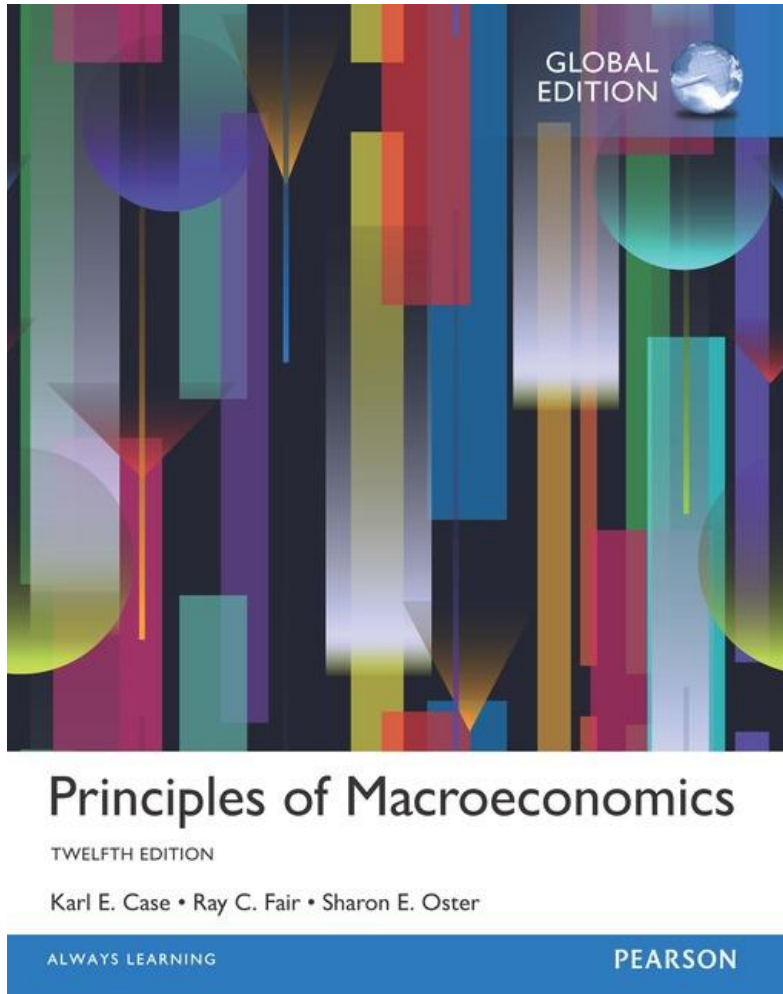


Principles of Macroeconomics

Twelfth Edition, Global Edition



Chapter(2)

Measuring National Output and National Income

Chapter 2 Measuring National Output and National Income

- ❑ Macroeconomics relies on data, Much of this data is collected by the government and/or central bank.
- **national income and product accounts** Data collected and published by the government describing the various components of national income and output in the economy.
- Data are compiled by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce.
- While there are literally thousands of variables in the national income and product accounts, in this chapter we discuss only those that are most important.

Gross Domestic Product

- The key concept in the national income and product accounts is gross domestic product (GDP).
- **gross domestic product (GDP)** The total market value of all final goods and services produced within a given period by factors of production located within a country.
- ❖ Suppose that we know that apples sell for \$0.25 each, bananas for \$0.50 each, and shoes for \$20.00 a pair.
- The market value of this economy's production, or its GDP, is equal to:
$$(6 \text{ apples} * \$0.25/\text{Apple}) + (8 \text{ bananas} * \$0.50/\text{banana}) + (3 \text{ pairs of shoes} * \$20.00/\text{pair}) = \$65.50.$$

Final Goods and Services (1 of 2)

- First, note that the definition refers to **final goods and services**. Many goods produced in the economy are not classified as *final* goods, but instead as intermediate goods.
- **final goods and services** Goods and services produced for final use.
- **intermediate goods** Goods that are produced by one firm for use in further processing or for resale by another firm.
- ✓ **Why are intermediate goods not counted in GDP?**
- Intermediate goods are not added separately in order to avoid double counting. Double counting can also be avoided by adding up national income using the value-added approach.

value added

- **value added** The difference between the value of goods as they leave a stage of production and the cost of the goods as they entered that stage.
- We do not use the value of total sales in an economy to measure how much output has been produced.

