

Economics 102
Fall 2015
Homework #3
Due Monday, October 26, 2015

Directions:

- The homework will be collected in a box **before** the large lecture.
- Please place your name, TA name and section number on top of the homework (legibly). Make sure you write your name as it appears on your ID so that you can receive the correct grade.
- Late homework will not be accepted so make plans ahead of time. **Please show your work.** Good luck!

Please realize that you are essentially creating “your brand” when you submit this homework. Do you want your homework to convey that you are competent, careful, professional? Or, do you want to convey the image that you are careless, sloppy, and less than professional. For the rest of your life you will be creating your brand: please think about what you are saying about yourself when you do any work for someone else!

You may use a calculator to do all of the calculations. Round all decimals to the nearest hundredth if necessary.

GDP Measurement

1. Suppose that Republic of Economists produces three goods: books, magazines and papers. The following table provides information about the prices and output for these three goods for the years 2013, 2014 and 2015.

	Price per book	Quantity of books	Price per magazine	Quantity of magazines	Price per paper	Quantity of papers
2013	\$100	10	\$50	100	\$10	200
2014	\$100	12	\$52	108	\$10	205
2015	\$110	12	\$54	115	\$10	212

- a. Using the provided information, fill in the following table.

Year	Nominal GDP
2013	
2014	
2015	

- b. What is the percentage change in nominal GDP from 2013 to 2014? Provide any formulas you use and show your work in calculating this answer.
- c. What was the percentage change in nominal GDP from 2014 to 2015?
- d. Using 2013 as the base year, fill in the following table.

Year	Real GDP
2013	
2014	
2015	

- e. What was the percentage change in real GDP from 2013 to 2014?
- f. What was the percentage change in real GDP from 2014 to 2015?
- g. Using 2013 as the base year, fill in the following table.

Year	GDP deflator measured on a 100-point scale with 2013 as the base year
2013	
2014	
2015	

2. The Organization for Economic Co-operation and Development (OECD) annually publishes **National Accounts of OECD Countries**. This annual publication consists of two issues, the first covering main aggregates and the second detailed tables. These publications cover: expenditure-based GDP (what we called Method 2 or the Expenditure Approach when discussing GDP measurement), output-based GDP (what we called Method 1 when discussing GDP measurement), income-based GDP (what we called Method 3 or the Income Approach when discussing GDP measurement), disposable income, saving and net lending, population, employment, and final consumption expenditure of households by purpose. The publications also include simplified accounts for the three main sectors of an country's economy: general government, corporations and households. The publications also include comparative tables based on purchasing power parities and exchange rates for different countries. Data are shown for 34 OECD countries and the Euro area. Figures provided in the country tables are expressed in the country's national currency.

Use the link below to answer the following set of questions:

http://www.oecd-ilibrary.org/economics/national-accounts-of-oecd-countries_2221433x

(You have a free access to the link since UW-Madison has a subscription for its students and researchers. HOWEVER, you must be on campus when downloading the reports and this IMPLIES THAT YOU WILL NEED TO PLAN AHEAD!)

The expenditure approach tells us that

GDP = Consumption + Investment + Government Spending + Net Exports or, symbolically:

$$GDP = C + I + G + (X - IM)$$

Let's verify whether the above identity or equation is true for South Korea's (in the tables and henceforth in this problem we will simply refer to "Korea") national accounts.

- a. Fill the blanks of the table below (in billion KRW & at **current** prices):

	2010 (Reference Year)	2012	2014
Consumption (including government spending)			
Capital Investment			
Net Exports			
Statistical Discrepancy	0	0	-182
Nominal GDP			

- b. Fill the blanks of the table below (in billion KRW & at **constant** prices with 2010 the base year or reference year):

	2010 (Reference Year)	2012	2014
Consumption (including government spending)			
Capital Investment			
Net Exports			
Statistical Discrepancy	0	-481	-475
Real GDP			

- c. Calculate Korea's GDP deflators for the year of 2010, 2012 and 2014 (using a 100-point scale and with 2010 the base year or reference year):

	2010 (Reference Year)	2012	2014
GDP Deflator			

- d. Calculate the biannual growth rates (biannual is every two years) of Korea's real GDP (in percentage):

	2010	2012	2014
Growth Rate of Real GDP	-		

Real GDP vs. Nominal GDP

3. The following table includes data showing US GDP and inflation for the past ten years. The nominal and real GDP series in this table are taken from the US Bureau of Economic Analysis (<http://www.bea.gov/national/index.htm#gdp>), while the last column in the table is calculated from CPI data provided at the US Bureau of Labor Statistics (<http://data.bls.gov/cgi-bin/surveymost?bls>, CPI for All Urban Consumers (CPI-U) 1982-84=100 (Unadjusted) - CUUR0000SA0). You are encouraged to use excel or other software to do the following calculations.

