

Economics 102
Spring 2011
Homework #3
Due 3/7/11 at the lecture

Directions: The homework will be collected in a box **before** the 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. Please remember the section number for the section **you are registered**, because you will need that number when you submit exams and homework. Late homework will not be accepted so make plans ahead of time. **Please show your work.** Good luck!

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

GDP Measurement

1. The expenditure approach tells us that

$$\text{GDP} = \text{Consumption} + \text{Investment} + \text{Government spending} + \text{Net exports}$$

Following is a link of the national income accounts released by the US Bureau of Economic Analysis. Various statistics of GDP are provided in around 10 tables. Find the corresponding numbers of nominal GDP, consumption, investment, government spending and net exports for 2010. Verify whether the above identity holds true or not.

http://www.bea.gov/newsreleases/national/gdp/2011/pdf/gdp4q10_adv.pdf or you can go to <http://www.bea.gov/national/index.htm#gdp> and open the link named "PDF version of the Gross Domestic Products release". Take a look at the tables even if they do not contain the information you are required to find. For example, table 9 shows the differences and connections among GDP, GNP, national income and the distribution of national income among various payments.

2. PengLai is a small island where there are only two firms, National Food Company (NFC) and National Clothes Company (NCC). Every year NFC rents land and hires labor from the residents on the island to produce food. If it produces more food than the amount consumed by residents on the island, then this excess supply is exported to other economies. At the same time, NCC borrows money from the island residents to buy cotton cloth from SuHang, a neighboring island. NCC then hires labor to produce clothes using this cotton cloth. Clothes produced in PengLai by NCC are not exported: all clothing produced by NCC stays in PengLai.

Suppose last year NFC produced 1000 tons of food and NCC produces 200,000 articles of clothing. 900 tons of the food and 160,000 articles of clothing were consumed domestically; the rest of the food was exported. The price of food was \$1000 per ton and the unit price of clothes was \$10 per articles of clothing. NFC paid \$300,000 rent to land owners and \$600,000 in wages

to labor. NCC borrowed \$1,000,000 to buy cotton cloth while it paid \$50,000 in interest for this loan and \$850,000 in wages to labor.

What is the value of GDP in PengLai last year based on the given information? Calculate GDP using the expenditure approach, the income approach and the value added approach. Do all three approaches provide the same measure of GDP? (If they don't give the same number you have made an error: go back and review your work and fix the error.)

Real vs. Nominal

3. In the following table is data showing US GDP and inflation for the past ten years. Nominal and real GDP series are taken from the website of the US Bureau of Economic Analysis (<http://www.bea.gov/national/index.htm#gdp>), while the last column is calculated from CPI data provided at the website of 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 (%)
2001	10,286.2	11,347.2		100	-	-
2002	10,642.3	11,553.0				1.58
2003	11,142.1	11,840.7				2.28
2004	11,867.8	12,263.8				2.66
2005	12,638.4	12,638.4				3.39
2006	13,398.9	12,976.2				3.23
2007	14,061.8	13,228.9				2.85
2008	14,369.1	13,228.8				3.84
2009	14,119.0	12,880.6				-0.36
2010	14,660.2	13,248.7				1.64

(1) According to the table above, which year is used as the base year in calculating real GDP? Why?

(2) 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.

(3) Now we want to redefine the base year and make the year 2001 the new base year. When we do this the GDP deflator in 2001 will have a value of 100 on a 100 point scale. Use your answer s from part (2), GDP deflator 1, to fill out the column labeled as GDP deflator 2.

(4) 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?

CPI

4. Suppose the only consumption of residents on the planet Fruits are apples, bananas and cherries. On average, a person consumes 6 apples, 9 bananas and 3 cherries every day. These numbers are thus defined as the market basket. The prices of these fruits in the past three years are given below: assume all prices are measured in dollars.

	Year 2008	Year 2009	Year 2010
Price of an apple	2	1	3
Price of a banana	1	2	2
Price of a cherry	3	4	4

(1) From the above information calculate the CPI using 2008 as the base year. Then, recalculate the CPI with 2009 and then 2010 as the base year. In each case, use a 100 point scale for the CPI (that is, the CPI for the base year should have a value of 100). Put your CPI values in the chart below.

	2008 as base year	2009 as base year	2010 as base year
CPI of 2008			
CPI of 2009			
CPI of 2010			

(2) Using the CPI values you calculated in part (1), find the rate of inflation in 2009 and 2010. Put your answers in the table below. Do you get the same rate of inflation for each year irrespective of the base year chosen? Explain your answer.

	2008 as base year %	2009 as base year %	2010 as base year %
Inflation: 2008-2009			
Inflation: 2009-1010			

(3) As a resident of the planet Fruits, Joey's nominal income in the year 2008 is \$10,000, what must be his nominal income in the year 2010 in order for Joey to avoid a decrease in his real income between 2008 and 2010? Use 2008 as the base year in this question.

(4) Chandler, Joey's roomie, earns a real income of \$10,000 in the year 2009, where real income is calculated using 2009 as the base year. What must be his nominal income in the year 2010 in order for Chandler to avoid a decrease in his real income between 2009 and 2010?

Unemployment Measurement

5. The table below provides data on Wisconsin employment taken from US Bureau of Labor Statistics.

Year	Period	labor force	employment	unemployment	unemployment rate (%)
2010	Jan		2767598	262656	8.7
2010	Feb	3039902		265053	8.7
2010	Mar	3046655	2777970		8.8
2010	Apr	3052300	2792031	260269	
2010	May	3054065	2803686		8.2
2010	Jun	3040729		240798	7.9
2010	Jul		2792525	237925	7.9
2010	Aug	3029737		239248	7.9
2010	Sep	3031807	2796086		7.8
2010	Oct	3033333	2797159	236174	
2010	Nov	3040948	2808985		7.6
2010	Dec	3050103		227678	7.5

(1) Fill out the missing numbers in the table

(2) According to the US Census Bureau, Wisconsin has a population of about 5.6 million people. Why is the labor force in the above table only about 3 million people? Which groups of people are not included in the labor force? List at least four groups.

Suppose that the Kingdom of Workers (KOW) is a country which has exactly the same amount of labor force, employed and unemployed workers as Wisconsin in December 2010. Among those 227678 unemployed workers in the KOW, 60000 of them are temporarily laid-off workers and newly graduated students who expect to find a new job soon, while 50000 of them are searching for jobs in the market where there are few vacancies due to the type of job.

(3) Given this information, what is the structural unemployment rate in KOW? What is the frictional unemployment rate in KOW? What is the cyclical unemployment rate in KOW? What is the natural unemployment rate in KOW?