Final Goods and Services *(2 of 2)*

value added

- In calculating GDP, we can sum up the value added at each stage of production, or we can take the value of final sales.

Example:

- **TABLE 6.1 Value Added in the Production of a Gallon of Gasoline (Hypothetical Numbers)**

Stage of Production	Value of Sales	Value Added
(1) Oil drilling	\$ 3.00	\$ 3.00
(2) Refining	3.30	0.30
(3) Shipping	3.60	0.30
(4) Retail sale	4.00	<u>0.40</u>
Total value added		\$ 4.00

Exclusion of Used Goods and Paper Transactions

- ❑ When calculating the value of the total GDP, some things are excluded:
 - GDP is concerned only with new, or current, production. Old output is not counted in current GDP because it was already counted when it was produced.
 - GDP does not count transactions in which money or goods change hands but in which no new goods and services are produced.

Exclusion of Output Produced Abroad by Domestically Owned Factors of Production

- GDP is the value of output produced by factors of production *located within a country*.
- It is sometimes useful to have a measure of the output produced by factors of production owned by a country's citizens regardless of where the output is produced. This measure is called **gross national product (GNP)**.
- **gross national product (GNP)** The total market value of all final goods and services produced within a given period by factors of production owned by a country's citizens, regardless of where the output is produced.
- For most countries, including the United States, the difference between GDP and GNP is small

Calculating GDP

❖ GDP can be computed two ways:

- **expenditure approach** A method of computing GDP that measures the total amount spent on all final goods and services during a given period.
- **income approach** A method of computing GDP that measures the income—wages, rents, interest, and profits—received by all factors of production in producing final goods and services.
- These two methods lead to the same value for GDP for the reason we discussed in the previous chapter: Every payment (expenditure) by a buyer is at the same time a receipt (income) for the seller. We can measure either income received, or expenditures made, and we will end up with the same total output

The Expenditure Approach *(1 of 7)*

- Recall from the previous chapter the four main groups in the economy: households, firms, the government, and the rest of the world.
- There are four main categories of expenditure:
 - Personal consumption expenditures (C): household spending on consumer goods
 - Gross private domestic investment (I): spending by firms and households on new capital—that is, plant, equipment, inventory, and new residential structures
 - Government consumption and gross investment (G)
 - Net exports ($EX - IM$): net spending by the rest of the world, or exports (EX) minus imports (IM)

TABLE 6.2 Components of U.S. GDP, 2014: The Expenditure Approach

	Billions of Dollars (\$)		Percentage of GDP (%)	
Personal consumption expenditures (C)	11,930.3		68.5	
Durable goods		1,302.5		7.5
Nondurable goods		2,666.2		15.3
Services		7,961.7		45.7
Gross private domestic investment (I)	2,851.6		16.4	
Nonresidential		2,210.5		12.7
Residential		559.1		3.2
Change in business inventories		82.0		0.5
Government consumption and gross investment (G)	3,175.2		18.2	
Federal		1,219.2		7.0
State and local		1,956.1		11.2
Net exports (EX – IM)	–538.2		–3.1	
Exports (EX)		2,337.0		13.4
Imports (IM)		2,875.2		16.5
Gross domestic product	17,418.9		100.0	

Source: U.S. Bureau of Economic Analysis, March 27, 2015.

The Expenditure Approach (2 of 7)

Personal Consumption Expenditures (C) (The largest part of GDP)

- **personal consumption expenditures (C)** Expenditures by consumers on goods and services.
- ✓ There are three main categories of consumer expenditures: **durable goods**, **nondurable goods**, and **services** :
 - **durable goods**: Goods that last a relatively long time, such as cars and household appliances.
 - **nondurable goods** : Goods that are used up fairly quickly, such as food and clothing.
 - **services** : The things we buy that do not involve the production of physical things, such as legal and medical services and education.

