Problem Sets Macroeconomics Week 1
Suggested Solution

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Quick Check Multiple Choice

1. If the price of a hot dog is $2 and the price of a hamburger is $4, then 30 hot dogs contribute as much to GDP as ____ hamburgers.

   A. 5

   B. 15

   C. 30

   D. 60

   answer B

2. Angus the sheep farmer sells wool to Barnaby the knitter for $20. Barnaby makes two sweaters, each of which has a market price of $40. Colette buys one of them, while the other remains on the shelf of Barnaby's store to be sold later. What is GDP here?

   A. $40

   B. $60

   C. $80

   D. $100

   answer C

3. Which of the following does NOT add to U.S. GDP?

   A. Air France buys a plane from Boeing, the U.S. aircraft manufacturer.

   B. General Motors builds a new auto factory in North Carolina.

   C. The city of New York pays a salary to a policeman.

   D. The federal government sends a Social Security check to your grandmother.

   answer D

4. An American buys a pair of shoes manufactured in Italy. How do the U.S. national income accounts treat the transaction?

   A. Net exports and GDP both rise.

   B. Net exports and GDP both fall.

   C. Net exports fall, while GDP is unchanged.

   D. Net exports are unchanged, while GDP rises.

   answer C

5. Which is the largest component of GDP?

A. Consumption

B. Investment

C. Government purchases

D. Net exports
answer A

6. If all quantities produced rise by 10 percent and all prices fall by 10 percent, which of the following occurs?

A. Real GDP rises by 10 percent, while nominal GDP falls by 10 percent.

B. Real GDP rises by 10 percent, while nominal GDP is unchanged.

C. Real GDP is unchanged, while nominal GDP rises by 10 percent.

D. Real GDP is unchanged, while nominal GDP falls by 10 percent.
answer A

Problems and Applications

1. What components of GDP (if any) would each of the following transactions affect? Explain.

a. A family buys a new refrigerator. (consumption)

b. Aunt Jane buys a new house. (investment)

c. Ford sells a Thunderbird from its inventory. (no impact)

d. You buy a pizza. (consumption)

e. California repaves Highway 101. (Government purchase)

f. Your parents buy a bottle of French wine. (consumption, import; no change in GDP)

g. Honda expands its factory in Marysville, Ohio. (investment)

2. The "government purchases" component of GDP does not include spending on transfer payments such as Social Security. Thinking about the definition of GDP, explain why transfer payments are excluded.
Suggested Solution: In short, government transfer does not produce any outputs for the nation. It is just transferring income from one group to another group. If it is counted, it will be double counts.

3. As the chapter states, GDP does not include the value of used goods that are resold. Why would including such transactions make GDP a less informative measure of economic well-being?
Suggested Solution: GDP, by definition, is the total outputs one nation produces in a given year or time- period. If it includes the value of used goods, since the goods were already counted when it was first produced, the GDP will double-count the output of that good.

4. Below are some data from the land of milk and honey.

Year	Price of Milk	Quantity of Milk	Price of Honey	Quantity of Honey
2013	\$1	100 quarts	\$2	50 quarts
2014	\$1	200 quarts	\$2	100 quarts
2015	\$2	200 quarts	\$4	100 quarts

Table 1: Prices and Quantities of Milk and Honey from 2013 to 2015.

a. Compute nominal GDP, real GDP, and the GDP deflator for each year, using 2013 as the base year.

b. Compute the percentage change in nominal GDP, real GDP, and the GDP deflator in 2014 and 2015 from the preceding year. For each year, identify the variable that does not change. Explain in words why your answer makes sense.

c. Did economic well-being rise more in 2014 or 2015? Explain.

Suggested Solution:

a. Compute nominal GDP, real GDP, and the GDP deflator for each year, using 2013 as the base year.

