

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

Answer:

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 |

2.1) Stock 2.2) Flow 2.3) Stock 2.4) flow 2.5) flow
2.6) flow 2.7) Stock 2.8) Stock 2.9) Stock 2.10) flow

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?

$GDP \neq GNP$:: GDP measure the value of output by fop located within country in the other hand GNP measure the total market value of all final g & s by fop owned by a country's citizens, regardless of where the output is produced.

GNP in China should be more the US because they have more population.

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

The GDP value of the canned apple is 22.

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

Cash payment made by the government to people who do not supply goods, services or to people to redistribute income.

Transfer Payment will not be included in GDP because it just transfer of money but if transfer payment has used in consuming goods or of services in this case transfer payment will be count.

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

We often use real GDP in measuring the change in quantity of the production regardless from the inflation for instance we can measure the GDP of fried rice from 2015 and 2021 regardless from the inflation. The problem with real GDP is that we must have data from a base year.

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

In the Base year $\text{Real GDP} = \text{Nominal GDP}$ and GDP deflation in Base year will equal to 100.

7. Explain three limitations of the GDP concept.

Inequality: GDP has nothing to say about the distribution of output among individuals in a society.

Informal Economy: GDP cannot detect the unreported income making in the hidden part of the economy.

Externality: GDP does not take into account the costs or benefits on the third party, as a result of production, e.g. pollution and environmental costs.

* GDP does not reflect composition of output e.g. large component of GDP base on military product.

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.

- 1 - The citizens bought 8 new cars, each worth 50\$. **400**
- 2 - The citizens bought 4 new houses, each worth 150\$. **600**
- 3 - The citizens grew rice for their own consumption. The rice was worth 500\$. **0 [Not count]**
- 4 - The firms bought 6 used machines, each worth 50\$. **300**
- 5 - The firms bought 8 car parts, each worth 25\$. **200**
- 6 - The government bought 4 new computers, each worth 50\$. **200**
- 7 - The government paid 1000\$ to the poor as welfare payment. **0 [Not Count]**
- 8 - The citizens bought 10 imported ships, each worth 100\$. **1000**
- 9 - The firms sold 4 planes abroad, each worth 200\$. **800**

1) Consumption, 2) Investment, 3) Not affect, 4) Investment, 5) Investment

6) Government spending, 7) Not affect, 8) Import, 9) Export

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

$$GDP = 400 + (600 + 300 + 200) + 200 + (800 - 1000)$$

$$GDP = 1500 \text{ \$}$$

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			

2012

$$\begin{aligned} \text{Nominal GDP} &= \sum (P_{2012} \times Q_{2012}) \\ &= (1)(3) + (2)(3) + (3)(3) = 18 \end{aligned}$$

$$\begin{aligned} \text{Real GDP} &= \sum (P_{2012} \times Q_{2012}) \\ &= 18 \end{aligned}$$

$$\text{GDP Deflator} = \frac{18}{18} \times 100 = 100$$

2013

$$\begin{aligned} \text{Nominal GDP} &= \sum (P_{2013} \times Q_{2013}) \\ &= (3)(1) + (4)(2) + (1)(4) \\ &= 15 \end{aligned}$$

$$\begin{aligned} \text{Real GDP} &= \sum (P_{2012} \times Q_{2013}) \\ &= (1)(1) + (2)(2) + (3)(4) \\ &= 17 \end{aligned}$$

$$\text{GDP deflation} = \frac{15}{17} \times 100 = 88.235$$

2014

$$\begin{aligned} \text{Nominal GDP} &= \sum (P_{2014} \times Q_{2014}) \\ &= (2)(2) + (3)(4) + (2)(1) \\ &= 17 \end{aligned}$$

$$\begin{aligned} \text{Real GDP} &= \sum (P_{2012} \times Q_{2014}) \\ &= (1)(2) + (2)(4) + (3)(1) \\ &= 13 \end{aligned}$$

$$\text{GDP deflator} = \frac{17}{13} \times 100 = 138.46$$

2015

$$\begin{aligned} \text{Nominal GDP} &= \sum (P_{2015} \times Q_{2015}) \\ &= (4)(4) + (1)(1) + (4)(2) \\ &= 25 \end{aligned}$$

$$\begin{aligned} \text{Real GDP} &= \sum (P_{2012} \times Q_{2015}) \\ &= (1)(4) + (2)(1) + (3)(2) \\ &= 12 \end{aligned}$$

$$\text{GDP deflator} = \frac{25}{12} \times 100 = 208.3$$

$$\text{Inflation Rate} = \frac{208.3 - 138.46}{138.46} \times 100 = 50.4 \%$$

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

$$\begin{aligned} \text{GNP} &= \text{GDP} + \text{Net foreign Factor Income (NFFI)} \\ &= 8000 + 250 - 300 = 7950 \end{aligned}$$

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

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
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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

11.1) Gross domestic investment

$$= 784.0 + 168 = 952$$

11.2) GDP, using the expenditure Approach

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

$$= 2203.2 + 952 + 716.8 + 212.8 - 235.2$$

$$= 3849.6$$

11.3) GNP = GDP + NFFI

$$= 3849.6 + 35.2 - 68.8 = 3816$$

11.4) NNP = 3816 - 168 = 3648

11.5) NI using the income approach

$$\begin{aligned} \text{NI} &= \text{Wage} + \text{Rent} + \text{Corporate Profit} + \text{Non} \\ &\quad \text{corporate Profit} + \text{Interest} + (\text{Indirect} \\ &\quad \text{tax} - \text{subsidy}) \end{aligned}$$

$$= 1407.7 + 257.6 + 173.9 + 34.1 + 182.2 + 593.6 - 44.8 = 2604.3$$

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	C
Investment	3000	I
Depreciation	1750	
Profits	2400	
Exports	850	X
Compensation of employees	11500	
Government purchases	3200	G
Direct taxes	1200	
Saving	1600	
Imports	900	M

Finding GDP from expenditure approach

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

$$= 9500 + 3000 + 3200 + (850 - 900) = 15650$$

$$GNP = GDP \quad \because \quad NFFI = 0$$

$$NNP = 15650 - 1750 = 13900$$

↑
Depreciation

Find NI from income approach

$$NI = 2400 + 11500 = 13900 \quad \#$$

$$\therefore NI = NNP = 13900$$