ECONOMICS IN PRACTICE

Where Does eBay Get Counted?

eBay's business is to provide a marketplace for exchange. In doing so, it uses labor and capital and creates value.

In return for creating this value, eBay charges fees to the sellers that use its site. The value of these fees enter into GDP.

Items that people sell on eBay do not contribute to current GDP. The cost of finding an interested buyer for those goods, however, does get counted.



THINKING PRACTICALLY

1. John has a 2009 Honda Civic. In 2013, he sells it to Mary for \$10,000. Is that \$10,000 counted in the GDP for 2013?
2. If John is an automobile dealer, does that change your answer to Question 1 at all?

The Expenditure Approach (3 of 7)

Gross Private Domestic Investment (I)

- *Investment* is the purchase of new capital – housing, plants, equipment, and inventory
- **gross private domestic investment (I)** Total investment in capital—that is, the purchase of new housing, plants, equipment, and inventory by the private (or nongovernment) sector.
- The gross private domestic investment(I) It consists of three elements::

1- nonresidential investment Expenditures by firms for machines, tools, plants, and so on.

The Expenditure Approach *(4 of 7)*

Gross Private Domestic Investment (I)

2-residential investment Expenditures by households and firms on new houses and apartment buildings.

- **3-change in business inventories** The amount by which firms' inventories change during a period. **Inventories are the goods that firms produce now but intend to sell later.**

- **The relationship between total production and total sales is as follows:**

- **$GDP = \text{Final sales} + \text{Change in business inventories}$.**

$GDP = \text{final sales} + \text{change in business inventories}$

The Expenditure Approach (5 of 7)

Gross Private Domestic Investment (I)

- **depreciation** The amount by which an asset's value falls in a given period.

✓ What is the relationship between gross investment (I) and depreciation?

❖ **gross investment** The total value of all newly produced capital goods (plant, equipment, housing, and inventory) produced in a given period. **It takes no account of the fact that some capital wears out and must be replaced**

❖ **net investment** = Gross investment minus depreciation.

- Therefore, if net investment is positive, the capital stock has increased, and if net investment is negative, the capital stock has decreased. Put another way, the capital stock at the end of a period is equal to the capital stock that existed at the beginning of the period plus net investment:

$$\text{capital}_{\text{end of period}} = \text{capital}_{\text{beginning of period}} + \text{net investment}$$

The Expenditure Approach *(6 of 7)*

Government Consumption and Gross Investment (G)

government consumption and gross investment (G)

Expenditures by federal, state, and local governments for final goods and services

The Expenditure Approach *(7 of 7)*

Net Exports ($EX - IM$)

- **net exports ($EX - IM$)** The difference between exports (sales to foreigners of U.S.-produced goods and services) and imports (U.S. purchases of goods and services from abroad). The figure can be positive or negative.

GDP Expenditures Equation

Terminology

Y	Gross Domestic Product or output
C	Consumption Expenditure
I	Investment
G	Government Purchases
NX	Net Exports

- Expenditure approach to measuring GDP

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

The Income Approach *(1 of 4)*

➤ We now turn to calculating GDP using the income approach

- **national income** The total income earned by the factors of production owned by a country's citizens. It consists of :

1-compensation of employees Includes wages, salaries, and various supplements—employer contributions to social insurance and pension funds, for example—paid to households by firms and by the government.

2-proprietors' income The income of unincorporated businesses.

3-rental income The income received by property owners in the form of rent.

The Income Approach *(2 of 4)*

4-corporate profits The income of corporations.

5-net interest The interest paid by business.

6-indirect taxes minus subsidies Taxes such as sales taxes, customs duties, and license fees less subsidies that the government pays for which it receives no goods or services in return.

7-net business transfer payments Net transfer payments by businesses to others.

8-surplus of government enterprises Income of government enterprises.

Example

TABLE 6.3 National Income, 2014

	Billions of Dollars (\$)		Percentage of National Income (%)	
National income	15,070.4		100.0	
Compensation of employees		9,221.6		61.2
Proprietors' income		1,380.2		9.2
Rental income		640.2		4.2
Corporate profits		2,089.8		13.9
Net interest		486.3		3.2
Indirect taxes minus subsidies		1,145.8		7.6
Net business transfer payments		140.6		0.9
Surplus of government enterprises		-34.2		-0.2

Source: U.S. Bureau of Economic Analysis, March 27, 2015.

