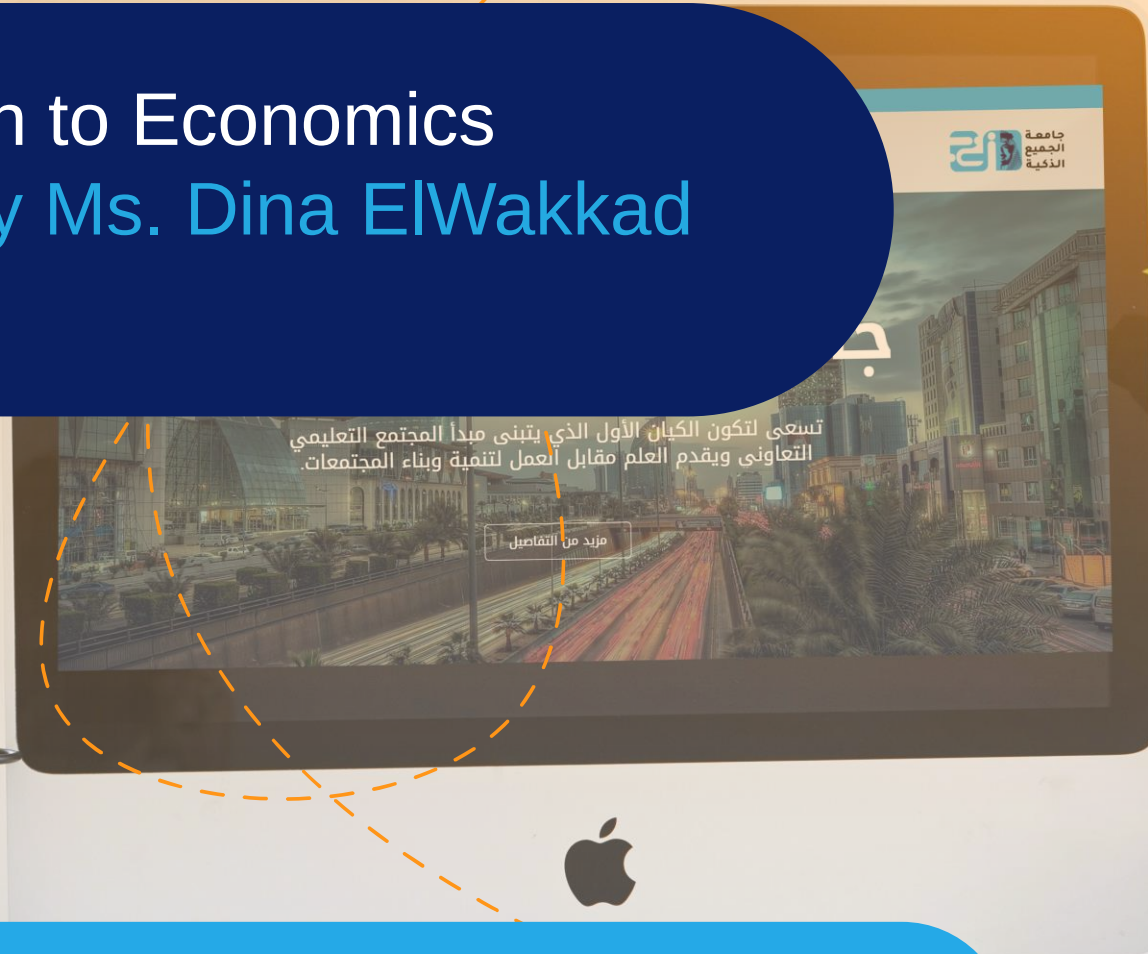


Introduction to Economics

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Lecture 9



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MGM112

MEASURING GDP AND ECONOMIC GROWTH

After studying this chapter, you will be able to

- Define GDP
- Explain the way of measuring GDP
- Explain how we measure real GDP and the GDP deflator
- Explain how we use real GDP to measure economic growth and describe the limitations of our measure

1) Gross Domestic Product

GDP Defined

GDP or **gross domestic product** is the market value of all final goods and services produced in a country in a given time period.

