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Exercise 2

National Output and National Income

1. Is the following a stock or flow variable?
 - 2.1 Inventories
 - 2.2 Change in Inventories
 - 2.3 Money Supply
 - 2.4 Change in Money Supply
 - 2.5 National Income
 - 2.6 Expenditure
 - 2.7 Wealth
 - 2.8 Population
 - 2.9 Capital
 - 2.10 Interest
2. What is the difference between GDP and GNP? When looking at the US and China, which country do you expect to have higher GNP? Why?
3. The canned apple has 5 stages of production as follows. Find the value added of each stage and the GDP value of the canned apple.

Stages of Production Value of Sales Value Added

Growing Apple	12
Pickling	15
Canning	18
Shipping	20
Retail Sale	22

4. What is Transfer Payment? Why is it not included in GDP?
5. Why are we interested in Real GDP? Explain with examples. Is there a problem associated with Real GDP?
6. Suppose 2018 is the base year. What can we say about Real GDP, Nominal GDP, and GDP Deflator of 2018?
7. Explain three limitations of the GDP concept.
8. In 2018, Kingdom Asgard made the following transactions. Using the expenditure approach, identify which component of GDP is affected by each transaction, and calculate the 2018 GDP.
 - The citizens bought 8 new cars, each worth 50\$.

- The citizens bought 4 new houses, each worth 150\$.
 - The citizens grew rice for their own consumption. The rice was worth 500\$.
 - The firms bought 6 used machines, each worth 50\$.
 - The firms bought 8 car parts, each worth 25\$.
 - The government bought 4 new computers, each worth 50\$.
 - The government paid 1000\$ to the poor as welfare payment.
 - The citizens bought 10 imported ships, each worth 100\$.
 - The firms sold 4 planes abroad, each worth 200\$.
9. Suppose that there are three goods in the economy – goods A, B, and C. Calculate Nominal GDP, Real GDP, and GDP Deflator when 2012 is the base year. Also, calculate the annual inflation rate from 2014 to 2015.

Year	Price of A	Quantity of A	Price of B	Quantity of B	Price of C	Quantity of C
2012	1	3	2	3	3	3
2013	3	1	4	2	1	4
2014	2	2	3	4	2	1
2015	4	4	1	1	4	2

Year	Nominal GDP	Real GDP	GDP Deflator
2012			
2013			
2014			
2015			

10. Using the table below, calculate GNP and NNP.

	Billions of Dollars
GDP	8000
Receipts of factor income from the rest of the world	250
Payments of factor income to the rest of the world	300
Depreciation	900
Indirect taxes minus subsidies	500
Corporate profits minus dividends	500
Social insurance payments	700
Personal interest income received from the government and consumers	300
Transfer payments to persons	1100
Personal taxes	1000

11. Using the table below, Calculate the following items.
- 11.1 Gross domestic investment
 - 11.2 GDP, using the expenditure approach
 - 11.3 GNP
 - 11.4 NNP
 - 11.3 National Income, using the income approach
(Do not worry if NNP and NI differ greatly.)

Table 6.5

Depreciation	168.0
Compensation of employees	1,407.7
Corporate profits	257.6
Dividends	78.4
Exports	212.8
Government purchases	716.8
Imports	235.2
Indirect taxes	593.6
Net interest income	182.2
Net private domestic investment	784.0
Personal consumption expenditures	2,203.2
Personal interest income	112.0
Receipts of factor income from the rest of the world	35.2
Personal taxes	627.2
Proprietor's income	173.9
Payments of factor income to the rest of the world	68.8
Rental income	34.1
Social insurance payments	380.8
Subsidies	44.8
Transfer payments	504.0

12. In a simple economy, suppose that all income is either compensation of employees or profits. Suppose also that there are no indirect taxes. Calculate GDP from the table below. Show that

the expenditure approach and the income approach add up to the same figure.

(Hints: (1) $NNP + \text{Depreciation} = GNP$, (2) $NFFI = 0$, and (3) $NI = NNP$)

Consumption	9500
Investment	3000
Depreciation	1750
Profits	2400
Exports	850
Compensation of employees	11500
Government purchases	3200
Direct taxes	1200
Saving	1600
Imports	900

Answers

- ①
- 2.1 Inventories: Stock Variable
 - 2.2 Changes in inventories: Flow Variable
 - 2.3 Money Supply: Stock Variable
 - 2.4 Changes in Money Supply: Flow Variable
 - 2.5 National Incomes: Flow Variable
 - 2.6 Expenditure: Flow Variable
 - 2.7 Wealth: Stock variable
 - 2.8 Population: Stock Variable
 - 2.9 Capital: Stock Variable
 - 2.10 Interest: Flow Variable

② The difference,

- * GDP: outputs produced within the country's border regardless of the producers' nationalities
- * GNP: output produced by the country's citizens regardless of where they live.