Homework

Compensation of employees	7,783.5
Proprietors' income	1,041.0
Rental income	268.1
Corporate profits	1,308.9
Net interest	788.2
Indirect taxes minus subsidies	964.3
Net business transfer payments	134.1
Surplus of government enterprises	-8.1

National income	-----
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- -Calculate GDP by using Income Approach .

The Income Approach *(3 of 4)*

- **net national product (NNP)** Gross national product minus depreciation; a nation's total product minus what is required to maintain the value of its capital stock.
- **statistical discrepancy** Data measurement error.
- **personal income** The total income of households.

personal income = national income - Amount of national income not going to households

Example

TABLE 6.4 GDP, GNP, NNP, and National Income, 2014

	Dollars (\$, Billions)
GDP	17,418.9
Plus: Receipts of factor income from the rest of the world	+827.7
Less: Payments of factor income to the rest of the world	<u>-616.0</u>
Equals: GNP	17,630.6
Less: Depreciation	<u>-2,736.2</u>
Equals: Net national product (NNP)	14,894.4
Less: Statistical discrepancy	<u>-176.0</u>
Equals: National income	15,070.4

Source: U.S. Bureau of Economic Analysis, March 27, 2015.

GNP = GDP + Receipts of factor income from the rest of the world - Payments of factor income to the rest of the world

Net national product (NNP) = GNP - Depreciation

National Income = NNP - Statistical discrepancy

The Income Approach *(4 of 4)*

- **disposable personal income** or **after-tax income** Personal income minus personal income taxes. The amount that households have to spend or save.

$$\text{disposable personal income} = \text{personal income} - \text{income tax}$$

- **personal saving** The amount of disposable income that is left after total personal spending in a given period.

$$\text{personal saving} = \text{disposable personal income} - \text{Personal consumption expenditures} - \text{Personal interest payments} - \text{Transfer payments made by households}$$

- **personal saving rate** The percentage of disposable personal income that is saved. If the personal saving rate is low, households are spending a large amount relative to their incomes; if it is high, households are spending cautiously.
- **personal saving rate** $= (\text{personal saving} / \text{disposable personal income}) * 100$

TABLE 6.5 National Income, Personal Income, Disposable Personal Income, and Personal Saving, 2014

	Dollars (Billions, \$)
National income	15,070.4
Less: Amount of national income not going to households	<u>-341.8</u>
Equals: Personal income	14,728.6
Less: Personal income taxes	<u>-1,742.9</u>
Equals: Disposable personal income	12,985.8
Less: Personal consumption expenditures	-11,930.3
-Personal interest payments	-256.8
-Transfer payments made by households	<u>-170.3</u>
Equals: Personal saving	628.3
Personal saving as a percentage of disposable personal income:	4.8%

Source: U.S. Bureau of Economic Analysis, March 27, 2015.

Personal income = National income - Amount of national income not going to households

Nominal versus Real GDP

- **nominal GDP** Gross domestic product measured in current dollars. the current prices we pay for goods and services.
- **current dollars** The current prices that we pay for goods and services.
- In the following discussion, we will use the concept of a weight, either price weights or quantity weights. What is a weight?
- **weight** The importance attached to an item within a group of items.

Calculating Real GDP

- ❖ Real GDP is nominal GDP adjusted for changes in the price level.
- Before 1996 the BEA calculated real GDP and the GDP deflator by selecting a base year and using the prices in that year to calculate the two. This is called a fixed-weight procedure
- **base year** The year chosen for the weights in a fixed-weight procedure.
- **fixed-weight procedure** A procedure that uses weights from a given base year.
- Table 6.6 presents all the data that we will need. The table presents price and quantity data for 2 years and three goods. The goods are labeled *A*, *B*, and *C*, and the years are labeled 1 and 2. *P* denotes price, and *Q* denotes quantity

