

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. Explain under what theoretical circumstances different GDP can be calculated under the production, the income and the expenditure approach.

GDP is one thing: the total value of output produced within the country within the year. We can measure it directly by adding the value of final goods produced (production side) or indirectly with the income or the expenditure method. Using the income method, we add the incomes (before tax profits and salaries) realized in the entire economy. Those will be equal to the value of the production (otherwise, where would the difference go?). Using the side of expenditure, we measure the amount of money spent by the households, the businesses, the government and the net foreign sector on the production. Again, this should be equal to the value of the production (otherwise, where would the difference go?). Thus, even though, in the real world we may find slight differences among the three approaches (due to approximation mistakes, accounting complications, underground spending, illegal imports etc.) all three methods should in principle yield the same theoretical result.

2. This year, company A produced a jackhammer and locally sold it for \$1K to company B who used it up entirely in the production of a house valued at \$500K. Explain how it is possible that the jackhammer is not a part of GDP because it is not a final good but it is part of investment (*I*), which is a component of GDP, and it will bring income to the seller, which also is a component of GDP.

First of all, the jackhammer IS definitely part of GDP because it was produced within the borders of the country during the current year. Thus, the issue is not IF it will be counted in GDP but HOW it will be counted in order to avoid double-counting it.

*From the side of **production**, we will count the jackhammer as part of the value of the house it was used to produce. That is, the \$500K of the value of the house already includes the value of the jackhammer (in the same manner that the price of a dress shirt includes the value of its buttons). Note that if we added the \$1K value of the jackhammer to the NIAs for production separately of the \$500K of the value of the house, we would have counted the jackhammer twice.*

*From the side of **expenditure**, we count the \$500K of the house as *I* and the \$1K of the jackhammer will again be a part of the \$500K for the house.*

*From the side of **income**, company A will register \$1K as income from the sale of the jackhammer. The rest \$499K of the value of the house will also be registered as income by someone (the sellers of materials, the workers, the architect etc.).*

3. Firm A imports from abroad raw materials valued at \$2,000 and produces goods of value \$7,000. Firm B buys those goods, processes them and sells them to firm C for \$12,000. Firm C retails those goods for \$15,000. How much GDP was produced in this scenario?

There are two ways to answer this question: we can either calculate the value of the final goods produced by domestic firms or we can add the value added to the production by all domestic firms. Here only firm C produces a final good of total value 15,000. However, from the 15,000 of the value

of this good, the 2,000 was not produced domestically, and therefore, must be subtracted from GDP. Thus, $15,000 - 2,000 = \$13,000$ of GDP was produced.

The second way is to calculate the value added by each firm, we have:

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

- Value added by firm B: $12,000 - 7,000 = \$5,000$.

- Value added by firm C: $15,000 - 12,000 = \$3,000$.

Total added value is: $5,000 + 5,000 + 3,000 = \$13,000$.

4. A Singaporean consumer orders a vacuum cleaner from China for \$40, including shipping. The Chinese seller pays a Singaporean company \$5 for handling the online sale and the delivery.

- (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. The production of the vacuum cleaner concerns the GDP of China, not Singapore. The service of the sale and delivery 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*?

The expenditure accounts include consumption, investment, government spending, exports and imports. 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 owner of the Singaporean company who produced the sale and delivery service will enjoy a profit of \$5, which may enjoy himself or pay part of it to her employees. In any case, an income of \$5 was produced in Singapore which reflects the change in GDP from the side of income.

- (d) Does this transaction cause GDP to change by a different amount from each of its three sides (production, expenditure, income)?

GDP is a single thing. No matter from which side you measure it, you should always find the same result. Any discrepancy would mean that you have confused and mixed up the sides (for example, by adding expenditure amounts to income amounts or production values).

5. In 2012, Mr. Chung bought a Toyota Corolla for 16,000 dollars. Yesterday, he sold it to Ms. Ong for 9,000 dollars. What change did yesterday's transaction cause to GDP?

This transaction is not supposed to affect the GDP in any way because no production took place in the current year. The car was included in the GDP of 2012 for \$16K. The current year, the car was not produced again. So, at an aggregate level, nothing really changed in this economy in the current year. Before the transaction, there was a car and 9,000 dollars. After the transaction, there is the same car and the same 9,000 dollars, but both just changed hands. This did not affect the GDP.

6. 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.

7. Explain how a product, the production of which causes a positive externality, may have a negative effect on the GDP.

This is the reverse from what we mentioned in the lecture about negative externalities being positive contributors to GDP. A positive externality may render the use of some other goods or services redundant, so that consumers stop buying them, reducing the GDP. An example of this is the addition of fluoride in the water systems of cities for disinfecting the water supply. Fluoride has been also found to be beneficial in the oral health of humans. Cities who use fluoride in their water systems had their residents visit the dentists less often, thus, register less expenditure to oral health, causing the GDP to appear lower.

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