

Some Practice Problems – September 2nd, 2011
FE312 Fall 2011
Rahman

These are to be done in class and handed in to the instructor at the end of period. Please pair up with one other person (in case of odd number of students, there may be ONE team made up of three individuals). Use your own paper. Each team will hand in their own sheets of paper as a group with their names on each sheet.

1. Nominal and Real GDP. *In this exercise, you calculate nominal and real GDP for a simple economy. You then calculate real GDP growth using two base years and discuss the differences.*

Suppose than an economy consists of only two types of products: computers and automobiles. Sales and price data for these two products for two different years are as shown below:

Year	No. of Computers Sold	Price per Computer	No. of Automobiles Sold	Price per Automobile
1990	500,000	\$6000	1,000,000	\$12,000
2000	5,000,000	\$2000	1,500,000	\$20,000

a. Nominal GDP in any year is calculated by multiplying the quantity of each final product sold by its price and summing over all final goods and services. Assuming that all computers and automobiles are final goods, calculate nominal GDP in 1990 and in 2000.

1990: \$15,000,000,000

2000: \$40,000,000,000

b. Real GDP in any year is calculated by multiplying that year's quantities of goods and services by their prices in some **base** year. Calculate real GDP in 1990 and 2000, using 1990 as the base year.

1990: \$15,000,000,000

2000: \$48,000,000,000

c. Calculate the **percentage change** in real GDP between 1990 and 2000 using 1990 as the base year.

220% increase

d. Calculate real GDP in 1990 and 2000, using 2000 as the base year.

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1990: \$21,000,000,000

2000: \$40,000,000,000

e. Calculate the percentage change in real GDP between 1990 and 2000 using 2000 as the base year.

90%

f. Explain why your answers to parts c and e are different. Do you feel there is one that more accurately measures the *true* growth in GDP? Which one, and why?

Answers differ because base-year prices are different. Neither measure is clearly superior, but notice that real GDP growth is radically different between the two. Notice that there are ten times as many computers in 2000 compared with 1990, and 50% more cars. So something between 50% and 1000% is appropriate. But how to weight each increase – that's where prices come in.

2. **The GDP Deflator and the Consumer Price Index.** *In this exercise, you calculate the consumer price index and GDP deflator using the same data you used for Problem 1. You then illustrate how and why the percentage changes in these two price indices can differ.*

a. The CPI in a given year is equal to the cost of a fixed market basket of consumer purchases in that year divided by the cost of that same market basket in a base year. Although the cost of the basket changes, its composition remains the same as in the base year. For ease of reporting, the official CPI is equal to this ratio multiplied by 100. Note that the ratio of these costs in the base year necessarily equals 1. Thus, if 1990 is the base year, the reported CPI for 1990 would equal $1 \cdot 100 = 100$. If the fixed market basket is the total amounts of computers and automobiles purchased in 1990, use the data on the first page to calculate the CPI in 2000, using 1990 as the base year.

140

b. The GDP deflator for any year is equal to nominal GDP in that year divided by real GDP. Again, it is common practice to multiply this ratio by 100. Calculate the GDP deflator in 2000, using 1990 as the base year.

83.3

c. Calculate the percentage changes in CPI and the GDP deflator between 1990 and 2000.

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CPI increase 40%, GDP deflator decreases 16.7%

d. Explain why your answers in part **c** are so different from each other, and relate your explanation to the difference between Laspeyres and Paasche indices (see the book). Is there one measure that is a more accurate measure of *true* inflation? Which one, and why?

Again, neither is clearly superior. CPI fixes its basket and so overstates inflation since most people can change their consumption choices. GDP deflator changes the basket each year and so understates inflation since changing baskets imply loss of utility for people.

3. GDP and Well Being. Finally, assume two countries have the same nominal GDP (measured in the same currency using the same accounting rules). Explain four reasons (which you believe are the most important) why you cannot assume the citizens in each country enjoy approximately the same level of economic well-being.

Some possible, but not all, explanations include:

a) different price levels in the two countries would result in different amounts of real GDP, i.e., different quantities of goods and services available in each country;

b) different-sized populations could result in different quantities of goods and services available per person in each country;

c) different levels of nonmarket production in the two countries would alter the quantity of goods and services available in each country;

d) different amounts of leisure time available (not captured in nominal GDP figures) would cause economic well-being to differ in the two countries;

e) different distributions of income in the two countries could alter the quantity of goods and services available to the typical citizen in each country.

f) different quantities of both positive and negative externalities associated with producing GDP, such as pollution and congestion, which are not measured in GDP, would cause the different levels of economic well-being between the two countries.