TABLE 6.6 A Three-Good Economy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Prod ucti on		Price per Unit		GDP in Year 1 in Year 1 Prices	GDP in Year 2 in Year 1 Prices	GDP in Year 1 in Year 2 Prices	GDP in Year 2 in Year 2 Prices
	Q_1	Q_2	P_1	P_2	$P_1 \times Q_1$	$P_1 \times Q_2$	$P_2 \times Q_1$	$P_2 \times Q_2$
Good A	6	11	\$ 0.50	\$ 0.40	\$ 3.00	\$ 5.50	\$ 2.40	\$ 4.40
Good B	7	4	0.30	1.00	2.10	1.20	7.00	4.00
Good C	10	12	0.70	0.90	7.00	8.40	9.00	10.80
Total					\$ 12.10	\$ 15.10	\$ 18.40	\$ 19.20
					Nominal GDP in year 1			Nominal GDP in year 2

Calculating the GDP Deflator

- Policy makers need not only good measures of how real output is changing but also good measures of how the overall price level is changing.
- The GDP deflator is one measure of the overall price level.

- $$GDP\ deflator = \frac{Nominal\ GDP}{Real\ GDP} \times 100$$

- **Inflation rate = 100 * (GDP deflator in year 3 – GDP deflator in year 2) / GDP deflator in year 2**

The Problems of Fixed Weights

- Many structural changes took place in the U.S. economy between the 1950s and 1987.
- The use of fixed-price weights does not account for the responses in the economy to supply shifts.
- The fixed-weight procedure ignores the substitution away from goods whose prices are increasing and toward goods whose prices are decreasing or whose prices are increasing less rapidly.

Limitations of the GDP Concept (1 of 2)

- ❖ Discuss the limitations of using GDP to measure well-being.

GDP and Social Welfare

- If crime levels went down, society would be better off, but a decrease in crime is not an increase in output and is not reflected in GDP.
- An increase in leisure is also an increase in social welfare, sometimes associated with a *decrease* in GDP.
- Most nonmarket and domestic activities, such as housework and childcare, are not counted in GDP.
- GDP also has nothing to say about the distribution of output among individuals in a society.

ECONOMICS IN PRACTICE

An alternative to GDP: The Human Development Index

GDP and GNI indicate economic welfare but do not measure the nation's overall well-being.

As a result of discussions about the multiple dimensions of economic development, a new indicator-the Human Development Index was created by the United Nations in 1990 to compare well-being across nations.

However, it neglects important aspects of a county's well-being such as human rights or political participation.



THINKING PRACTICALLY

1. What are the other aspects of a nation's well-being you think are missing from both HDI and GDP (or GNI) measures?

Limitations of the GDP Concept *(2 of 2)*

The Informal Economy

- **informal economy** The part of the economy in which transactions take place and in which income is generated that is unreported and therefore not counted in GDP.

Gross National Income per Capita

- **gross national income (GNI)** GNP converted into dollars using an average of currency exchange rates over several years adjusted for rates of inflation.
- GNI per capita is a better measure of well-being for the average person than is total GDP. GNI per capita is also extremely useful when trying to compare the economies of two different countries.

Exercise n 1

Refer to the information provided in Table 1 below to answer the questions that follow.

Table 1

	\$Billions
Durable goods	800
Nonresidential investment	400
Federal purchases of goods	300
Exports	400
State and local purchases of goods	200
Residential investment	50
Services	500
Imports	250
Change in business inventories	-25
Nondurable goods	700

- 1) Refer to Table 1, calculate the personal consumption expenditures.

Answer:

$$C = \text{durable goods} + \text{nondurable goods} + \text{services} = 800 + 700 + 500 = 2000$$

- 2-Refer to Table 1, calculate the value for gross private domestic investment.

Answer:

$$I = \text{Nonresident investment} + \text{Residential investment} + \text{Change in business inventories} = 400 + 50 - 25 = 425$$

- 3)Refer to Table 1, calculate the value for net exports.

Answer: $\text{Net exports} = \text{exports} - \text{imports} = 400 - 250 = 150$

- 4)Refer to Table 1, calculate the value of government spending.

