

Economics 102
Spring 2012
Homework #3
Due 3/14/12

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!

1. This problem concerns the economic activities of five friends—Sylvester, Bruce, Jean-Claude, Kurt, and Arnold—who live in Hollywood. Answer the following questions:
 - a) Jean-Claude decides to offer all the other guys karate lessons at his karate studio, Fast Chop. Everyone but Arnold signs up and pays a one-time enrollment fee of \$250. To convince Arnold to join, Jean-Claude offers him a 20% discount, so Arnold signs up as well. What is the change in U.S. GDP due to the karate lessons?
 - b) In 1997, Bruce decides to sell his 1992 Rolls-Royce to Kurt for \$300,000. Sylvester takes care of all the paperwork for this deal, for which the other two each pay him \$25. What is the change in U.S. GDP in 1997 due to the car deal?
 - c) In 2000, the five guys inherit \$10 million from their friend, Dolph, and decide to use it to set up a business to produce and sell swords. In order to save money, they decide to build the factory themselves, which takes 3 months to complete. They buy the materials and the machinery for the production of swords from China and pay \$1.5 million for them. Kurt offers to take care of advertisement, for which he is compensated with \$10,000. The entire first batch of swords is immediately sold to Japan for \$3 million. What is the change in U.S. GDP due to the sword-making business?
 - d) In 2001 the guys continue their production of swords. During that year, they produce 10,000 swords, but are able to sell only a quarter of them for a total value of sales of \$250,000. What is the change in U.S. GDP for 2001 due to this activity? Which expenditure components of GDP (C, I, G, X, or M) change?
 - e) In 2002 the guys get bored with their sword-making business, so they look for new jobs. Arnold takes a government job, which pays \$45,000 a year. Sylvester and Kurt get hired to star in a movie and each of them is paid \$150,000 for the job. Jean-Claude decides to try a more exciting life and joins a band of drug smugglers, who pay him a weekly salary of \$1000. Bruce is the only one left to take care of the business, so he has to scale down, but still collects an annual profit of \$250,000. How do the economic activities of the five friends affect U.S. GDP for 2002?

2. The following table contains information about the small economy of Nedelialand, which produces only four kinds of goods: cheesecakes, muffins, chocolate fudge, and cookies. Use the information to answer the questions below.

Year	Cheesecakes		Muffins		Chocolate Fudge		Cookies	
	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity
2007	\$5.00	150	\$0.80	320	\$5.50	20	\$0.25	400
2008	\$5.00	200	\$1.00	400	\$6.00	30	\$0.30	600
2009	\$6.25	100	\$1.00	250	\$6.00	16	\$0.50	300

- Calculate the nominal GDP of Nedelialand for 2007, 2008, and 2009.
 - If we use 2008 as a base year to calculate real GDP, do you think real GDP in 2007 would be higher or lower than nominal GDP in 2007? Why? (No calculations here, just intuition).
 - Calculate real GDP for 2007, 2008, and 2009 using 2008 as the base year.
 - Calculate the GDP deflator for the three years, using 2008 as the base year.
 - By what percentage did Nedelialand's real GDP grow from 2007 to 2008? How about from 2008 to 2009? Can you think of economic reasons to justify these numbers?
 - What was the inflation rate from 2007 to 2008? How about from 2008 to 2009? (using 2008 as the base year)
3. The population of Raleigh, NC is 400,000. Of those, 5% are under 16 years of age and 10% are already retired. **Of the remaining people**, 10% fall into the category "not in the civilian labor force". **Of the remaining people**, there are 26,000 part-time workers, 20,000 who are underemployed, and 230,000 full-time employees.
- Determine the size of the civilian labor force of Raleigh.
 - What is the unemployment rate in Raleigh?
 - What figure would be a more realistic representation of the proportion of people in Raleigh who would like to work, but don't have a job?
 - Now suppose you are told that of those who are unemployed, 20% are being retrained because their skills no longer match the advancements in technology introduced at their jobs. Another 15% of the unemployed are students who have just graduated and are looking for a job for the first time since they got their degree. Also, another 65% of the unemployed are workers who were laid off when the recession hit and have been unsuccessfully looking for a job ever since.
 - What is the frictional rate of unemployment in Raleigh?
 - What is the structural rate of unemployment in Raleigh?
 - What is the cyclical rate of unemployment in Raleigh?
 - What is the natural rate of unemployment in Raleigh? How can you check your work?

4. In the small island country of Montecristo, people consume only services. Thus, their representative consumer basket for one year consists of 5 haircuts, 20 bus rides, 4 visits to the dentist, 10 visits to the movies, and 1 consultation with a lawyer. The prices of these services for the years 2000, 2001, and 2002 per usage (visit) in Euros are as follows:

Service/Year	2000	2001	2002
Haircut	€8	€20	€20
Bus Ride	€2	€3	€5
Dentist	€20	€20	€25
Movies	€4	€8	€10
Lawyer	€50	€80	€100

- a) Fill out the following table, noting that the CPI value for the base year should be 100 (this is a good way to check your calculations).

	Base year: 2000	Base year: 2001	Base year: 2002
CPI in 2000			
CPI in 2001			
CPI in 2002			

- b) Using your answers from part a), calculate the rate of inflation from 2000 to 2001 and from 2001 to 2002 and fill out the table below. Provide some intuition for your answers.

	Base year: 2000	Base year: 2001	Base year: 2002
Inflation ₍₂₀₀₁₎			
Inflation ₍₂₀₀₂₎			

- c) Suppose Edmond lives in Montecristo and his annual nominal income in 2001 is €5,000. What must his annual nominal income in 2002 be so that Edmond doesn't experience a drop in real income?
- d) Suppose Mercedes is Edmond's wife and their combined annual nominal income in 2001 is €8,000. What should Mercedes' annual nominal income in 2002 be so that the two together don't experience a drop in their real income, if Edmond's nominal income in 2002 is €6,250?

5. Suppose economy X produces according to the following production function:

$$Y = K^{1/2}L^{1/2}$$

Here, Y is real GDP, K is capital, and L is labor. Suppose capital K is fixed at 25 units at each period. Fill out the following table:

Period	Labor	Real GDP	Growth in Real GDP
0	4		
1	9		
2	25		
3	49		
4	64		