Calculating nominal GDP:

- 2013: (\$1 per qt. of milk $\times$ 100 qts. milk) + (\$2 per qt. of honey $\times$ 50 qts. honey) = \$200
- 2014: (\$1 per qt. of milk $\times$ 200 qts. milk) + (\$2 per qt. of honey $\times$ 100 qts. honey) = \$400
- 2015: (\$2 per qt. of milk $\times$ 200 qts. milk) + (\$4 per qt. of honey $\times$ 100 qts. honey) = \$800

Calculating real GDP (base year 2013):

- 2013: (\$1 per qt. of milk $\times$ 100 qts. milk) + (\$2 per qt. of honey $\times$ 50 qts. honey) = \$200
- 2014: (\$1 per qt. of milk $\times$ 200 qts. milk) + (\$2 per qt. of honey $\times$ 100 qts. honey) = \$400
- 2015: (\$1 per qt. of milk $\times$ 200 qts. milk) + (\$2 per qt. of honey $\times$ 100 qts. honey) = \$400

Calculating the GDP deflator:

- 2013: (\$200/\$200) $\times$ 100 = 100
- 2014: (\$400/\$400) $\times$ 100 = 100
- 2015: (\$800/\$400) $\times$ 100 = 200

b. Compute the percentage change in nominal GDP, real GDP, and the GDP deflator in 2014 and 2015 from the preceding year.

Calculating the percentage change in nominal GDP:

- Percentage change in nominal GDP in 2014 = [(\$400 - \$200)/\$200] $\times$ 100 = 100%
- Percentage change in nominal GDP in 2015 = [(\$800 - \$400)/\$400] $\times$ 100 = 100%

Calculating the percentage change in real GDP:

- Percentage change in real GDP in 2014 = [(\$400 - \$200)/\$200] × 100 = 100%
- Percentage change in real GDP in 2015 = [(\$400 - \$400)/\$400] × 100 = 0%

Calculating the percentage change in the GDP deflator:

- Percentage change in the GDP deflator in 2014 = [(100 - 100)/100] × 100 = 0%
- Percentage change in the GDP deflator in 2015 = [(200 - 100)/100] × 100 = 100%

Real GDP did not change from 2014 to 2015. It means the output did not increase between the two years. The GDP deflator between 2013 and 2014 did not change, meaning the price level between the two years did not change.

c. Economic well-being concerns more of the output level. So it is more of real GDP rather than nominal GDP. So economic well-being only rises in 2014 but not in 2015.

5. Consider an economy that produces only chocolate bars. In year 1, the quantity produced is 3 bars and the price is \$4. In year 2, the quantity produced is 4 bars and the price is \$5. In year 3, the quantity produced is 5 bars and the price is \$6. Year 1 is the base year.

   a. What is nominal GDP for each of these years?

   b. What is real GDP for each of these years?

   c. What is the GDP deflator for each of these years?

   d. What is the percentage growth rate of real GDP from year 2 to year 3?

   e. What is the inflation rate as measured by the GDP deflator from year 2 to year 3?

   f. In this one-good economy, how might you have answered parts (d) and (e) without first answering (b) and (c)?

   Suggested Solution:

   a. What is nominal GDP for each of these years?

   - Year 1: $3 \times 4 = \$12$
   - Year 2: $4 \times 5 = \$20$
   - Year 3: $5 \times 6 = \$30$

   b. What is real GDP for each of these years?

   - Year 1: $3 \times 4 = 12$
   - Year 2: $4 \times 4 = 16$
   - Year 3: $5 \times 4 = 20$

   c. What is the GDP deflator for each of these years?

   - Percentage change in the GDP deflator in Year 1 = $(12/12) \times 100 = 100$
   - Percentage change in the GDP deflator in Year 2 = $(20/16) \times 100 = 125$
   - Percentage change in the GDP deflator in Year 3 = $(30/20) \times 100 = 150$

   d. What is the percentage growth rate of real GDP from Year 2 to Year 3?

$$\frac{20 - 16}{16} \times 100\% = 25\%$$

   e. What is the inflation rate as measured by the GDP deflator from Year 2 to Year 3?

$$\frac{150 - 125}{125} \times 100\% = 20\%$$

f. In this one-good economy, how might you have answered parts (d) and (e) without first answering (b) and (c)?

In one-good economy, the percentage growth rate of real GDP from Year 2 to Year 3 (or the percentage change in real GDP from Year 2 to Year 3) is equal to the percentage change in quantity produced from Year 2 to Year 3.

$$\frac{5-4}{4} \times 100\% = 25\%$$

In one-good economy, the inflation rate from Year 2 to Year 3 (or the percentage change in GDP deflator from Year 2 to Year 3) is equal to the percentage change in price from Year 2 to Year 3.

$$\frac{6-5}{5} \times 100\% = 20\%$$