Answer: $G = \text{Federal purchase of goods} + \text{state and local purchases of goods} = 300 + 200 = 500$

5) Refer to Table 1, calculate the value of gross domestic product.

Answer: : $GDP = C + I + G + NX = 2000 + 425 + 425 + 500 + 150 = 3075$

- **Exercise n 2**

- A company produced 8 dishwasher machines in 2015. The company sold 6 in 2015 and added 2 to its inventory. The market value of the dishwasher machines in 2015 was \$200 per unit. What is the value of this company's output that will be included in the 2015 GDP?

- **Answer: C** : $GDP = 8 * 200 = 1600$

Exercise n 3 : 1) In 2016, final sales equal \$350 billion, and the change in business inventories is -\$60 billion. What is the value of GDP in 2016?

Answer: $GDP = \text{final sales} + \text{change in business inventories} = 350 - 60 = 290$

2) In 2016 the change in business inventories is -\$70 billion and GDP is \$200 billion. What was the value of Final sales in 2016?

Answer:

$GDP = \text{final sales} + \text{change in business inventories}$

$\text{final sales} = GDP - \text{change in business inventories} = 200 + 70 = 270$

3) Suppose that net investment in 2016 was \$20 billion and depreciation was \$4 billion. What was the value of the Gross investment in 2016?

Answer: : $\text{Net investment} = \text{Gross investment} - \text{Depreciation}$

$\text{Gross investment} = \text{Net investment} + \text{Depreciation} = 20 + 4 = 24$

4-If net investment in 2016 is \$350 billion and gross investment in 2016 is \$500 billion, what is the value of the depreciation in 2016?

Answer: Net investment = Gross investment – Depreciation

$$\text{Depreciation} = \text{Gross investment} - \text{net investment} = 500 - 350 = 150$$

5)If gross investment in 2016 is \$750 billion and depreciation in 2016 is \$850 billion, what is the value of the net investment in 2016?

Answer: Net investment = Gross investment – Depreciation = 750 – 850 = -100

Exercise n 4

Refer to the information provided in Table 2 below to answer the questions that follow.

	\$Billions
Compensation of employees	475
Proprietors' income	60
Corporate profit	40
Net interest	25
Rental income	10
Deprecation	70
Indirect taxes	40
Direct taxes	80
Subsidies	15
Payments of factor income to the rest of the world	20
Receipts of factor income from the rest of the world	15

1)Refer to Table 2, what is the value for national income?

Answer: C :National income = compensation of employees + proprietor's income + rental income + corporate profits

$$+ \text{net interest} + (\text{indirect taxes} - \text{subsidies}) + \text{Net business transfer payments} + \text{surplus of government enterprises} = 475 + 60 + 10 + 40 + 25 + (40 - 15) = 635$$

2) Refer to Table 2, what is the value for gross domestic product?

Answer: $GDP + (\text{Receipts of factor income from the rest of the world} - \text{Payments of factor income to the rest of the world}) - \text{depreciation} - \text{Statistical discrepancy} = \text{National income}$

$GDP = \text{National income} - (\text{Receipts of factor income from the rest of the world} - \text{Payments of factor}$

$\text{income to the rest of the world}) + \text{depreciation} + \text{Statistical discrepancy} = 635 - (15 - 20) + 70 = 710$

3) Refer to Table 2. The value of net factor payments to the rest of the world in billions of dollars is **Answer:**
 $\text{net factor payments to the rest of the world} = \text{Payments of factor income to the rest of the world} - \text{Receipts of factor income from the rest of the world} = 20 - 15 = 5$

4) Refer to Table 2, what is the value of disposable income?

- Answer:** $\text{Disposable personal income} = \text{Personal income} - \text{Personal income (direct) taxes} = (475 + 60 + 10 + 25 + 40) - 80 = 610 - 120 = 530$

- Exercise n 5** Refer to the information provided in Table 3 below to answer the questions that follow.

