Measuring a Nation's Income

PRINCIPLES OF
Economics
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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?

(1) Income and Expenditure

- **Gross Domestic Product (GDP)** measures **total income** of everyone in the economy. [later: more formal definition]
- GDP also measures **total expenditure** on the economy's output of goods and services (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.

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., Bangladeshi Taka, U.S. dollars)*
- *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.

***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.

e.g., General Motors (GM) does not produce tires for its cars; it buys them from tire companies (such as Goodyear)

Tire: *intermediate good*; GM car: *final good*

Prevent **double counting**

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, mobile 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.

e.g. If you bought a Toyota Prius on January 2005, the purchase (say, at $200,000) was included in GDP (of 2005). If you sold it on December 2010, that transaction was not included in GDP (of 2010). Why?

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 the borders of a country (an economy), 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)

(3) 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**):

$$\mathbf{Y = C + I + G + NX}$$

Consumption (C)

- is total spending by households on g&s.

- Consumption is normally the largest GDP component. Many Economist judge the economic performance of their country mainly in terms of consumption level

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.

GDP and Its Components

- Adding up all the components of GDP gives:

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

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 the Central.

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

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. A car company 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 the Central.

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 Japan.

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

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. A car company 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.

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

(4) 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.

Real versus Nominal GDP

Reason for Introducing Real GDP

When GDP increases from one year (2006) to the next (2007) by 9.4%, can we conclude that the quantity of production increases by 9.4%?

Because GDP is measured in value terms, it can be changed by changes in prices, not quantities. We should be careful about interpreting changes over time.

To separate price changes from quantity changes, we introduce a concept called real GDP.

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

Question : Compute nominal GDP in each year

EXAMPLE:

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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%

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

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

Increase:

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		$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.

Which measure of GDP represents changes strictly in the quantity of goods and services produced in the economy, not the prices?

a. Nominal GDP.

b. Real GDP.

c. The GDP measure that sums up the value of goods and services evaluated at current year prices.

d. None of the above.

Which measure of GDP represents changes strictly in the quantity of goods and services produced in the economy, not the prices?

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b. **Real GDP.**

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d. None of the above.

The GDP Deflator

- One by-product of real GDP calculation is to compute the general price level.
- 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.

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

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

(5) 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:

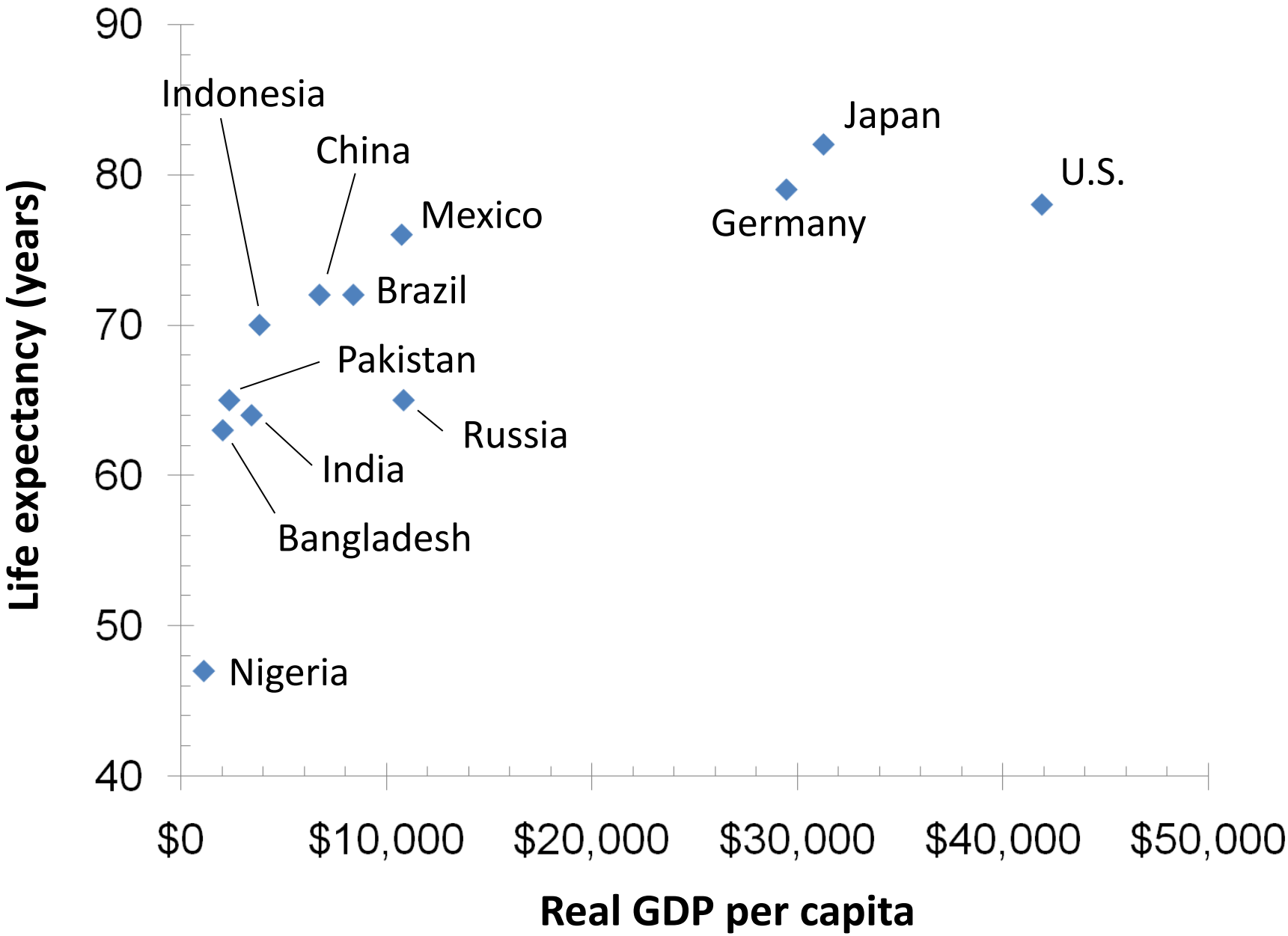
GDP Does Not Value:

