

TOTAL SCORE _____

MC _____

EXE 1 _____

EXE 2 _____

Econ 002- INTRO MACRO Prof. Luca Bossi September 28, 2015

MIDTERM #1 – SOLUTIONS

My signature below certifies that I have complied with the University of Pennsylvania's Code of Academic Integrity in completing this examination. In particular, I declare that I have not used a graphing calculator to complete this exam.

Student Name (printed)

PennID

Your Signature

Date

Your TA Name (printed)

INSTRUCTIONS

The exam is closed book. The exam is composed of 21 multiple choice questions and two exercises. Unless stated otherwise, all multiple choice questions are worth 3 points (the total is 60 points for the multiple choice part). The exercises are worth 20 points each (the total is 40 points for the exercise part). You can detach the answer sheet for the MC part at the end of the exam if this is more comfortable for you. If that is the case, be sure to put your name on it and to tell your TA to staple it back to the exam when finished. If you do not fill in the MC part on time and request extra time at the end of the exam to write the answers up, a proctor will take your name and you will receive a penalty of 5 points. Please follow the instructions as to how to submit your exam at the end of the 60 minutes. If you do not follow those instructions and/or delay your exam submission, a proctor will take your name and you will receive a penalty that will depend on your (miss)behavior.

ANSWER ALL QUESTIONS. TOTAL POINTS = 100. TOTAL TIME = 60 minutes

Provide your answers on the exam sheet directly. Read all questions very carefully. Write legibly.

EXAM TAKING POLICY

If you need to use the restroom, raise your hand and wait for the proctor to come to you. Only one person can be out of the examination room at a time, and the proctor will hold onto your exam papers while you are out at the restroom.

FOR THE DURATION OF THE EXAM, AND WITH THE EXCEPTION OF YOUR ALLOWED SCIENTIFIC CALCULATOR, YOU HAVE TO TURN OFF EVERYTHING ELSE THAT HAS A POWER BUTTON. NO CELL PHONES. NO BOOKS. NO NOTES. NO HELP SHEETS. NO TALKING TO EACH OTHER. NO ASKING THE PROCTORS ANY QUESTION OR HELP TO SOLVE THE EXAM. YOU CANNOT CONNECT TO THE INTERNET.

WRITE IN PENCIL OR IN PEN AS YOU LIKE, BUT IF YOU WRITE IN PENCIL THERE IS NO POSSIBILITY TO ASK FOR RE-GRADING. PLEASE WRITE YOUR NAME ON THE FIRST PAGE OF THE EXAM AND ON THE MC BUBBLE PAGE.

PLEASE DO NOT START THIS EXAM UNTIL INSTRUCTED TO DO SO.

GOOD LUCK!

MULTIPLE CHOICE QUESTIONS

Identify the letter that best completes the statement or answers the question. Mark your answer (fill in the letter of your choice) in the answer bubble sheet for the MC provided on the last page of the exam.

1) The residents of country A earn \$500 million of income from abroad. Residents of other countries earn \$200 million in country A. The earnings that Country A residents earn abroad are accounted for in country A's

- a. **GNP which is larger than GDP in country A.**
- b. GNP which is smaller than GDP in country A.
- c. GDP which is larger than GNP in country A.
- d. GDP which is smaller than GNP in country A.

2) Which of the following transactions does *not* take place in the markets for the factors of production in the circular-flow diagram?

- a. Jason provides plumbing services for a plumbing company and receives an hourly wage from the company for his services.
- b. **Jennifer works as a marriage counselor and her clients pay her on a per-hour basis for her services.**
- c. Brody owns several shopping malls and receives rent payments from the companies that operate those malls.
- d. Bree sells advertising for a newspaper and receives a commission from the newspaper company for each advertisement that she sells.

3) A U.S. grocery chain purchases olive oil from Tunisia and sells it to U.S. consumers. In which of the following is this transaction included?

- a. **U.S. consumption and U.S. imports**
- b. U.S. consumption but not U.S. imports
- c. U.S. imports but not U.S. consumption
- d. neither U.S. consumption nor U.S. imports

4) Arnold quit his job because he was unhappy at work. Michael was fired because he frequently came to work late. Who is eligible for unemployment insurance benefits?