Table 3

	\$Billions
Depreciation	40
Receipts of factor income from the rest of the world	30
Government purchases	100
Imports	50
Payments of factor income to the rest of the world	50
Net private domestic investment	200
Personal income taxes	120
Personal consumption expenditures	600
Dividends	20
Exports	100
Amount of national income not going to households	20

- 1) Refer to Table 3, what is the value for GDP?

- Answer:** $GDP = C + I + G + (\text{Exports} - \text{Imports}) = 600 + 200 + 100 + (100 - 50) = 950$

2) Refer to Table 3, what is the value of GNP?

Answer: $GNP = GDP + (\text{Receipts of factor income from the rest of the world} - \text{Payments of factor income to the rest of the world}) = 950 + (30 - 50) = 930$

3) Refer to Table 3, what is the value of NNP?

Answer: $NNP = GNP - \text{Depreciation} = 930 - 40 = 890$

4) Refer to Table 3, what is the value of the national income?

Answer: $\text{National income} = NNP - \text{Statistical discrepancy} = 890 - 0 = 890$

5) Refer to Table 3, what is the value of personal income?

Answer: $\text{Personal income} = \text{National income} - \text{Amount of national income not going to households} = 890 - 20 = 870$

6) Refer to Table 3, calculate the value of the disposable personal income.

Answer: $\text{disposable personal income} = \text{Personal income} - \text{Personal income taxes} = 870 - 120 = 750$

Exercise n 6

If GDP is \$300 billion, depreciation is \$30 billion, and net factor income from the rest of the world is -\$40 billion, then calculate the net national product.

Answer: $NNP = GNP - \text{Depreciation} = (GDP + \text{Receipts of factor income from the rest of the world} - \text{Payments of factor income to the rest of the world}) - \text{Depreciation} = (300 - 40) - 30 = 230$

Exercise n 7

If personal saving is -\$10 billion and disposable personal income is \$370 billion, then what is the value of the personal consumption spending?

Answer: B

$\text{personal saving} = \text{Disposable personal income} - \text{personal consumption spending}$

$\text{personal consumption spending} = \text{Disposable personal income} - \text{personal saving} = 370 + 10 = 380$

2) If the disposable personal income is \$400 billion and the personal saving is \$8 billion, calculate the personal saving rate.

Answer: $\text{Personal saving rate} = (\text{personal saving} / \text{Disposable personal income}) * 100 = (8/400) * 100 = 2\%$

Exercise n 8

1- A company produced 12 motorcycles in 2015. The company sold 8 in 2015 and added 4 to its inventories. The market value of the motorcycles in 2015 was \$1,000 per unit. What is the value of this company's output that will be included in the 2015 GDP?

Answer: $12 * 1000 = 12000$

2) In 2016 final sales equal \$500 billion and the change in business inventories is -\$40 billion. What is the value of GDP in 2016?

Answer:

$$\text{GDP} = \text{final sales} + \text{change in business inventories} = 500 - 40 = 460$$

3) In 2016 the change in business inventories is -\$30 billion and GDP is \$160 billion. What is the value of final sales in 2016?

Answer:

$$\text{Final sales} = \text{GDP} - \text{change in business inventories} = 160 + 30 = 190$$

4) Suppose that net investment in 2016 was \$90 billion and depreciation was \$27 billion. What was the value of Gross investment in 2016?

Answer:

$$\text{Gross investment} = \text{net investment} + \text{depreciation} = 90 + 27 = 117$$

5) If net investment in 2017 is \$225 billion and gross investment in 2017 is \$350 billion, what is the value of the depreciation in 2017?

Answer:

$$\text{Depreciation} = \text{Gross investment} - \text{net investment} = 350 - 225 = 125$$

6) If gross investment in 2016 is \$525 billion and depreciation in 2016 is \$650 billion, what is the value of the net investment in 2016?

Answer: $\text{Net investment} = \text{gross investment} - \text{depreciation} = 525 - 650 = -125$

7) If GNP is \$625 billion, receipts of factor income from the rest of the world are \$25 billion, and payments of factor income to the rest of the world are \$50 billion, then what is the value of GDP?

Answer:

$\text{GNP} = \text{GDP} + (\text{receipts of factor income from the rest of the world} - \text{payments of factor income to the rest of the world})$

$\text{GDP} = \text{GNP} - (\text{receipts of factor income from the rest of the world} - \text{payments of factor income to the rest of the world}) = 625 - (25 - 50) = 650$

Exercise n 9

1) If nominal GDP is \$8 trillion and real GDP is \$6 trillion, what is the value of the GDP deflator?

Answer:

$\text{GDP deflator} = (\text{Nominal GDP} / \text{Real GDP}) * 100 = (8/6) * 100 = 133.33$

2) The GDP deflator in year 2 is 110, and the GDP deflator in year 3 is 118. Calculate the rate of inflation between years 2 and 3.

Answer:

$\text{Inflation rate} = 100 * (\text{GDP deflator in year 3} - \text{GDP deflator in year 2}) / \text{GDP deflator in year 2} = 100 * (118 - 110) / 110 = 7.27\%$

- 3) The GDP deflator in year 2 is 110 using year 1 as a base year. This means that, on average, the price of goods and services is
- A) 110% higher in year 2 than in year 1.
 - B) 10% higher in year 2 than in year 1.
 - C) 5% higher in year 1 than in year 2.
 - D) 110% higher in year 1 than in year 2.

Justify your answer. **Answer: B**

$$\text{GDP deflator} = (\text{Nominal GDP} / \text{Real GDP}) * 100 = 110$$

☐ $100 * \text{Nominal GDP} = 110 * \text{Real GDP}$

☐ $\text{Nominal GDP} = (110/100) * \text{Real GDP} = 1.10 * \text{Real GDP}$

☐ $\text{Nominal GDP} > \text{Real GDP}$

☐ The price of goods and services is 10% higher in year 2 than in year 1.

4) The GDP deflator in year 2 is 95 using year 1 as a base year. This means that, on average, the price of goods and services is

A) 105% higher in year 2 than in year 1.

B) 5% higher in year 2 than in year 1.

C) 5% higher in year 1 than in year 2.

D

) 105% higher in year 1 than in year 2.

Justify your **answer. Answer: C**

$$\text{GDP deflator} = (\text{Nominal GDP} / \text{Real GDP}) * 100 = 95$$

☐ $100 * \text{Nominal GDP} = 95 * \text{Real GDP}$

☐ $\text{Nominal GDP} = (95/100) * \text{Real GDP} = 0.95 * \text{Real GDP}$

☐ $\text{Nominal GDP} < \text{Real GDP}$

☐ the price of goods and services is 5% higher in year 1 than in year 2.

5) The GDP deflator in year 3 is 135 using year 1 as a base year. This means that, on average, the price of goods and services is

135% higher in year 3 than in year 1.

17.5% higher in year 3 than in year 1.

35% higher in year 3 than in year 1.

17.5% higher in year 1 than in year 3.

Justify your answer. **Answer: C**

$$\text{GDP deflator} = (\text{Nominal GDP} / \text{Real GDP}) * 100 = 135$$

$$-100 * \text{Nominal GDP} = 135 * \text{Real GDP}$$

$$\text{-Nominal GDP} = (135/100) * \text{Real GDP} = 1.35 * \text{Real GDP}$$

$$\text{-Nominal GDP} > \text{Real GDP}$$

-The price of goods and services is 35% higher in year 3 than in year 1.

6) The GDP deflator in year 3 is 85 using year 1 as a base year. This means that, on average, the price of goods and services is

A) 15% higher in year 3 than in year 1.

B) 7.5% higher in year 3 than in year 1.

C) 15% higher in year 1 than in year 3.

D) 7.5% higher in year 1 than in year 3.

Justify your answer. **Answer: C**

$$\text{GDP deflator} = (\text{Nominal GDP} / \text{Real GDP}) * 100 = 85$$

$$\square 100 * \text{Nominal GDP} = 85 * \text{Real GDP}$$

$$\square \text{Nominal GDP} = (85/100) * \text{Real GDP} = 0.85 * \text{Real GDP}$$

$$\square \text{Nominal GDP} < \text{Real GDP}$$

☐ the price of goods and services is 15% higher in year 1 than in year 3.