

## Exercise 2

### National Output and National Income

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1. Is the following a stock or flow variable?

- |                                 |  |
|---------------------------------|--|
| 2.1 Inventories <i>stock</i>    | 2.2 Change in Inventories <i>flow</i>  |
| 2.3 Money Supply <i>stock</i>   | 2.4 Change in Money Supply <i>flow</i> |
| 2.5 National Income <i>flow</i> | 2.6 Expenditure <i>flow</i>            |
| 2.7 Wealth <i>stock</i>         | 2.8 Population <i>stock</i>            |
| 2.9 Capital <i>stock</i>        | 2.10 Interest <i>flow</i>              |

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?

- GDP is the total market value of all final goods & services that produce by input located within a country.
- GNP is the total market value of all final goods & services that owned by a country's citizens regardless of where the output is produced.
- The U.S. has higher GNP because the U.S. have more investment abroad than China.

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	12
Pickling	15	3
Canning	18	3
Shipping	20	2
Retail Sale	22	2

$\therefore \text{GDP} = 22$

4. What is Transfer Payment? Why is it not included in GDP?

- Transfer Payment is the money that the government give to people for free.
- It is not included in GDP because it doesn't create new goods & services.

5. Why are we interested in Real GDP? Explain with examples. Is there a problem associated with Real GDP?

- Because it adjusted for price change by fixed prices at same base year.
- Example  $\Rightarrow$  Assume country A both produce 1 good in 2019, 2020  
2020 :  $P = 20$  and  $Q = 5 \rightarrow \text{Nominal GDP}_{2020} = 100$   
2019 :  $P = 5$  and  $Q = 18 \rightarrow \text{Nominal GDP}_{2019} = 90$   
 $\rightarrow$  real GDP 2019 as base year is 25
- When the structure of economy change the base year must be update and chang real GDP.

6. Suppose 2018 is the base year. What can we say about Real GDP, Nominal GDP, and GDP Deflator of 2018?

- Real GDP<sub>2018</sub> = Nominal GDP<sub>2018</sub>
- GDP deflator<sub>2018</sub> = 100

7. Explain three limitations of the GDP concept.

- 1) Inequality → GDP per capita (output/person)  
→ GDP has nothing to say about the distribution of output.
- 2) Informal Economy → GDP doesn't count the unreported/illegal income generated in hidden part of the economy.
- 3) Externality → GDP doesn't take into account the costs or benefits on the third party.  
→ pollution and environmental costs.

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\$. **consumption ↑ 400**
- The citizens bought 4 new houses, each worth 150\$. **Investment ↑ 600**
- The citizens grew rice for their own consumption. The rice was worth 500\$. **Not included in GDP**
- The firms bought 6 used machines, each worth 50\$. **Not included in GDP**
- The firms bought 8 car parts, each worth 25\$. **Not included in GDP**
- The government bought 4 new computers, each worth 50\$. **Government spending ↑ 200**
- The government paid 1000\$ to the poor as welfare payment. **Not included in GDP**
- The citizens bought 10 imported ships, each worth 100\$. **Import ↓ 1000**
- The firms sold 4 planes abroad, each worth 200\$. **Export ↑ 800**

$$\therefore \text{GDP} = 400 + 600 + 200 + 800 - 1000 = 1000$$

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	$(1 \times 3) + (2 \times 3) + (3 \times 3) = 16$	$(1 \times 3) + (2 \times 3) + (3 \times 3) = 16$	100
2013	15	$(1 \times 1) + (2 \times 2) + (3 \times 4) = 17$	$(15/17) \times 100 = 100$
2014	18	$(1 \times 2) + (2 \times 4) + (3 \times 1) = 13$	$(18/13) \times 100 = 138.5$
2015	25	$(1 \times 4) + (2 \times 1) + (3 \times 2) = 12$	$(25/12) \times 100 = 208.3$

Annual inflation rate from 2014 to 2015

$$= \frac{208.3 - 138.5}{138.5} \times 100 = 50.4$$

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

$$\begin{aligned}
 - \text{GNP} &= \text{GDP} + \text{NFFI} \\
 &= 8000 + 250 - 300 \\
 &= 7950 \#
 \end{aligned}$$

$$\left. \begin{array}{l} \text{GNP} = 7950 \\ \text{NNP} = 7050 \end{array} \right\}$$

$$\begin{aligned}
 - \text{NNP} &= \text{GNP} - \text{Depreciation} \\
 &= 7950 - 900 \\
 &= 7050 \#
 \end{aligned}$$

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

$$\begin{aligned}
 11.1 \text{ GDP} &= \text{NNP} + \text{Depreciation} \\
 &= 784 + 168 = 952 \#
 \end{aligned}$$

$$\begin{aligned}
 11.2 \text{ GDP} &= C + I + G + (X - M) \\
 &= 2203.2 + 952 + 716.8 + 212.8 - 235.2 \\
 &= 3849.6 \#
 \end{aligned}$$

$$\begin{aligned}
 11.3 \text{ GNP} &= \text{GDP} + \text{NFFI} \\
 &= 3849.6 + 35.2 - 68.8 \\
 &= 3816 \# \\
 11.4 \text{ NNP} &= \text{GNP} - \text{Depreciation} \\
 &= 3816 - 168 = 3648 \#
 \end{aligned}$$

$$\begin{aligned}
 11.5 \text{ National Income} \\
 &= 1,407.7 + 173.9 + 34.1 + 257.6 + 182.2 + 593.6 + 44.8 \\
 &= 2,604.3 \#
 \end{aligned}$$

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

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

$$\begin{aligned}
 - \text{GDP} &= C + I + G + (X - M) \\
 &= 9500 + 3000 + 3200 + 850 - 900 \\
 &= 15,650 \#
 \end{aligned}$$

$$\begin{aligned}
 - \text{GNP} &= \text{GDP} + \text{NFFI} \\
 &= 15,650 + 0 \\
 &= 15,650 \#
 \end{aligned}$$

$$\begin{aligned}
 - \text{NNP} &= \text{GNP} - \text{Depreciation} \\
 &= 15,650 - 1750 \\
 &= 13,900 \#
 \end{aligned}$$

$$\begin{aligned}
 - \text{NNP} &= \text{NI} \\
 13,900 &= 11,500 + 2,400 \\
 &= 13,900 \#
 \end{aligned}$$