Measuring a Nation's Income

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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?

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

- **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

- 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

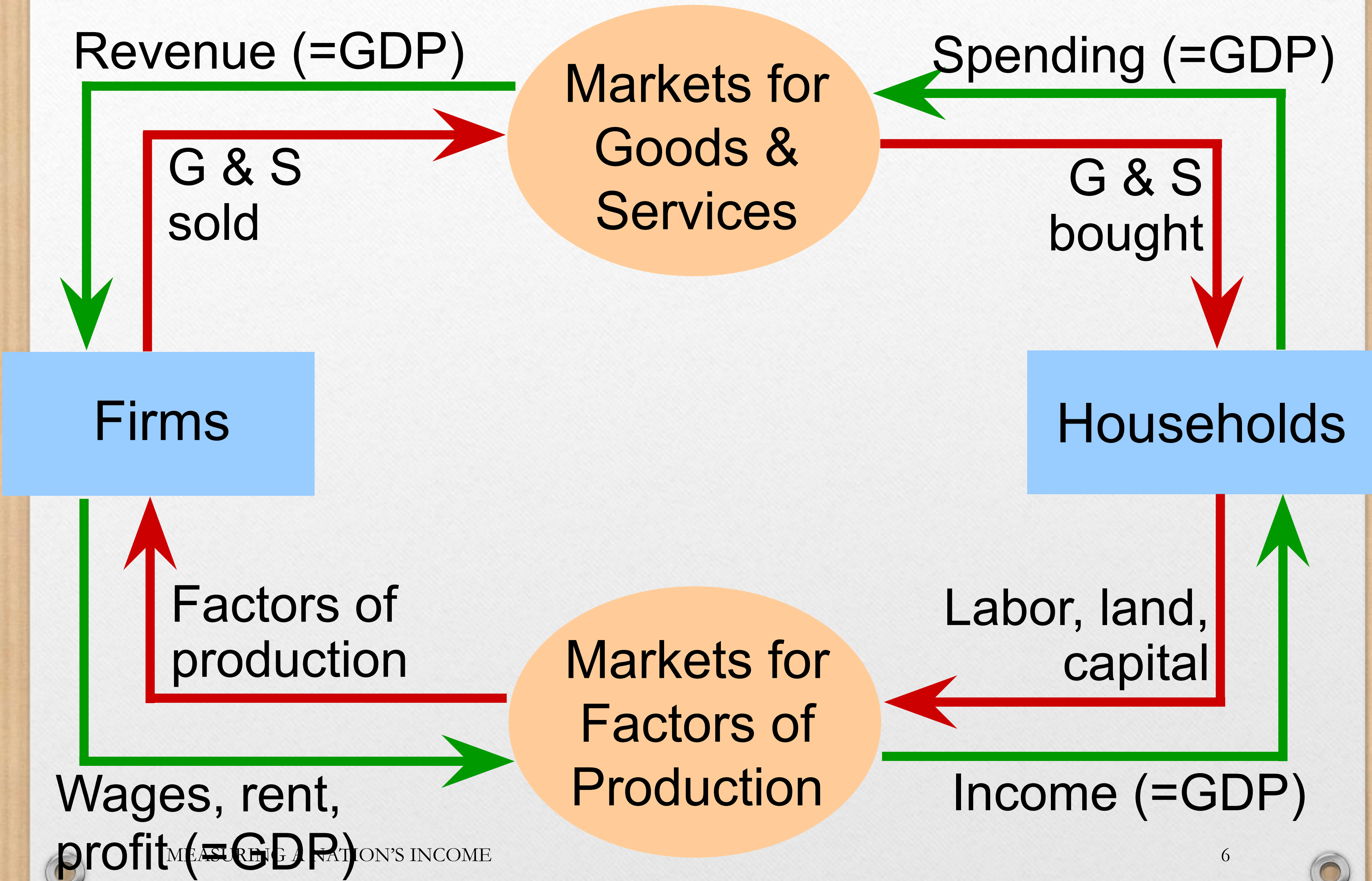
Firms

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 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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…the market value of all final goods & services
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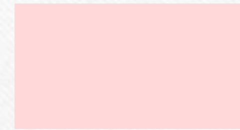

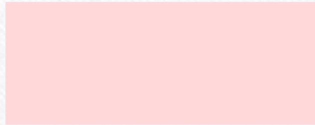

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The Components of GDP

- 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**):

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

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 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.*

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.