This definition has four parts:

1. Market value
2. Final goods and services
3. Produced within a country
4. In a given time period

1- Market value

GDP is a market value—goods and services are valued at their market prices.

To add apples and oranges, computers and popcorn, we add the market values so we have a total value of output in dollars.

2- Final goods and services

GDP is the value of the final goods and services produced.

A **final good** (or service) is an item bought by its final user during a specified time period.

- Ex: Bread sold to a consumer is a final good

A final good contrasts with an **intermediate good**, which is an item that is produced by one firm, bought by another firm, and used as a component of a final good or service.

- Ex: Wheat sold to a baker to make the bread is an intermediate good

Excluding intermediate goods and services **avoids double counting**.

3- Produced within a country

GDP measures production within a country—domestic production.

4- In a given time period

GDP measures production during a specific time period, normally a year or a quarter of a year.

Aggregate expenditure

- Total expenditure on final goods and services equals the value of output of final goods and services, which is GDP.
- **$\text{GDP} = \text{Total expenditure} = C + I + G + (X - M).$**

Aggregate income

- Aggregate income earned from production of final goods, Y , equals the total paid out for the use of resources, wages, interest, rent, and profit.
- Firms pay out all their receipts from the sale of final goods, so income equals expenditure,
 - **$GDP = Y = C + I + G + (X - M)$.**

Measuring Gross Domestic Product

GDP= Total Expenditure = Total Income = Total Product (output)

GDP = Consumption + Investment + Government Spending + Net Export

$$\text{GDP} = Y = AE$$

$$\text{GDP} = C + I + G + NX.$$

$$\text{GDP} = C + I + G + (X - M)$$

- **C** = All private consumption/ consumer spending in the economy.
- **I** = All of a country's investment in capital equipment, housing, etc.
- **G** = All of the country's government spending. It includes the salaries of a government employee, construction, maintenance, etc.
- **NX** = Net country export – Net country import

World's Region

Country	Wealth (\$T)	Percentage (%)
United States	\$20.49T	23.89%
China	\$13.61T	15.86%
Japan	\$4.97T	5.79%
India	\$2.73T	3.18%
Germany	\$3.99T	4.65%
United Kingdom	\$2.82T	3.29%
Russia	\$1.66T	1.93%
France	\$2.78T	3.24%
Italy	\$2.07T	2.42%
Spain	\$1.43T	1.66%
Canada	\$1.71T	1.99%
Australia	\$1.43T	1.67%
Other Countries		8.98%

World's Region Legend:

- AFRICA
- AUSTRALIA
- OTHER COUNTRIES
- LATIN AMERICA AND CARIBBEAN
- MIDDLE EAST
- EUROPE
- ASIA
- NORTH AMERICA

howmuch.net

Measuring Gross Domestic Product

Net Export = Exports - Imports

$$NX = (X - M)$$

Exports > Imports Surplus

Exports < Imports Deficit

Exports = Imports Balanced



Problem (1)

The table shows data from the United Kingdom in 2005. Calculate GDP in the United Kingdom and Explain the approach (expenditure or income) that you used to calculate GDP.

Answer

The expenditure approach will be used

$$GDP = AE$$

$$GDP = C + I + G + (X-M)$$

$$GDP = 791 + 209 + 267 + (322-366)$$

$$GDP \text{ in the United Kingdom} = \text{£1,223 billion}$$

$$M > E \rightarrow 366 > 322 \rightarrow \text{Trade deficit}$$

Item	Billions of pounds
Wages paid to labor	685
Consumption expenditure	791
Taxes	394
Transfer payments	267
Profits	273
Investment	209
Government expenditure	267
Exports	322
Saving	38
Imports	366

Think



The transactions in Jupiter last year are in the table to the right.

- Calculate Jupiter's aggregate expenditure.
- Calculate Jupiter's net exports.
- Calculate Jupiter's government expenditure.