- the 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

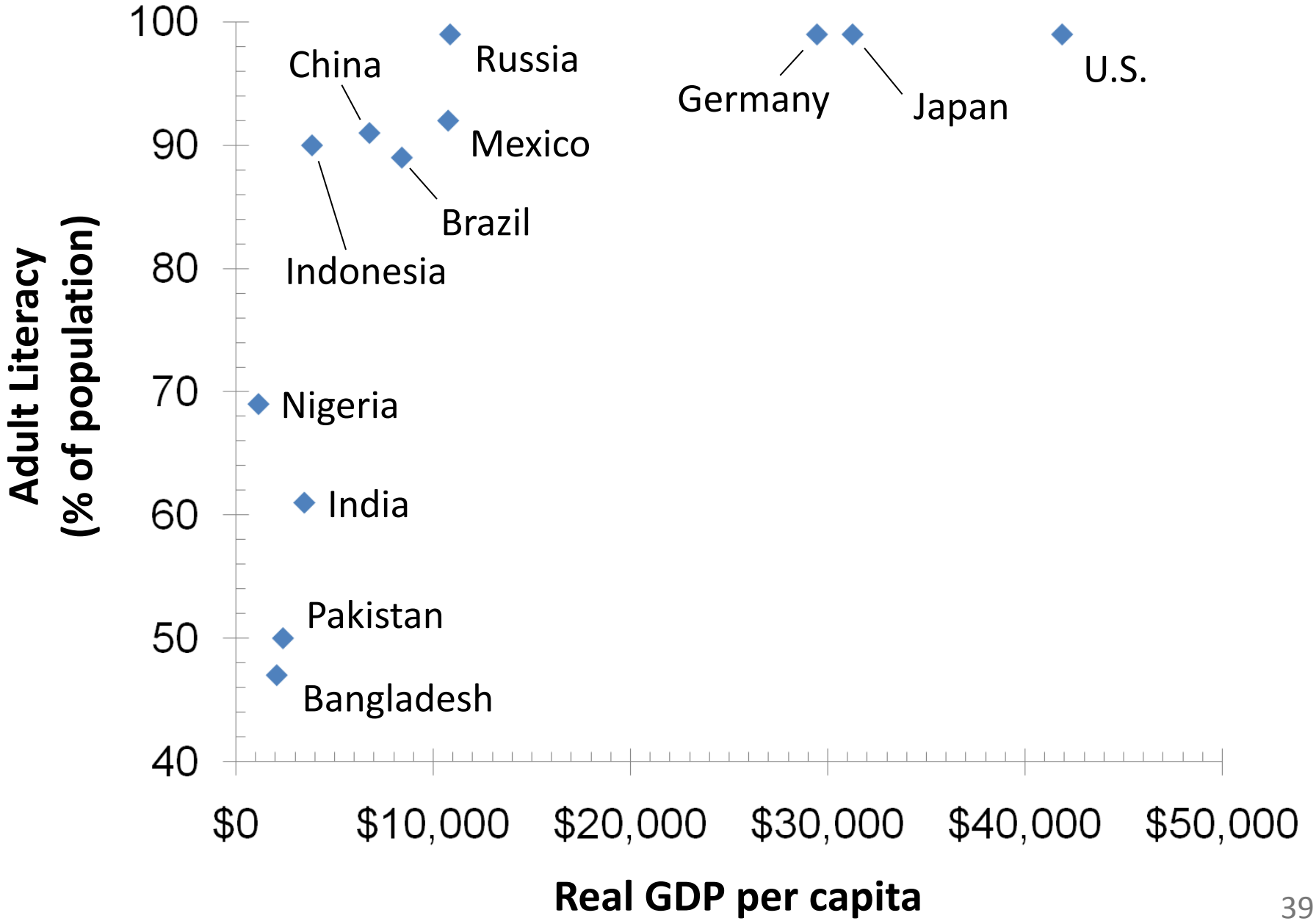
Then Why Do We Care About GDP?