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:

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

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

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:

	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:

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

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

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

Increase:

37.5%

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

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

20.0%

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).

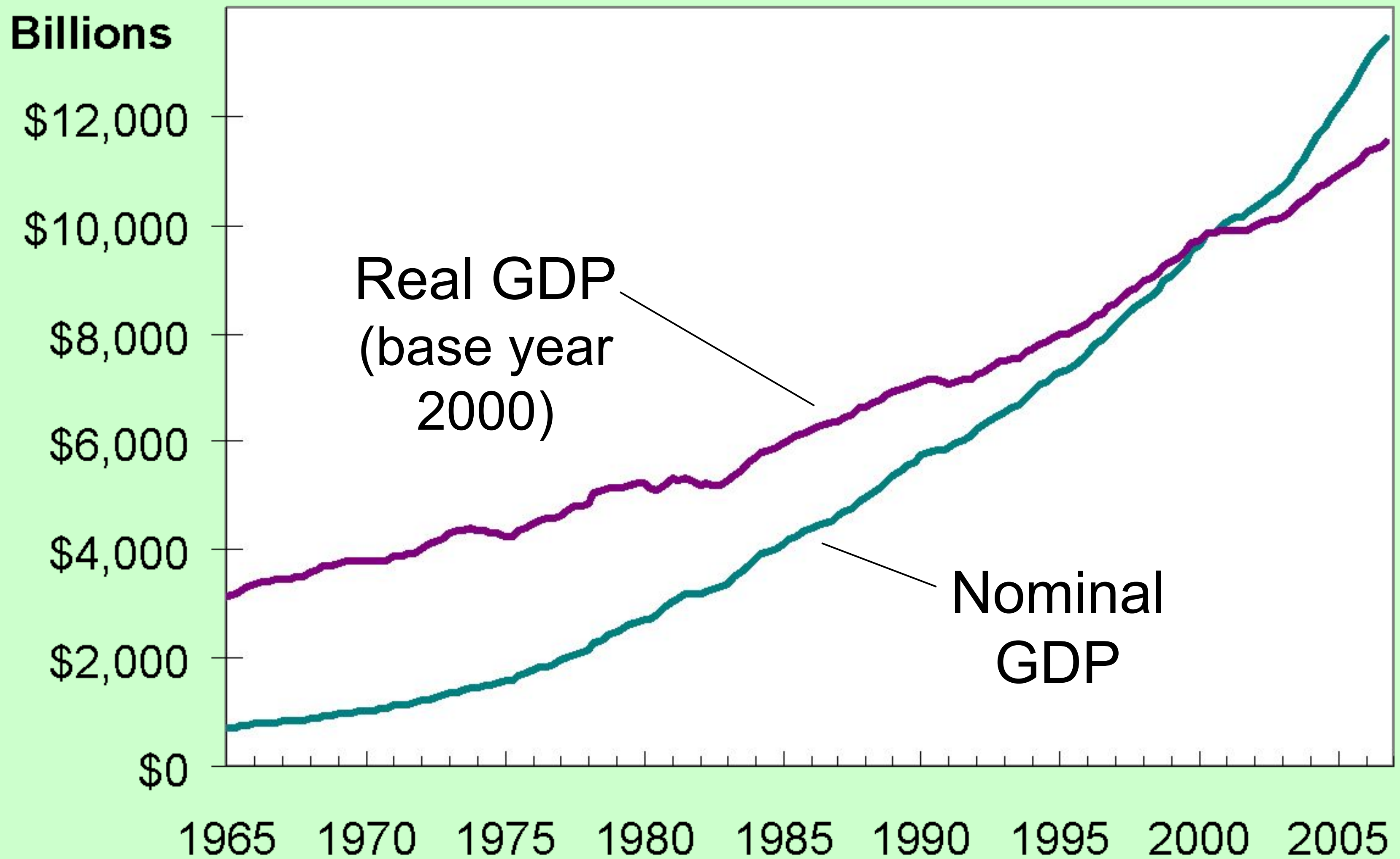
EXAMPLE:

year	Nominal GDP		Real GDP	
2005	$6000	37.5%	$6000	20.0%
2006	$8250	30.9%	$7200	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	
				14.6%
2006	$8250	$7200	114.6	
				12.2%
2007	$10,800	$8400	128.6	

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.

