

# **PROBLEM SET ON MACROECONOMIC CONCEPTS**

Pascal Michailat

**Problem 1**

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An economy produces three goods: cars, computers, and carrots. Quantities and prices per unit for years 2014 and 2015 are as follows:

	2014		2015	
	Quantity	Price	Quantity	Price
<b>Cars</b>	20	\$2000	24	\$3000
<b>Computers</b>	8	\$1000	12	\$500
<b>Carrots</b>	2000	\$1	2000	\$1

A) What is nominal GDP in 2014 and in 2015? By what percentage does nominal GDP change from 2014 to 2015?

B) Using the prices for 2014 as the set of common prices, what is real GDP in 2014 and in 2015? By what percentage does real GDP change from 2014 to 2015?

C) Using the prices for 2015 as the set of common prices, what is real GDP in 2014 and in 2015? By what percentage does real GDP change from 2014 to 2015?

D) Why are the two output growth rates constructed in B) and C) different? Which one is correct? Explain your answer.

E) As in B), use the prices for 2014 as the set of common prices for the purpose of computing real GDP in 2014 and in 2015. Compute the GDP deflator for 2014 and for 2015. Infer the rate of inflation from 2014 to 2015.

F) As in C), use the prices for 2015 as the set of common prices for the purpose of computing real GDP in 2014 and in 2015. Compute the GDP deflator for 2014 and for 2015. Infer the rate of inflation from 2014 to 2015.

G) Why are the two rates of inflation computed in E) and F) different? Which one is correct? Explain your answer.

**Problem 2**

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The Consumer Price Index represents the average price of goods that households consume. Many thousands of goods are included in such an index. Here consumers are represented as buying only carrots and gas as their basket of goods. Here is a representation of the kind of data the Bureau of Economic Analysis collects to construct a consumer price index. In the base year, 2013, both the prices of goods purchased and the quantity of goods purchased are collected. In subsequent years, only prices are collected.

The data: In an average week in 2013, the Bureau of Economic Analysis surveys many consumers and determines that the average consumer purchases 2 carrots and 6 gallons of gas in a week. Prices change over time. The price per carrot and price per gallon in subsequent years are found below.

Year	Price of carrots	Price of gas
2013	\$1	\$3
2014	\$1.1	\$3.3
2015	\$1.2	\$3.5
2016	\$1.2	\$3.7
2017	\$1.2	\$2.5
2018	\$1.2	\$3.5

A) What is the cost of the consumer price basket in 2013?

B) What is the cost of the consumer price basket in 2014 and in subsequent years?

- C) Represent the cost of the consumer price basket as an index number in the years 2013 to 2018. Set the value of the index number equal to 100 in 2013.
- D) Calculate the annual rate of inflation using the percent change in the value of the index number between each year from 2014 through 2018.
- E) Is there a year where inflation is negative? Why does this happen?
- F) What is the source of inflation in the year 2016? How is that different than inflation in the years 2014 and 2015?
- G) If I have \$100 in 2013. How many baskets of goods can I buy with \$100 in 2013?
- H) If I have \$100 in 2018, how many baskets can I buy with that money in 2018?
- I) What is the percentage decline in the purchasing power of my money from 2013 to 2018? How does the percentage decline in the purchasing power of money relate to the change in the price index between 2013 and 2018?
- J) From 2014 to 2016, the price of a carrots remains the same. The price of gas rises. How might consumers respond to such a change?
- K) Then in 2017, the price of gas falls. What are the implications of such changes in relative prices for the construction of the Consumer Price Index?
- L) Suppose the Bureau of Economic Analysis determines that in 2018, the average consumer buys 2 carrots and 7 gallons of gas in a week. Using the 2018 basket in the years from 2013 to 2018, calculate the Consumer Price Index set equal to 100 in 2018 and moving back in time.
- M) Why are the inflation rates slightly different in D) and L)?