Item	Dollars
GDP	1,400,000
Consumption expenditure	700,000
Taxes	350,000
Transfer payments	150,000
Profits	300,000
Investment	350,000
Exports	400,000
Saving	400,000
Imports	350,000

Answer

- Aggregate expenditure = GDP = **\$1,400,000.**
- $NX = X - M = \$400,000 - \$350,000 = \textbf{\$50,000}$
- Jupiter's government expenditure was \$300,000, As:

$$GDP = C + I + G + NX$$

$$\$1,400,000 = \$700,000 + \$350,000 + G + \$50,000$$

$$\$1,400,000 = \$1,100,000 + G$$

$$G = \$1,400,000 - \$1,100,000$$
 $G = \$300,000.$



Gross Domestic Product can be measured as the sum of

- a. final goods and services, intermediate goods, transfer payments, and rent.
- b. consumption, investment, government purchases, and net exports.**
- c. consumption, transfer payments, wages, and profits.
- d. investment, wages, profits, and intermediate production.

Gross Domestic Product is the sum of the market value of the

- a. intermediate goods.
- b. final goods and services.**
- c. manufactured goods.
- d. inferior goods and services.



If a cobbler buys leather for €100 and thread for €50 and uses them to produce and sell €500 worth of shoes to consumers, the contribution to GDP is

- a. €50.
- b. €100.
- c. €650.
- d. €500.**

If your grandparents buy a newly built retirement home, this transaction will affect
a. investment.

- b. net exports.
- c. government purchases.
- d. consumption.



Intermediate goods are not included to calculate the final output because:

- a) they do not have value
- b) they have unknown value
- c) their value is included in final goods, so they are not added to avoid the problem of double counting**
- d) none of the above

A country with a larger GDP per person generally has a greater standard of living or quality of life than a country with a smaller GDP per person. True

If company A, an American corporation, produces sneakers in Thailand this would add to Thailand's GDP but not to U.S. GDP. True

2) Real GDP and the Price Level

Steps to measure GDP inflation rate/ price level:

1. Measure Nominal GDP
2. Measure Real GDP
3. Measure GDP deflator $(1/2)*100$

4.

GDP Inflation Rate

$$= \frac{\text{GDP Deflator Year 2} - \text{GDP Deflator Year 1}}{\text{GDP Deflator Year 1}} \times 100$$

- **Real GDP** is the value of final goods and services produced in a given year when **valued at constant prices**.

- **Calculating Real GDP**

- The first step in calculating real GDP is to calculate **Nominal GDP**, which is the value of goods and services produced during a given year valued at the prices of **that year**.

Nominal GDP	Real GDP
It is the value of final goods and services produced in a given year valued at the prices of that year	It is the value of final goods and services produced in a given year when valued at the prices of a reference base year .
$\text{Nominal GDP} = \sum Q \text{ Current Period} \times \text{Prices Current Period}$ $= (Q1(2002) * \underline{P}(2002)) + (Q2(2002) * P(2002))$	$\text{Real GDP} = \sum Q \text{ Current Period} \times \text{Prices Base Period}$ $= (Q1(2003) * P(2002)) + (Q2(2003) * P(2002))$

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

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

GDP Inflation Rate

$$= \frac{\text{GDP Deflator Year 2} - \text{GDP Deflator Year 1}}{\text{GDP Deflator Year 1}} \times 100$$

Real GDP and the Price Level

year	Pizza		Latte	
	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
2002	\$10	400	\$2.00	1000
2003	\$11	500	\$2.50	1100
2004	\$12	600	\$3.00	1200

a) Compute nominal GDP in each year:

Answer

$$2002: \$10 \times 400 + \$2 \times 1000 = \$6,000$$

$$2003: \$11 \times 500 + \$2.50 \times 1100 = \$8,250$$

$$2004: \$12 \times 600 + \$3 \times 1200 = \$10,800$$

Real GDP and the Price Level

	Pizza		Latte	
year	<i>P</i>	<i>Q</i>	<i>P</i>	<i>Q</i>
→ 2002	\$10	400	\$2.00	1000
2003	\$11	500	\$2.50	1100
2004	\$12	600	\$3.00	1200

b) Compute real GDP in each year
using 2002 as the base year:

Answer:

$$2002: \$10 \times 400 + \$2 \times 1000 = \$6,000$$

$$2003: \$10 \times 500 + \$2 \times 1100 = \$7,200$$

$$2004: \$10 \times 600 + \$2 \times 1200 = \$8,400$$

c) Compute the GDP deflator in each year

Answer:

year	Nominal GDP	Real GDP	GDP Deflator	
2002	\$6000	\$6000	100.0	$100 \times (6000/6000)$
2003	\$8250	\$7200	114.6	$100 \times (8250/7200)$
2004	\$10,800	\$8400	128.6	$100 \times (10,800/8400)$

d) Use GDP deflator to compute the Inflation rate from 2002 to 2003, and from 2003 to 2004

Inflation rate from 2002 to 2003

$$= (D_{2003} - D_{2002}) / D_{2002} \times 100$$

$$= (114.6 - 100 / 100) \times 100 = 14.6 \%$$

Inflation rate from 2002 to 2003 = 14.6 %

Inflation rate from 2003 to 2004

$$= (D_{2004} - D_{2003}) / D_{2003} \times 100$$

$$= (128.6 - 114.6 / 114.6) \times 100 = 12.2 \%$$

Inflation rate from 2003 to 2004 = 12.2 %

year	GDP Deflator	
2002	100.0	} 14.6%
2003	114.6	
2004	128.6	} 12.2%

3) Measuring Economic Growth

What in it for me?

Economic Growth

- Is your main indicator of the economic activity
- Sales Leaders as to use the expected growth as base to their sales forecasting.
- Countries with high rate of Economic growth are attractive for new investment.



- We use **real GDP** to calculate the economic growth rate.
- The **economic growth rate** is the percentage change in the quantity of goods and services produced from one year to the next.

$$\text{Economic Growth} = (\text{Real GDP Current Period} - \text{Real GDP Last}) / \text{Real GDP Last}$$

We measure economic growth so we can make:

1. Economic welfare comparisons
2. International welfare comparisons

1) Economic Welfare Comparisons

- Economic welfare measures the nation's **overall state of economic well-being**.

- Real GDP is not a perfect measure of economic welfare for seven reasons:

1. Real GDP does not include **Quality improvements**
2. Real GDP does not include **household production**
3. Real GDP does not include **the underground economy, illegal economic activity**.
 - The underground economy means that GDP will understate the actual level of economic welfare.

1) Economic Welfare Comparisons

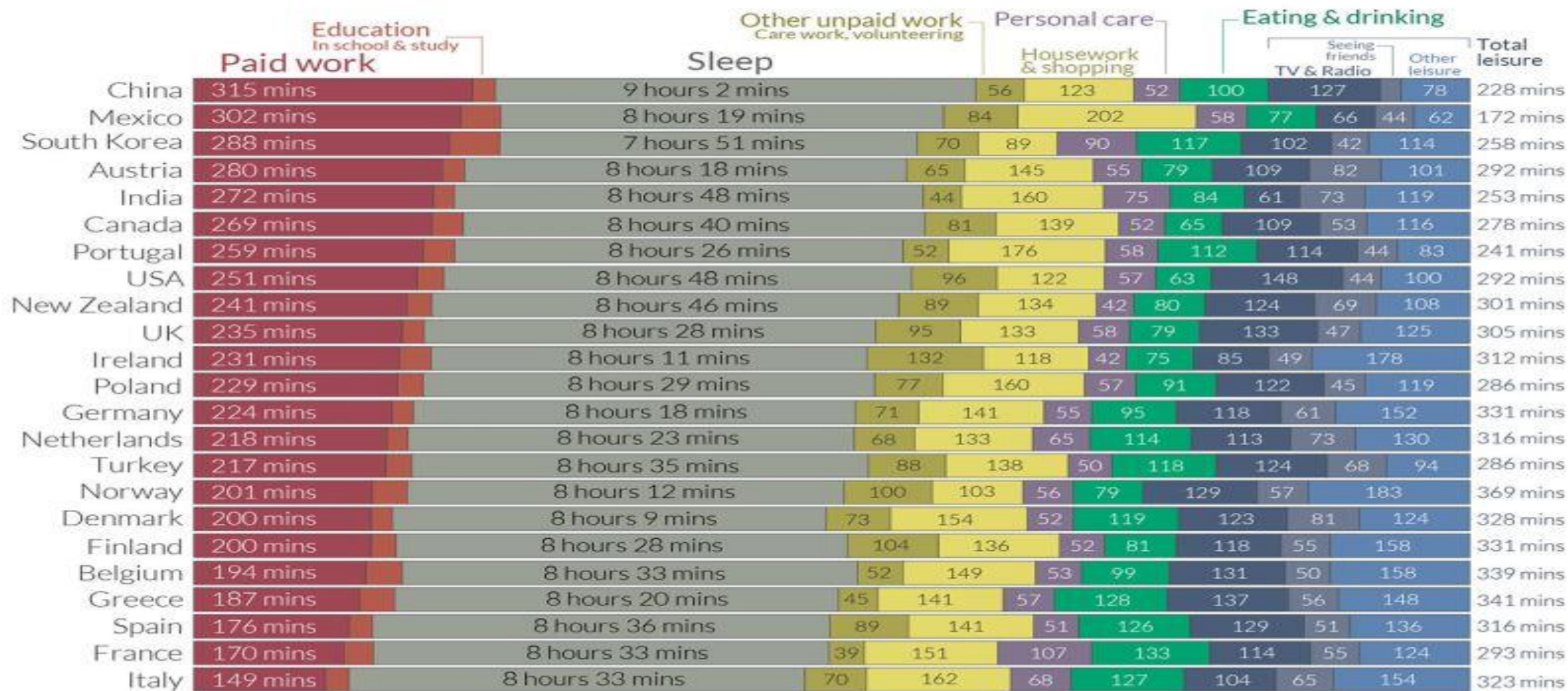
• Real GDP is not a perfect measure of economic welfare for seven reasons:

4. Real GDP does not account for **people's health and life expectancy**
5. Real GDP does not consider **the value of leisure time.**
6. Real GDP does not consider **Environmental Quality / damage**
7. Real GDP does not indicate the extent of **political freedom and social justice** enjoyed by a nation's citizens

How do people spend their time?

Our World
in Data

Averages of minutes per day from time-use diaries for people between 15 and 64.



Data source: OECD Time Use Database, Gender Data Portal. For most countries surveys were conducted between 2009 and 2016, but surveys for some countries are older.

OurWorldinData.org - Research and data to make progress against the world's largest problems.

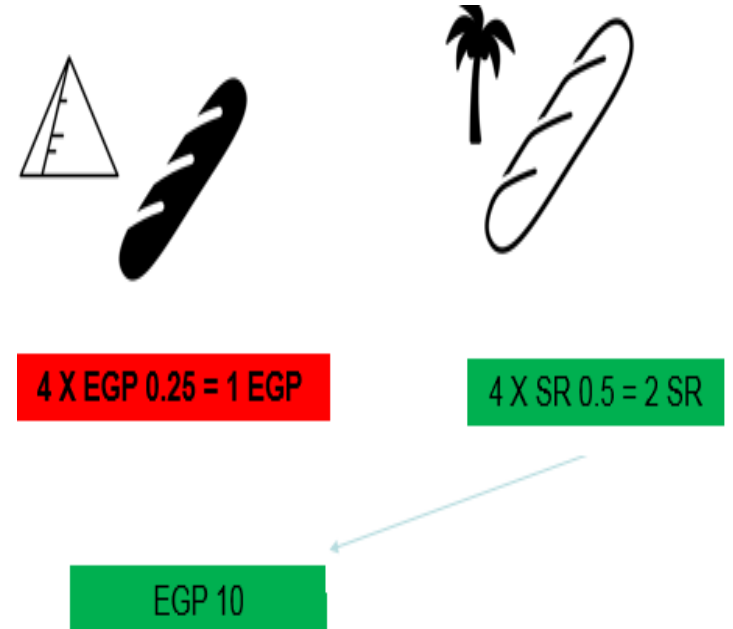
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2) International Comparisons

- When Real GDP is used to compare economic welfare in one country with that in another, there are two special problems arise:
 1. Real GDP of one country must be converted into the same currency units as the real GDP of the other country, so an exchange rate must be used.
 2. The same prices should be used to value the goods and services in the countries being compared, but prices of particular products in one country may be much less or much more than in the other country





THINK

Suppose that nominal GDP is \$21,000 in 2002, the 1998 GDP deflator is 100, and the 2002 deflator is 105. The approximate real GDP in 2002 is

- A) \$20,000.
- B) \$21,000.
- C) \$19,048.
- D) \$22,050.