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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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

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:

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:

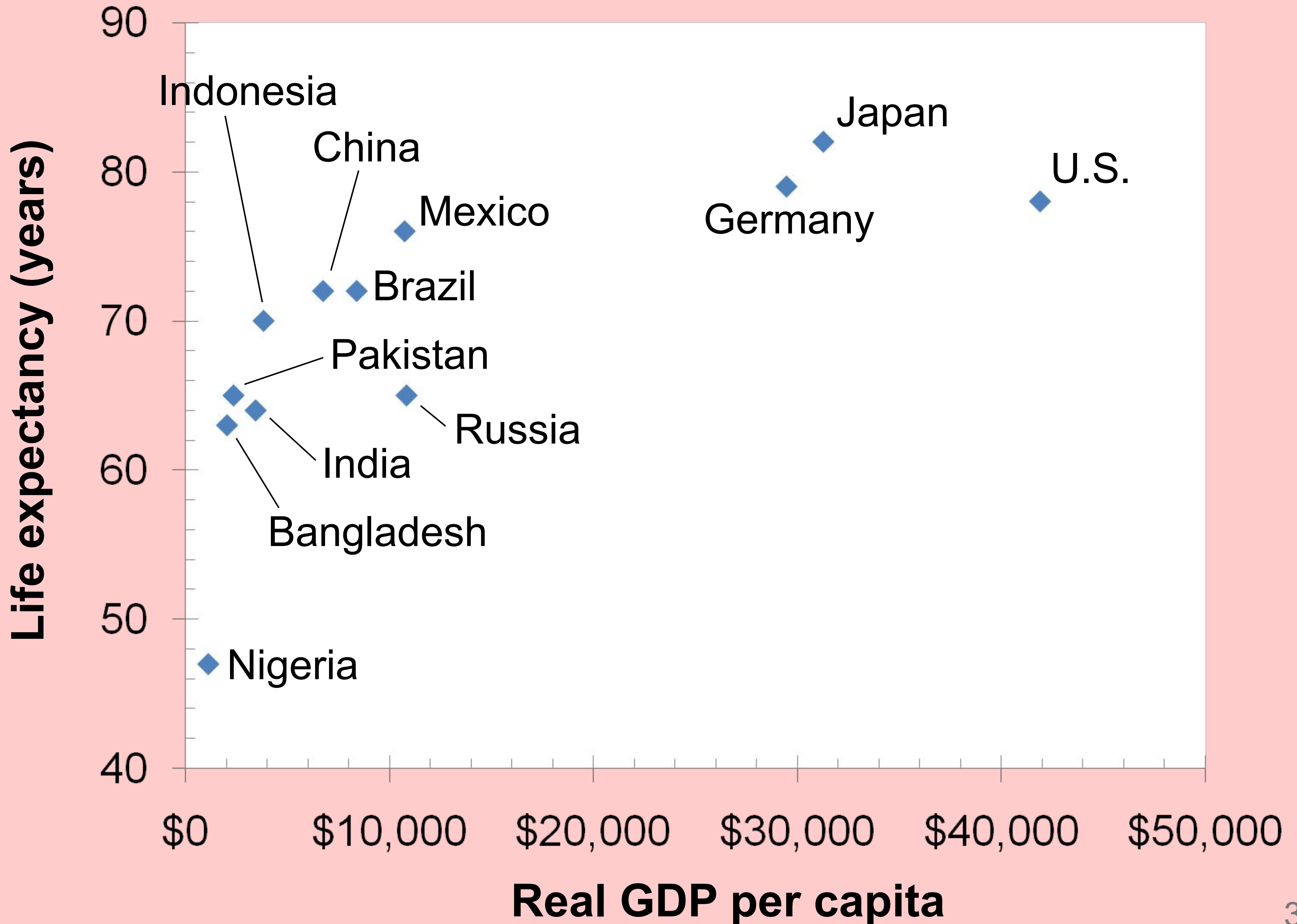
- the quality of the environment
- leisure time
- non-market activity, such as the child care a parent provides his or her child at home
- an equitable distribution of income

Then Why Do We Care About GDP?

