** | ***Q*** | ***P*** | ***Q*** |
| 2005 | $10 | 400 | $2.00 | 1000 |
| 2006 | $11 | 500 | $2.50 | 1100 |
| 2007 | $12 | 600 | $3.00 | 1200 |

Compute real GDP in each year,
using 2005 as the base year:

*Increase:*

2005: $10 x 400 + $2 x 1000 = $6,000

2006: $10 x 500 + $2 x 1100 = $7,200 — 20.0%

2007: $10 x 600 + $2 x 1200 = $8,400 — 16.7%



# EXAMPLE:

| *year* | *Nominal GDP* | *Real GDP* |
|---|---|---|
| 2005 | $6000 | $6000 |
| 2006 | $8250 | $7200 |
| 2007 | $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 (2005 in this example).

## EXAMPLE:

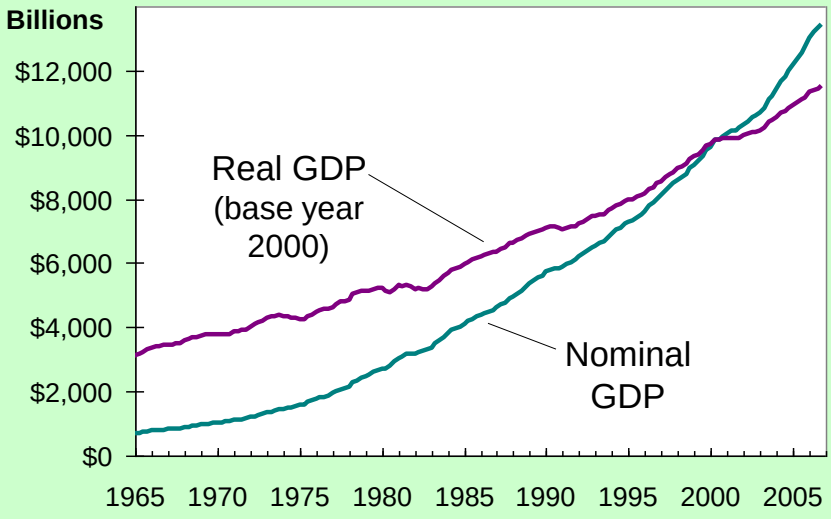
| *year* | *Nominal GDP* | | *Real GDP* | |
|---|---|---|---|---|
| 2005 | $6000 | | $6000 | |
| | | 37.5% | | 20.0% |
| 2006 | $8250 | | $7200 | |
| | | 30.9% | | 16.7% |
| 2007 | $10,800 | | $8400 | |

- 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.***



## Nominal and Real GDP in the U.S., 1965-2007



# 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.



## EXAMPLE:

| *year* | *Nominal GDP* | *Real GDP* | *GDP Deflator* | |
|---|---|---|---|---|
| 2005 | $6000 | $6000 | 100.0 | |
| 2006 | $8250 | $7200 | 114.6 | 14.6% |
| 2007 | $10,800 | $8400 | 128.6 | 12.2% |

Compute the GDP deflator in each year:

2005: 100 x (6000/6000) = 100.0

2006: 100 x (8250/7200) = 114.6

2007: 100 x (10,800/8400) = 128.6

ACTIVE LEARNING 2

## Computing GDP

| | 2007 (base yr) | | 2008 | | 2009 | |
|---|---|---|---|---|---|---|
| | *P* | *Q* | *P* | *Q* | *P* | *Q* |
| Good A | $30 | 900 | $31 | 1,000 | $36 | 1050 |
| Good B | $100 | 192 | $102 | 200 | $100 | 205 |

Use the above data to solve these problems:

**A.** Compute nominal GDP in 2007.

**B.** Compute real GDP in 2008.

**C.** Compute the GDP deflator in 2009.

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ACTIVE LEARNING 2

## Answers

| | 2007 (base yr) | | 2008 | | 2009 | |
|---|---|---|---|---|---|---|
| | *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 2007.

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

**B.** Compute real GDP in 2008.

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

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## ACTIVE LEARNING 2
## Answers

| | 2007 (base yr) | | 2008 | | 2009 | |
|---|---|---|---|---|---|---|
| | *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 2009.

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

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## 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:

## GDP Does Not Value:

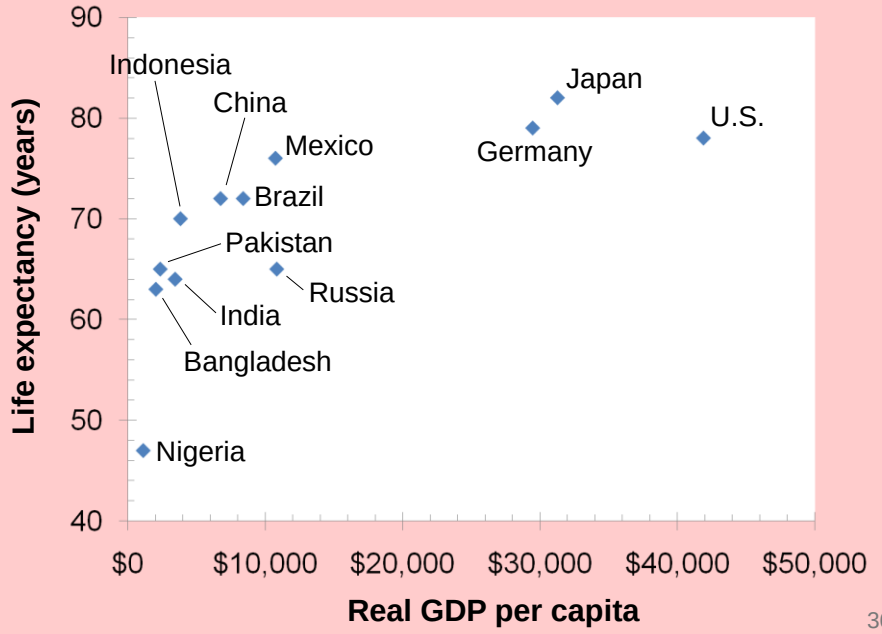
- the (  ) of the environment
- (  ) time
- non-market activity, such as the child care a parent provides his or her child at home
- an (  ) distribution of income



## 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

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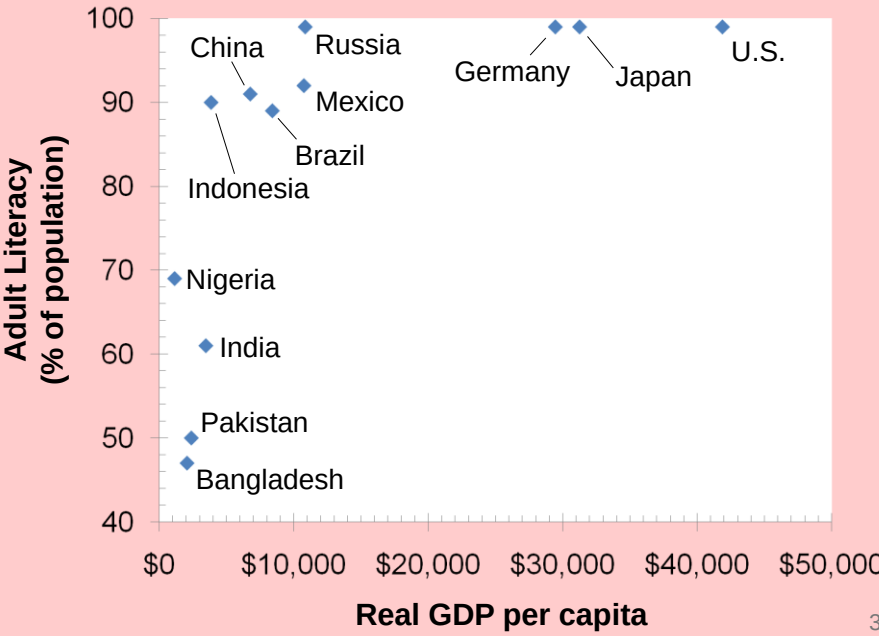
## GDP and Literacy in 12 countries

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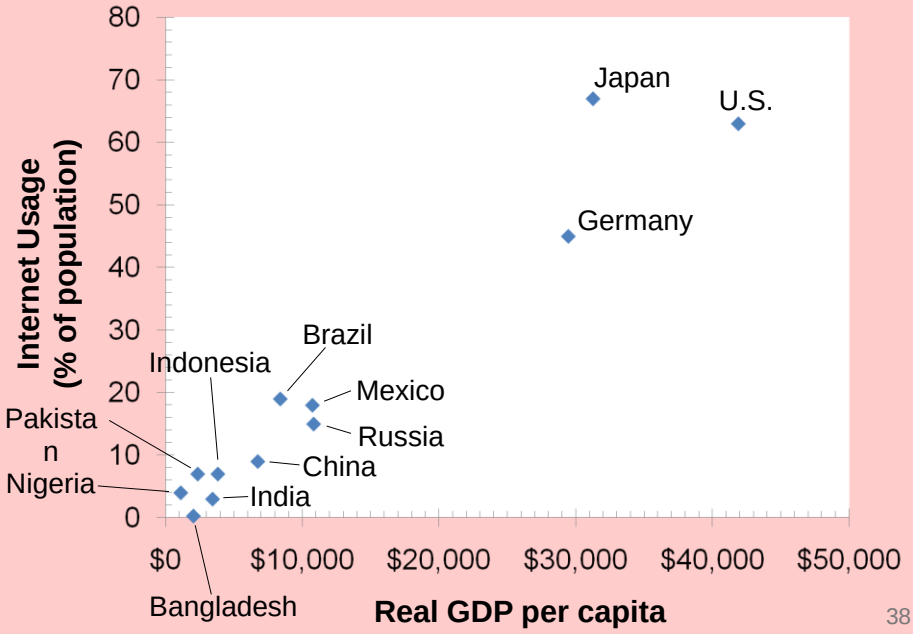
## GDP and Internet Usage in 12 countries

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- 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.

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