- a. both Arnold and Michael
- b. Arnold but not Michael
- c. Michael but not Arnold
- d. **neither Arnold nor Michael**

5) During the third quarter of 2006, a firm produces consumer goods and adds some of those goods to its inventory. During the fourth quarter of 2006, the firm sells the goods at a retail outlet, with the result that the value of its inventory at the end of the fourth quarter is smaller than the value of its inventory at the end of the third quarter. These actions affect which component(s) of fourth-quarter GDP?

- a. These actions affect only consumption, and they affect consumption positively.
- b. These actions affect only investment, and they affect investment positively.
- c. **These actions affect consumption positively and investment negatively.**
- d. These actions affect both consumption and investment positively.

6) Consider the following three items of spending by the government: (1) the federal government pays a \$500 unemployment benefit to an unemployed person; (2) the federal government makes a \$2,000 salary payment to a Navy lieutenant; (3) the city of Bozeman, Montana makes a \$10,000 payment to ABC Lighting Company for street lights in Bozeman. Which of these payments contributes directly to government purchases in the national income accounts?

- a. only item (1)
- b. only item (2)
- c. only items (1) and (2)
- d. **only items (2) and (3)**

7) James owns two houses. He lawfully rents one house to the Johnson family for \$10,000 per year. He lives in the other house. If he were to rent the house in which he lives, it has been estimated that he could earn \$12,000 per year in rent. How much do the housing services provided by these two houses contribute to GDP?

- a. \$0
- b. \$10,000
- c. \$12,000
- d. **\$22,000**

8) Suppose an economy produces only iPhones and bananas. In 2010, 1000 iPhones are sold at \$300 each and 5000 pounds of bananas are sold at \$3 per pound. In 2009, the base year, iPhones sold at \$400 each and bananas sold at \$2 per pound. For 2010,

- a. **nominal GDP is \$315,000, real GDP is \$410,000, and the GDP deflator is 76.83.**
- b. nominal GDP is \$410,000, real GDP is \$315,000, and the GDP deflator is 130.16.
- c. nominal GDP is \$315,000, real GDP is \$410,000, and the GDP deflator is 130.16.
- d. nominal GDP is \$410,000, real GDP is \$315,000, and the GDP deflator is 76.83.

9) During a presidential campaign, the incumbent argues that he should be reelected because nominal GDP grew by 12 percent during his 4-year term in office. You know that population grew by 4 percent over the period and that the GDP deflator increased by 6 percent during the past 4 years. You should conclude that real GDP per person

- a. grew by more than 12 percent.
- b. **grew, but by less than 12 percent.**
- c. was unchanged.
- d. decreased.

10) In 1931, President Herbert Hoover was paid a salary of \$75,000. Government statistics show a consumer price index of 15.2 for 1931 and 207 for 2007. President Hoover's 1931 salary was equivalent to a 2007 salary of about

- a. \$5507.
- b. **\$1,021,382.**
- c. \$1,140,000.
- d. \$15,525,000.

11) Suppose some unemployed people search for jobs only at places where they are unlikely to be hired, so that they can still qualify for unemployment benefits. These people are officially counted as unemployed. If these individuals were counted as out of the labor force instead of as unemployed, then

- a. both the unemployment rate and labor-force participation rate would be higher.
- b. **both the unemployment rate and labor-force participation rate would be lower.**
- c. the unemployment rate would be lower and the labor-force participation rate would be higher.
- d. the unemployment rate would be higher and the labor-force participation rate would be lower.

12) Over the last few decades, Americans have chosen to cook less at home and eat more at restaurants. This change in behavior, by itself, has

- a. reduced measured GDP.
- b. not affected measured GDP.
- c. reduced measured GDP only to the extent that the value of the restaurant meals is greater than the value of meals previously cooked at home.
- d. **increased measured GDP by the full value of the restaurant meals minus the value of the ingredients that Americans used to be buying to make their own meals.**

Table 1

2010 Labor Data for Adults (age 16 and older) in Meditor

Males not in labor force	45 million
Females not in labor force	35 million
Males unemployed	5 million
Females unemployed	5 million
Males employed	85 million
Females employed	65 million

13) Refer to Table 1. What is the adult population in Meditor?

- a. 90 million
- b. 160 million
- c. 230 million
- d. **240 million**

14) Refer to Table 1. What is the adult male unemployment rate in Meditor?

