

Practice Set 7 – KEY

Macroeconomic Aggregates & Global Inequality

This set contains problems for your own practice. It is highly recommended to work on the problems on your own. Do not just read the provided solutions. Instead, try to solve the problems and use the solutions only when you cannot continue on your own. Reading problems that someone else has solved has the same value for your preparation like watching someone else running a marathon on TV and then expecting to be able to run it, too. If you have questions on this set, please ask your section's teaching assistant.

1. A dentist gives a root canal to a patient. The price of the root canal is 460 dollars. For this root canal, the patient paid 50 dollars and the patient's insurance paid another 410 dollars. The dentist pays 80 dollars to his nurse for helping him, another 60 dollars for sales taxes and another 100 dollars for raw materials. How will the service of this root canal be counted in GDP?

From the side of production, we measure one root canal valued at 460 dollars. From the side of expenditure, we add the 50 dollars that the patient paid and the 410 dollars the insurance paid for a total of 460 dollars. From the side of income, we add the 80 dollars the nurse earned, the 60 dollars that went to the government, the 100 dollars earned from those who sold the raw materials to the dentist, and the 220 dollars that the dentist ended up making from the root canal, to a total of 460 dollars.

2. Firm A imports from abroad raw materials valued at \$2,000 and produces goods valued at \$7,000. Firm B buys those goods, processes them, and sells them to firm C for \$13,000. Firm C retails the goods for \$15,000. How much GDP was produced in this scenario?

There are two alternative ways to approach this question:

1. *We can only consider the final goods produced by firm A (\$7,000) and then subtract the value of foreign GDP that was imported (\$2,000). GDP produced is $\$7,000 - \$2,000 = \$5,000$.*

2. *We can calculate the value added by each firm:*

- Value added by firm A: $7,000 - 2,000 = \$5,000$.

- Value added by firm B: $13,000 - 7,000 = \$6,000$.

- Value added by firm C: $15,000 - 13,000 = \$2,000$.

Total added value is: $5,000 + 6,000 + 2,000 = \$13,000$.

3. A Singaporean consumer orders a vacuum cleaner from China and paid a total of \$40. The Chinese seller pays a Singaporean company \$5 for handling the online sale and the delivery in Singapore.

- (a) How is this transaction going to affect the Singapore's national income accounts of *production*?

The value of the vacuum cleaner is \$35 and the value of the sale and delivery is \$5. Only the latter occurred in Singapore. Thus, Singapore's GDP from the side of production will increase by \$5.

- (b) How is this transaction going to affect the Singapore's national income accounts of *expenditure*?

Singapore will import the vacuum cleaner from China; thus, imports will increase by \$35. The Singaporean consumer paid \$40 for the vacuum cleaner to be bought and delivered, thus consumption will go up by \$40. Singapore's GDP from the side of expenditure will increase by $\$40 - \$35 = \$5$ (we subtract the \$35 because imports enter the aggregate expenditure equation with negative sign).

- (c) How is this transaction going to affect the Singapore's national income accounts of *income*?

The Singaporean company who produced the sale and delivery service will earn \$5, which may stay in the company or pay labor and expenses. In any case, income worth \$5 was earned in Singapore which reflects the change in GDP from the side of income.

4. In 2012, Mr. Chung bought a brand-new Toyota Corolla for 70,000 dollars. In 2022, he sold it to Ms. Ong for 22,000 dollars. How did this transaction affect the GDP of 2022?

This transaction will not affect the GDP of 2022 because no good or service that was involved in it took place in 2022. The car was included in the GDP of 2012 for \$70K. In 2022, a preexisting car and preexisting \$22K just changed hands.

5. An economy produces only one good the price and quantity of which evolved as:

Year	2015	2016	2017	2018
Price	10	11	14	12
Quantity	100	105	95	122

- (a) Calculate *real GDP* for all 4 years using 2015 as the base year.

- The real GDP for in 2015 (2015 base year) is: $10 \cdot 100 = 1,000$.
- The real GDP for in 2016 (2015 base year) is: $10 \cdot 105 = 1,050$.
- The real GDP for in 2017 (2015 base year) is: $10 \cdot 95 = 950$.
- The real GDP for in 2018 (2015 base year) is: $10 \cdot 122 = 1,220$.

- (b) Calculate real GDP for all 4 years using 2018 as the base year.

- The real GDP for in 2015 (2018 base year) is: $12 \cdot 100 = 1,200$.
- The real GDP for in 2016 (2018 base year) is: $12 \cdot 105 = 1,260$.
- The real GDP for in 2017 (2018 base year) is: $12 \cdot 95 = 1,140$.
- The real GDP for in 2018 (2018 base year) is: $12 \cdot 122 = 1,464$.

- (c) Calculate percentage change in *nominal GDP* from 2015 to 2016.

- The nominal GDP in 2015 is $10 \cdot 100 = 1,000$.
- The nominal GDP in 2016 is $11 \cdot 105 = 1,155$.
- The percentage change is $(1,155 - 1,000)/1,000 = 15.5\%$.

- (d) Calculate percentage change in *real GDP* (base year 2015) from 2015 to 2016.

- The real GDP in 2015 is $10 \cdot 100 = 1,000$.
- The real in 2016 is $10 \cdot 105 = 1,050$.
- The percentage change is $(1,050 - 1,000)/1,000 = 5\%$.

- (e) Compare your results in (c) and (d) and explain the reason for the difference.

The result in (c) is the nominal growth of the economy between 2015 and 2016, while the result in (d) is the real growth in those two years. If we look at the table, we will realize that between the years 2015 and 2016, both production and prices have changed. The result in (c) measures the growth of the economy without filtering out the effect of the change in prices. The result (d) filters out this effect.

6. Explain how a positive externality may have a negative effect on the GDP.

A positive externality can decrease the demand for certain market goods or services, causing consumers to reduce their purchases, which, in turn, results in a decrease in GDP. An illustrative example of this is the introduction of fluoride into municipal water for purification purposes. Fluoride has been discovered to also benefit oral health. Cities that incorporate fluoride into their water supplies have observed a reduction in the frequency of residents' visits to dentists. Consequently, this results in reduced spending on oral healthcare, ultimately leading to a lower GDP figure.

You are kindly requested to report any typos, mistakes or proposals for the improvement of this practice set key at kmarinakis@smu.edu.sg.