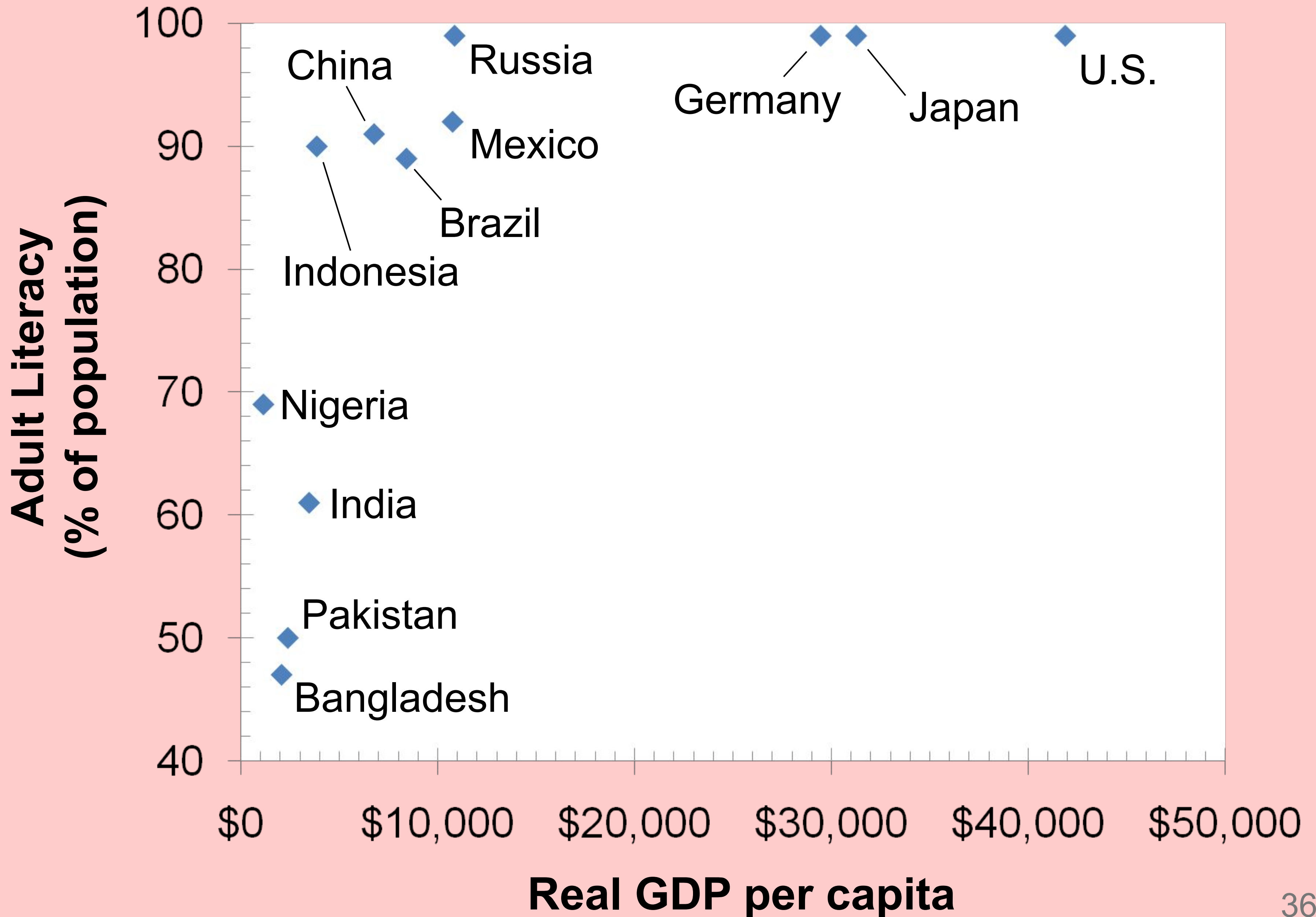
- Having a large GDP enables a country to afford better schools, a cleaner environment,
health care, etc.

