

Economics 102  
Spring 2017  
Answers to Homework #3  
Due March 16, 2017

**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.
- Late homework will not be accepted so make plans ahead of time.
- **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 and 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!**

**Part I: GDP measurement**

- 1) Before he finally managed a successful coup d'état of the Ministry of Magic, Lord Voldemort was trying his best to better understand the Muggle Economy. He reasoned that a better understanding of the sources of output would lead to insights as to perpetuating his regime of chaos and destruction. After a loyal servant of the Dark Lord placed one of the Muggles working at the Bank of England under the Imperius Curse, the following list of transactions was obtained:

Source	Million £
Tea imports	100
Consumer purchases of raincoats	50
Government spending on Corgi breeding	20
Footballer salaries	20
Profits from Oil and Gas companies	40
Consumer Aston Martin purchases	10
New Aston Martin factory construction	90
Government "00" training programme	50
Rolls Royce jet engine sales to Boeing	20
Payments in exchange for lending out farm equipment	30
Consumer purchases of tea sets	20

Use the list of transactions to answer the following questions:

- a. If He-Who-Must-Not-Be-Named assumes these are all the transactions that took place in 1997, what would his estimate of GDP be using the Expenditure approach?

$$(-100) + 50 + 20 + 10 + 90 + 50 + 20 + 20 = 160 \text{ million } \pounds$$

$$\text{Consumption Spending} = C = 50 + 10 + 20 = 80$$

$$\text{Government Spending} = 20 + 50 = 70$$

$$\text{Investment Spending} = 90 + 20 = 110$$

$$\text{Spending on Imports} = 100$$

$$\text{GDP} = C + I + G + (X - \text{IM})$$

$$\text{GDP} = 80 + 110 + 70 - 100 = 160 \text{ million } \pounds$$

- b. Voldemort decides to check his work and attempts to calculate GDP using the Income approach. What number will the Dark Lord come up? Based on this value, what can you conclude about the above list of transactions?

Income approach to GDP:  $\text{GDP} = \text{wages} + \text{interest} + \text{rent} + \text{profits}$ . We know the following:

$$\text{Salaries} = 20$$

$$\text{Profits} = 40$$

$$\text{Interest} = 30$$

So,  $20 + 40 + 30 = 90$  million  $\pounds$ . The list of transactions must be incomplete, since you should get the same number whether you use the expenditure approach or the income approach.

- c. Unfortunately for the vilest wizard of our age, the internet was not quite as robust in 1997 as it is today. Today, we can easily look up the GDP for most countries for a given year. Conduct a (quick) internet search for GDP in 1997 and find the value of British Nominal GDP for 1997. Do your findings support your answer to part (b)? (Hint: I recommend using <https://fred.stlouisfed.org/> and searching for “British Nominal GDP” under “Economic Data.”)

We find that nominal GDP in 1997 was approximately 230 million pounds, therefore even in our calculation using the expenditure approach it appears we are not including all calculations.

- 2) Meg and Lois decide that with all the other 10-year-olds selling lemonade on street corners, there really isn't a way for them to enter the beverage industry. Therefore, they enlist their friend Loretta, whose parents own a dairy farm, to run a little three-

part business. The end goal is selling breakfast on the curb outside Meg's house. Lois will oversee baked goods, Loretta will provide milk, and Meg will sell the final product. Each girl will sell any extra milk or baked goods that Meg can't use. They also enlist the help of the three boys who live at the bottom of the hill, Stewie, Chris, and Peter, and pay each of them wages to help. The production is summarized in the following table:

	Loretta	Lois	Meg
Inputs	\$0	\$5 (milk)	\$5 (milk) \$15 (croissants)
Wages	\$3 (Stewie)	\$4 (Chris)	\$7 (Peter)
Total Sales	\$12	\$15	\$36

Use the table to answer the following questions:

- a. How much value is Meg adding in putting together the final product?

Using the value-added approach: Value of sales at this stage of production – Value of goods entering this stage of production =  $36 - (5 + 15) = \$16$

- b. Compute the GDP contributions of the group using the value-added approach.

Meg: \$16 (see (a) for explanation)

Lois:  $15 - 5 = \$10$

Loretta: \$12

Total: \$38

- c. Say the three girls decide to share the profits evenly. How much do they each get?

Meg:  $36 - 7 - 20 = \$9$

Lois:  $15 - 4 - 5 = \$6$

Loretta:  $12 - 3 = \$9$

Average =  $(9 + 6 + 9) / 3 = \$8$

- d. Verify your answer in (b) by computing GDP using the income approach.

Income approach = wages + interest + rent + profits

There are no interest payments and there is no rent in the problem, so:

Profits: \$24

Wages: \$14

Total: \$38

Note that your measure of GDP using the value added approach gives the same value as your measure of GDP using the factor payments approach.

- e. Meg and Loretta decide Lois isn't adding a whole lot to the enterprise, so they decide to cut her out. They lack her baking expertise, so they decide to raid Meg's parents' pantry for cereal, deciding Trix are not just for kids. Note that

Meg no is no longer buying the \$15 of croissants from Lois, however her total sales fall by \$10. She also ends up buying an additional \$5 of milk from Loretta, raising Loretta's total sales by \$5. The girls also send Chris to work for Loretta at half his original wage. What is the loss in GDP from cutting out Lois? Hint: you will find it helpful to make a table summarizing this new data before you calculate your answer: the table should have the following information:

	Loretta	Meg
Inputs		
Wages		
Total Sales		

The new table is:

	Loretta	Meg
Inputs	\$0	\$10 (milk)
Wages	\$5 (Stewie and Chris)	\$7 (Peter)
Total Sales	\$17	\$26

New GDP: Profits:  $(17 - 5) + (26 - 7 - 10) = \$21$

Wages: \$12

Total: \$33. They lost \$5 of GDP.

- 3) Below is a table of Real and Nominal GDP, along with GDP deflators for the state of Wisconsin, in billions of USD (data source: <https://fred.stlouisfed.org/>, WIRGSP and WINGSP, select years):

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Real GDP	254	255		245	251		260	262	268	271
Nominal GDP	236	244	245			262	272	280	292	302
GDP Deflator	93	96	97	100	101		105	107	109	112

- a. Which year was used as the base year for calculations? If any information is missing about that year, complete the entry.

The base year was 2009, since the GDP Deflator is equal to 100 in that year. Nominal GDP was \$245 billion

- b. If the percent change in prices using the GDP deflator as the price index was 1.64% from 2010 to 2011, what was the GDP deflator in 2011? What was the level of Real GDP in that year?

GDP deflator:  $x - 101 / 101 * 100 = 1.64$  gives us that  $x = 102$

Real GDP:  $262 / 102 * 100 = \text{Real GDP} = \$256.9 \text{ billion} = \$257 \text{ billion.}$

- c. Figure out the rest of the missing values from the table. Show how you found your answers and provide the completed table.

$$\text{Real GDP 2008: } 245 / 97 * 100 = 252$$

$$\text{Nominal GDP 2010: } 251 * 101 / 100 = 253.51 = 254$$

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Real GDP	254	255	252	245	251	257	260	262	268	271
Nominal GDP	236	244	245	245	254	262	272	280	292	302
GDP Deflator	93	96	97	100	101	102	105	107	109	112

## **Part II: Unemployment**

- 4) For the following questions, determine whether the form of unemployment is structural, frictional, cyclic, or none of these choices.
- a. Shrek spends one evening crunching the numbers and realizes that given recent economic forecasts that tourism in his swamp will be down in the next year. He has a hard conversation with Donkey, where he tells Donkey he won't be able to employ him in the coming year, but can hopefully rehire him once a prince has come and saved the economy.

**This is cyclic unemployment.**

- b. Moisture farmers on the desert planet of Tatooine had for a long time been a vital part of the planet's economy, however recent developments in terraforming and space irrigation have led to it being an outdated and inefficient practice, leaving hundreds of thousands of moisture farmers out of work.

**This is structural unemployment.**

- c. A young economist decides that she did not get her PhD so that should could make millions on Wall Street, and quits her high-profile job in Manhattan to find an academic position, realizing it might take some time to find a suitable job.

**This is frictional unemployment.**

- d. One day, everyone wakes up and finds that all economic assumptions of rationality are met, allowing individuals to optimize and any kinds of contracts can be written between agents. This leads to the insurance companies becoming obsolete, as individuals can now perfectly self-insure.

**This is structural unemployment.**

- e. Harry decides that after defeating Lord Voldemort, saving the wizarding world, and rebuilding the Auror Department that he doesn't need to work anymore.

**This is none of the above choices; Harry is not in the labor force.**

5)



An anonymous source recently told me that the U6 unemployment rate (total unemployment, plus marginally attached workers, plus part-time for economic reasons) is not a more useful measure than U3, since the additional classifications included in U6 are relatively constant over time. How would you respond to this claim? The above graph shows the difference between the U6 rate and the U3 rate, over approximately the past 20 years. What can you say about the gap between U3 and U6 during recessions? (Data source: <https://fred.stlouisfed.org/>, U6RATE – UNRATE).

The first observation is that the difference also moves up and down; it is certainly not constant over time. We can also notice that the gap increased a lot during the last recession (starting around 2008), with some persistence, suggesting that there is additional information about the economy in U6 that is not contained in U3.

**Part III: CPI**

6) Below is a table of prices for goods that we would include in a “typical” basket of goods:

Year	Commemorative Super Bowl LI Hat	Tom Brady Super Bowl LI Jersey	Rob Gronkowski Navy/Silver Jersey
2017	\$35.00	\$500,000.00	\$100.00
2018*	\$37.50	\$500,100.00	\$110.00

2019*	\$39.00	\$500,290.00	\$115.00
-------	---------	--------------	----------

\*projected

Use the table to answer the following questions:

- a. If a typical basket includes 1000 SB LI hats, 500 Rob Gronkowski Jerseys, and 1 Tom Brady SB LI jersey, compute the CPI for each year (use a scale factor of 100), using 2017 as the base year.

2017: 100

2018:  $((37.5 * 1000) + (500,100) + (110 * 500)) / ((35 * 1000) + (500,000) + (100 * 500)) * 100 = 101.3$

2019:  $((39 * 1000) + (500,290) + (115 * 500)) / ((35 * 1000) + (500,000) + (100 * 500)) = 102$

- b. Based on these (projected) prices, what is your estimate of the rate of inflation between 2018 and 2019?

$102 - 101.3 / 101.3 * 100\% = 0.7\%$

- 7) Since you finally decided to pick Economics as your major, you of course have several amazing job-offers around the country. Below is a summary of your offers and the location:

New York, NY	\$90,000
Madison, WI	\$65,000
San Diego, CA	\$70,000
Seattle, WA	\$79,000

Using an online cost-of-living calculator, which offer is the most lucrative after adjusting for cost of living? (Hint: pick one city, and compare every other city with that one city).

Using <http://www.bestplaces.net/> and Madison as the base city, I found:

The Madison, WI salary would need to increase to \$106,752 in NY for these two offers to have the same purchasing power.

The San Diego, CA salary would need to increase to \$98,449 for me to have the same purchasing power as I have in Madison, WI.

The Seattle, WA salary would need to increase to \$104,676 for me to have the same purchasing power as I have in Madison, WI.

Thus, in turns of maximizing my purchasing power, the Madison, WI offer is the best offer since once we adjust each of these offers in terms of the cost-of-living using Madison as our base city we find that each offer has less purchasing power than the Madison offer.