- 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…

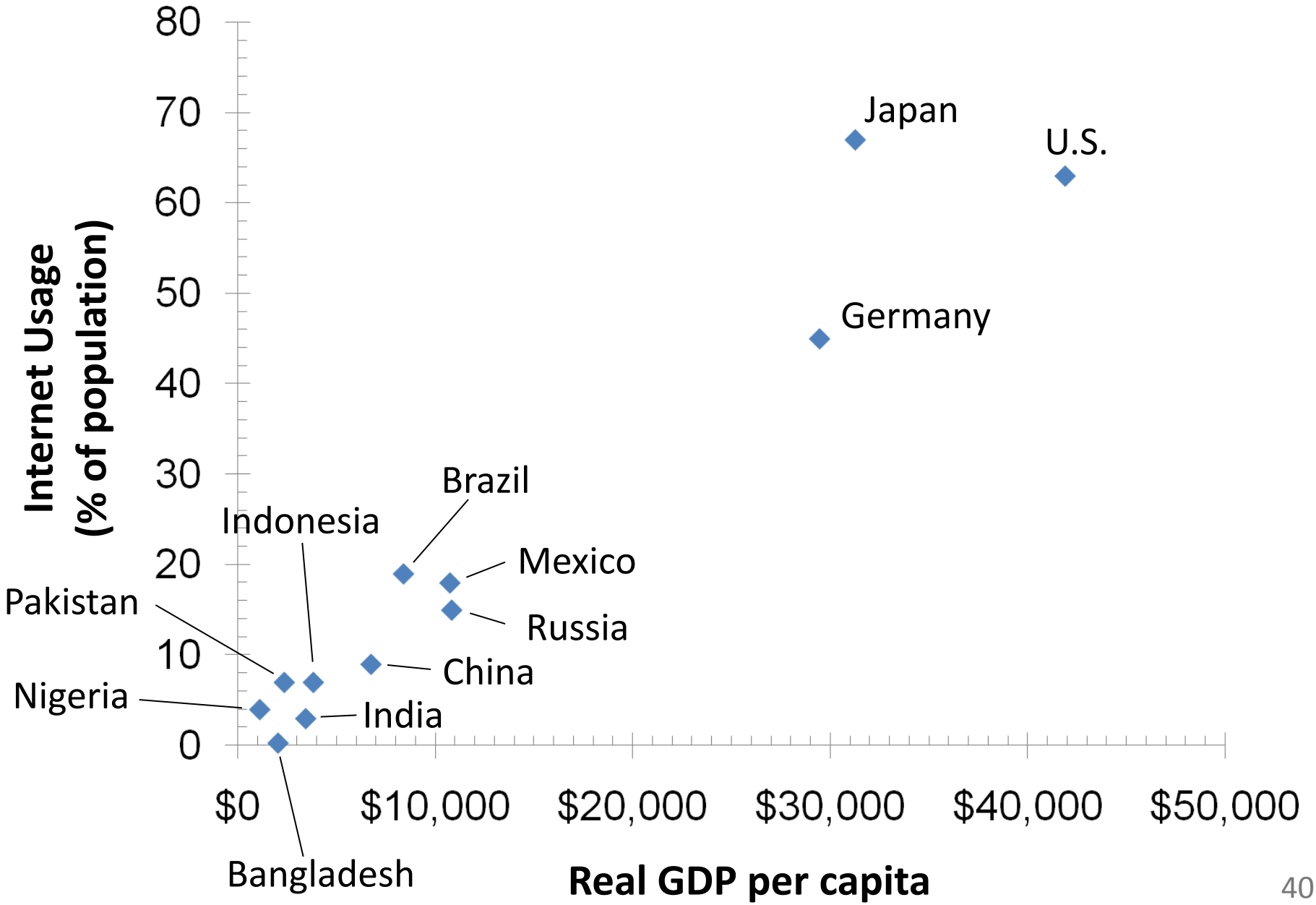
GDP and Life Expectancy in 12 countries



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.