Year	Nominal GDP in billions	Real GDP in billions	GDP deflator1	GDP deflator2	Inflation (%)	Inflation from CPI (%)
2005	13,093.7	14,234.2		100	-	-
2006	13,855.9	14,613.8				3.23%
2007	14,477.6	14,873.7				2.85%
2008	14,718.6	14,830.4				3.84%
2009	14,418.7	14,418.7				-0.36%
2010	14,964.4	14,783.8				1.64%
2011	15,517.9	15,020.6				3.16%
2012	16,155.3	15,354.6				2.07%
2013	16,663.2	15,583.3				1.46%
2014	17,348.1	15,961.7				1.62%

- a. According to the table above, which year is used as the base year in calculating real GDP? Explain your answer.
- b. Using the formula for the GDP deflator given in class, calculate the GDP deflator for the last ten years and fill out the column labeled GDP deflator1. Calculate this GDP deflator using a one-point scale.
- c. Now we want to redefine the base year and make 2005 the new base year. When we do this the GDP deflator in 2005 will have a value of 100 on a 100 point scale. Use your answers from part (b), GDP deflator 1, to fill out the column labeled as GDP deflator 2. Note: not only do we want you to change the base year, we also want you to change the scale from a one-point scale to a 100-point scale.
- d. Define inflation as the % change in the general price level; review your class notes for the general formula for the % change in the general price level. Calculate the annual inflation rate for the last ten years based upon the GDP deflator and fill out the column labeled inflation. Compare your calculation of the inflation rate using the GDP deflator to the measure of inflation provided by the CPI (see the column labeled “inflation from CPI”). Are these two measures of inflation equal? Why or why not?

Unemployment Measurement

4. The table below provides data on US employment taken from US Bureau of Labor Statistics (in thousands).

Year	Month	Labor Force	Employment	Unemployment	Unemployment Rate
2014	Jan		145206	10280	6.6
2014	Feb	155688	145301	10387	
2014	Mar		145796	10384	6.6
2014	Apr	155420		9696	6.2
2014	May	155629	145868		6.3
2014	Jun	155700	146247	9453	6.1
2014	Jul	156048		9648	6.2
2014	Aug	156018	146451	9568	6.1
2014	Sep	155845	146607	9237	
2014	Oct	156243	147260		5.7
2014	Nov		147331	9071	5.8
2014	Dec	156129	147442	8688	5.6
2015	Jan	157180		8979	5.7
2015	Feb	157002	148297	8705	5.5
2015	Mar	156906	148331		5.5
2015	Apr	157072	148523	8549	
2015	May	157469	148795	8674	5.5
2015	Jun	157037	148739	8299	5.3

2015	Jul	157106	148840	8266	5.3
2015	Aug	157065	149036	8029	5.1
2015	Sep	156715	148800	7915	5.1

- a. Fill in the missing numbers in the table. Provide any formulas you need to use in filling out the missing values as well.
- b. According to the US Census Bureau, the US has a population of about 320 million people. Why is the labor force in the above table only about 160 million people? Which groups of people are not included in the labor force? List at least four groups of people that are excluded from the labor force.

Suppose that the Republic of Economists (ROE) is a country which has exactly the same values for their labor force, their employment and their unemployment as the US in September 2015. Among those 7915 unemployed workers in the ROE, 2000 of these unemployed workers are temporarily laid-off workers and newly graduated students who expect to find a new job soon, while 1800 of these unemployed workers are searching for jobs in the market where there are few vacancies due to the type of job that is being sought.

- c. Given this information, what is the structural unemployment rate in ROE? What is the frictional unemployment rate in ROE? What is the cyclical unemployment rate in ROE? What is the natural unemployment rate in ROE? For each answer show the formula you use and the numeric values you entered in that formula when computing your answer (don't just provide a final number!).

CPI

5. Suppose that the market basket for purposes of computing the consumer price index (the CPI) in Madison contains 2 books, 10 steaks, 20 potatoes, 5 cookies, and 2 bags of charcoal. You are given the following price data for the years 2005 through 2010 in Madison.

Item	Price in 2010	Price in 2011	Price in 2012	Price in 2013	Price in 2014	Price in 2015
1 Book	\$5.00	\$5.00	\$5.00	\$6.00	\$6.00	\$7.00
1 Steak	\$4.00	\$5.00	\$4.00	\$6.00	\$5.00	\$7.00
1 Potato	\$.50	\$.60	\$.60	\$.40	\$.50	\$.80
1 Cookie	\$1.00	\$1.00	\$2.00	\$2.00	\$1.00	\$2.00
1 Bag of Charcoal	\$5.00	\$5.00	\$5.00	\$6.00	\$7.00	\$5.00

- a. Using the above data compute the cost of each market basket. Put your answers in the following table.

Cost of Basket in 2010	
Cost of Basket in 2011	
Cost of Basket in 2012	
Cost of Basket in 2013	
Coat of Basket in 2014	
Cost of Basket in 2015	

- b. Now, calculate the CPI for 2010 through 2015 using 2010 as the base year. Enter your results in the following table. Use a 100-point scale for the CPI. Carry your answer out to two places past the decimal.

Year	CPI
2010	
2011	
2012	
2013	
2014	
2015	

- c. Now, using the answers you got in part (b) calculate the annual rate of inflation in this economy from 2011 through 2015. Enter your answers in the table provided. Carry your answer out to two places past the decimal.

Year	Rate of Inflation
2011	
2012	
2013	
2014	
2015	

- d. Now, redo the CPI you found in part (b) with 2015 as the base year. Enter your results in the following table. Use a 100-point scale for the CPI. Carry your answer out to two places past the decimal.

Year	CPI
2010	
2011	
2012	
2013	
2014	
2015	

- e. Now, using the answers you got in part (d) calculate the annual rate of inflation in this economy from 2011 through 2015. Enter your answers in the table provided. Carry your answer out to two places past the decimal.

Year	Rate of Inflation
2011	
2012	
2013	
2014	
2015	

- f. Compare the annual rates of inflation in part (c) and (e). Are they the same or different? Explain your answer.