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

$$105 = \frac{21000}{\text{Real GDP}} \times 100$$

$$1.05 = \frac{21000}{\text{Real GDP}}$$

$$\text{Real GDP} = 20000$$





Which of the following is NOT included in real GDP?

- A) Production of services, such as the services of doctors.
- B) Production of goods that last more than one year, such as television sets.
- C) Production of goods that do not last more than one year, such as gasoline.
- D) Production in the home.**

Which of the following is NOT a reason that real GDP is a poor measure of a nation's economic welfare?

- A) Real GDP omits measures of political freedom.
- B) Real GDP does not take into account the value of people's leisure time.
- C) Real GDP does not include the underground economy.
- D) Real GDP overvalues household production.**



Real GDP is measured in _____ prices while nominal GDP is measured in _____ prices.

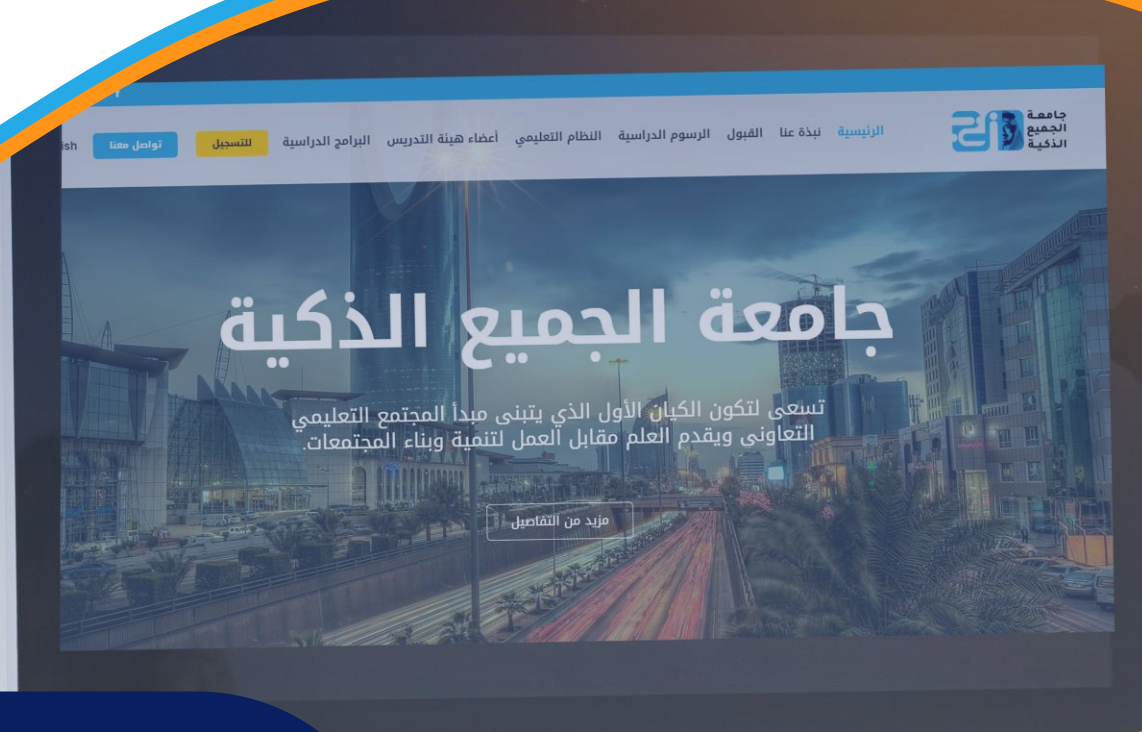
- A. foreign; domestic
- B. current year; base year
- C. domestic; foreign
- D. base year; current year

Summary outlines

- Definition of GDP
- Measuring GDP
- Real GDP and the Price Level
- Measuring Economic Growth
- Limitations of Real GDP as a measure of economic welfare



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Thank You