- a. 3.7 percent
- b. 5 percent
- c. **5.6 percent**
- d. 5.9 percent

15) Refer to Table 1. What is the adult female labor-force participation rate in Meditor?

- a. 38.1 percent
- b. 61.9 percent
- c. **66.7 percent**
- d. 95.2 percent

16) Which of the following is an explanation for the existence of frictional unemployment?

- a. efficiency wages
- b. minimum-wage laws
- c. unions
- d. **job search**

17) The natural unemployment rate includes

- a. **both frictional and structural unemployment.**
- b. neither frictional nor structural unemployment.
- c. structural, but not frictional unemployment.
- d. frictional, but not structural unemployment.

18) The consumer price index was 225 in 2006 and 234 in 2007. The nominal interest rate during this period was 6.5 percent. What was the real interest rate during this period?

- a. **2.5 percent**
- b. 4.0 percent
- c. 6.76 percent
- d. 10.5 percent

19) By far the largest category of goods and services represented in the CPI basket is

- a. Transportation
- b. **Housing**
- c. Recreation
- d. food and beverages

20) (Readings: 1 POINT) According to the assigned reading I gave you: "GDP and indirect taxes"

- a. GDP at market prices = GDP at factor costs + Subsidies + Indirect Taxes
- b. GDP at market prices = GDP at factor costs - Subsidies - Indirect Taxes
- c. GDP at market prices = GDP at factor costs + Subsidies - Indirect Taxes
- d. GDP at market prices = GDP at factor costs - Subsidies + Indirect Taxes

21) (Attendance: 2 POINTS) We studied how to use the chain weighted method to compute RGDP to better account for the introduction of new goods each year. In particular during a class these past few weeks, Professor Bossi used a spreadsheet example with actual figures and goods to explain this concept. Which new good was used in that spreadsheet as an example of the introduction of a new good?

- a. iPhone.
- b. Ipad Mini.
- c. Windows 10.
- d. Android Phone.

To get full credit in these exercises below you really need to show your work. If you write just a number as the answer and even if that number is correct you will not get full credit in the exercise unless you show fully the formulas and your work (how you got that number and the steps involved in your computation).

EXERCISE I (20 points total)

Assume that the Bureau of Labor Statistics reported the following CPI data:

Date	CPI
June 2009	201.9
June 2010	207.2
June 2011	217.4

- a) **(4 POINTS)** Calculate the inflation rates for the years ending with June 2010 and June 2011. Show your work.
- b) **(6 POINTS)** List the three theoretical bias and explain why calculated inflation may differ from actual inflation.
- c) **(10 POINTS)** Now disregard the information given above and fill in the blank cells in the following table.

Year	CPI	Inflation Rate	Nominal Wage	Real Wage
2007	56		\$7.15	
2008	55		\$11.20	
2009		27.27%	\$12.85	
2010		161.43%		\$18.94
2011	221			\$21

PAPER FOR YOUR USE

Answers:

a) General Formula:

$$[(\text{CPI year } t - \text{CPI year } t-1) \div \text{CPI year } t-1] \times 100 = \text{Inflation rate (t)}$$

June 2010

$$\text{Inflation} = [(207.2 - 201.9) / 201.9] \times 100 = 2.63\%$$

June 2011

$$\text{Inflation} = [(217.4 - 207.2) / 207.2] \times 100 = 4.92\%$$

b) The three reasons are:

1. **Substitution bias** – when a cheaper good is introduced but not included in the typical basket of goods, consumers may substitute away from a more expensive good in the basket, thereby causing the inflation to be overstated.
2. **Introduction of new goods** – new goods which are introduced in commerce but not included in the basket of goods in the CPI. This increases variety, allows consumers to find products that more closely meet their needs. In effect, dollars become more valuable. This neglect of new goods, which is reflected in their introduction into the CPI only after a long delay, leads to an upward bias in the inflation.
3. **Unmeasured quality changes**– An increase in the quality of a good over time is not reflected in the CPI. Again, the dollars in your pocket are more valuable if there is an improvement in the quality of the goods you are buying.

c) General formulas:

$$[(\text{CPI year } t - \text{CPI year } t-1) \div \text{CPI year } t-1] \times 100 = \text{Inflation rate (t)}$$

$$(\text{Nominal Wage}(t) \div \text{CPI}(t)) \times 100 = \text{Real Wage}(t)$$

Using CPI data for 2007 and 2008 you can find the inflation rate for 2008.