③ Find the value added:

	Value added
Growing apple	12
Picking	3
Canning	3
Shipping	2
Retailing	2

GDP: 22

④ Transfer payment is when money is transferred from one entity to another without the exchange of goods and services.

It is NOT included in the GDP because there is NO output.

⑤ Real GDP can show us the real performance of the economy due to it being adjusted for inflation.

Example: 20x1 GDP can be compared to 20x2 GDP by replacing P_2 in 20x2 to P_1 in 20x1, compare $GDP_1: Q_1 \times P_1$ to $GDP_2: Q_2 \times P_1$, using 20x1 as the base year.

The problem with GDP is that there can be errors in survey that doesn't account for irregularities in the economy.

⑥. If 2018 is used as the base year then:

- Real GDP 2018 = Nominal GDP 2018

- GDP deflator 2018 = 100.

⑦. Three limitations of GDP are:

- GDP does not reflect crime rates, more GDP growth does not mean less crime rate and vice versa

- Informal Economy: Illegal goods and services are not measured in GDP

- Self-consumption: outputs produced for self-consumption are not measured in GDP.

⑧. - The citizen bought 8 new cars, each \$50

↳ affects consumption (C)

- The citizen bought 4 new houses, each \$150

↳ affects investment (I)

- The citizen grew rice for own consumption

↳ does not affect GDP

- The firms bought 6 used machines. Each \$50
 - ↳ does not affect GDP
- The firms bought 8 car parts. Each \$25
 - ↳ does not affect GDP
- The Government bought 4 new computers. Each \$50.
 - ↳ affects Government spending (G)
- The Government paid \$1,000 to the poor
 - ↳ does not affect GDP
- The citizen bought 10 imported ships, each \$100
 - ↳ affect imports (M)
- The firm sold 4 planes abroad, each \$200
 - ↳ affects exports (X)

Calculate GDP 2018

$$\text{GDP 2018} = 50 \times 8 + 150 \times 4 + 50 \times 4 - 100 \times 10 + 200 \times 4$$

$$\text{GDP 2018} = \$1,000$$

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Year	Price of A	Quantity of A	Price of B	Quantity of B	Price of C	Quantity of C
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2015	4	4	1	1	4	2

Year	Nominal GDP	Real GDP	GDP Deflator
2012	18	18	100
2013	15	17	88.24
2014	18	13	138.46
2015	25	12	208.33

Inflation rate :

2013 : -11.76 %

2014 : 56.91 %

2015 : 33.54 %

10 Calculate :

- $GNP = GDP + NFFI$

$= 8000 + (250 - 300) = \$ 7,950 \text{ B}$

- $NNP = GNP - Depreciation$

$= 7,950 - 900 = \$ 7,050 \text{ B}$

⑪. Calculate:

11.1 Gross domestic investment

= net private investment + depreciation

$$= 784 + 168 = 952$$

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

$$= 2,203.2 + 952 + 716.8 + (212.8 - 235.2)$$

$$= 3,849.6$$

11.3 GNP = GDP + NFFI

$$= 3,849.6 + (35.2 - 68.8) = 3,816.3$$

11.4 NNP = GNP - Depreciation

$$= 3,816.3 - 168 = 3,648.3$$

11.5 National Income: $1,407.7 + 173.9 + 34.1 + 257.6 + 152.2$
 $+ 548.8$

$$NI = 2,604.3$$

⑫. Calculate:

+ Expenditure Approach:

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

$$= 9,500 + 3,000 + 3,200 + (850 - 900) = 15,650$$

+ Income Approach

$$GDP = GNP - NFFI \quad \text{but } NFFI = 0$$

$$\Rightarrow GDP = GNP$$

$$GNP = NNP + \text{depreciation}$$

$$\Rightarrow GDP = NNP + \text{depreciation}$$

we have $NNP = NI$

$$NI = 2400 + 11,500$$

$$= 13,900$$

$$\Rightarrow GDP = 13,900 + 1750 = 15,650$$

$$\Rightarrow GDP \text{ expenditure} = GDP \text{ income} = 15,650$$