- Many indicators of the quality of life are positively correlated with GDP. For example…

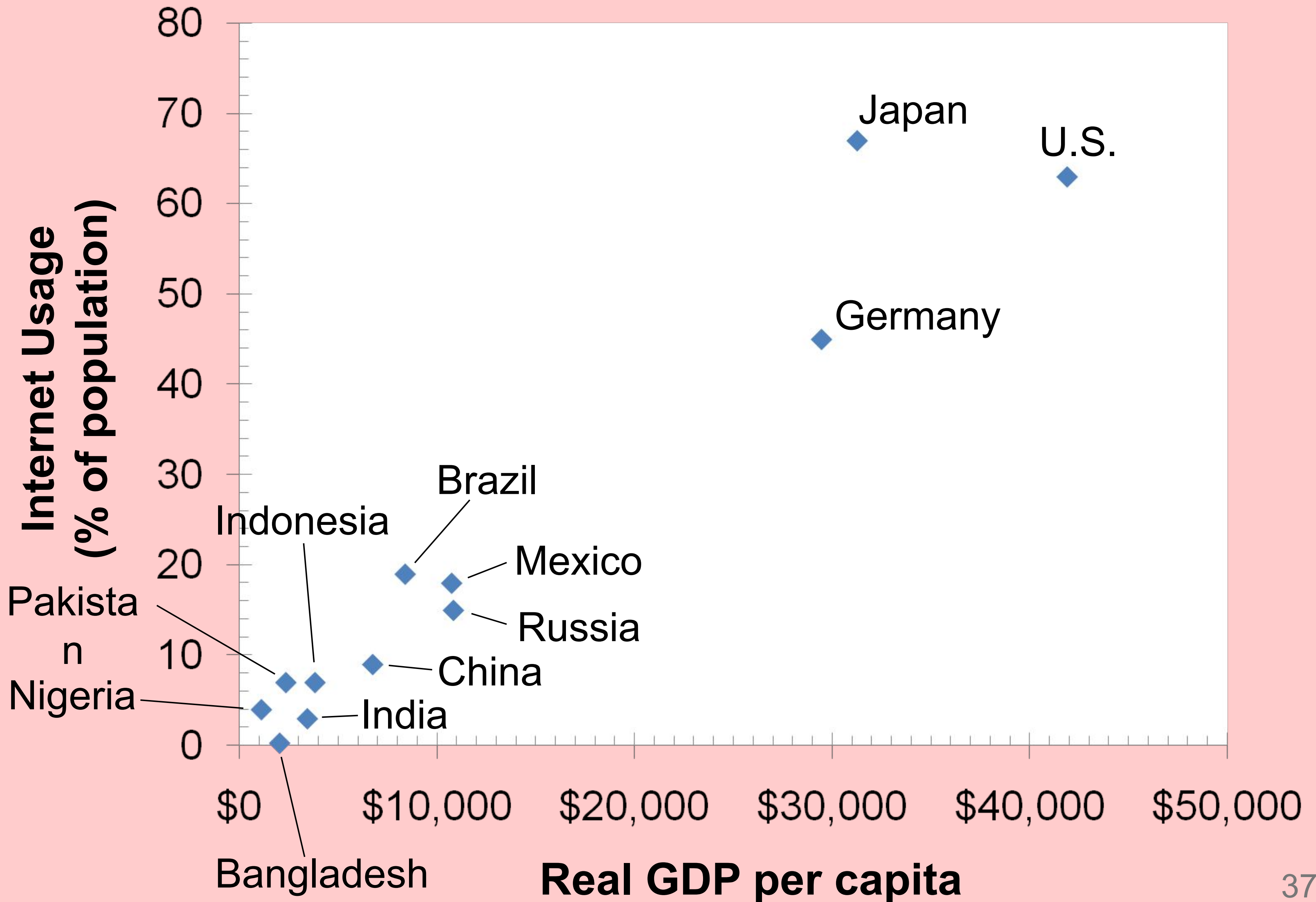
GDP and Life Expectancy in 12 countries



GDP and Literacy in 12 countries



GDP and Internet Usage in 12 countries



CHAPTER 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.