Inflation for 2007 is not available. It is NOT 0.

Using Inflation rate of 2009 and the CPI of 2008 you can retrieve the CPI for 2009.

Same logic applies for 2010.

Using CPI for 2010 and 2011 you can find the inflation rate for 2011.

Now using CPI and Nominal wages you can find the real wages for 2007/2008/2009.

Using Real Wages and CPI you can find the nominal wages for 2010 and 2011.

Example of how to find the numbers for year 2009 (you can follow similar formulas for different years):

Formula for inflation rate:

$$\text{Inflation Rate} = [(\text{CPI year } t - \text{CPI year } t-1) \div \text{CPI year } t-1] \times 100 = 27.27\%$$

Hence plugging in:

$$[(\text{CPI } 2009 - 55) \div 55] \times 100 = 27.27\%$$

$$\text{CPI } 2009 = 70$$

Formula for Real wages:

$$\text{Real wage } 2009 = 100 * \text{Nominal Wage } 2009 / \text{CPI } 2009 = 100 * 12.85 / 70$$

If you did not multiply by 100 then real wages will look very low.

Here is the full table:

Year	CPI	Inflation Rate	Nominal Wage	Real Wage
2007	56	N/A	\$7.15	\$12.77
2008	55	-1.79%	\$11.20	\$20.36
2009	70	27.27%	\$12.85	\$18.36
2010	183	161.43%	\$34.66	\$18.94
2011	221	20.77%	\$46.41	\$21

EXERCISE II (20 points total)

There are only 3 firms in a fictitious American economy.

Firm A imports 10 units of good x that cost 50\$ per unit from a Portuguese firm. It employs 5 employees paid at the wage of 80\$ per worker. Firm A then sells 8 units of good y to firm C and 4 units to American consumers. The price at which each good y is sold is 60\$.

Firm B buys 5 units of good x that cost 40\$ each from a Chinese firm. It employs 4 employees paid at the wage of 70\$ per worker. It has to pay interest of 100\$ on a loan. Firm B then sells 10 units of good y to firm C and 7 units to a French firm. The price of each good y is 50\$.

Firm C buys 8 units of good y from firm A at the price of 60\$ and 10 units of good y from firm B at the price of 50\$. The firm has 2 employees that receive a wage 100\$ each, pays rents of 50\$ and sells 30 units of good z at the price of 50\$ each to domestic consumers.

- (6 POINTS)** Compute the American GDP using the expenditure approach. Show your work.
- (7 POINTS)** Compute the GDP using the income approach. Show your work.
- (7 POINTS)** Compute the GDP using the value added approach. Show your work.

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Answers:

a) Consumption (what the consumers buy): $4*60+30*50=1740$

Investment: 0

Public Spending: 0

Exports (firm B to French firm): $7*50=350$

Imports (from Firm A and Firm B): $10*50+5*40=700$

GDP=C+I+G+NX= $1740+350-700=1390$

b) GDP = wages + rents + interest + profits

Wages: $5*80+4*70+2*100=880$

Rents: 50

Interest: 100

Profits:

From Firm A: $(12*60-10*50-5*80) = -180$

From Firm B: $(17*50-5*40-4*70-100) = 270$

From Firm C: $(30*50-8*60-10*50-2*100-50) = 270$

Total profits from all firms = 360

GDP = $880+50+100+360=1390$

c) We have to sum all the value added from each firm. To find the value added from each firm we have to compute the final sales - value of intermediate goods.

Firm A: $60*12-10*50=220$

Firm B: $17*50-5*40=650$

Firm C: $30*50-8*60-10*50=520$

GDP= sum of all value added = $220+650+520=1390$

MARK CLEARLY (FILL IN) THE LETTER OF YOUR CHOICE FOR THE MULTIPLE CHOICE QUESTIONS ONLY THIS PAGE WILL BE GRADED FOR THE MC PART.

- | | | | | |
|-----|---|---|---|---|
| 1. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 2. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 3. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 4. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 5. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 6. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 7. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 8. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 9. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 10. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 11. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 12. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 13. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
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| 17. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 18. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 19. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 20. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 21. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |