

TOTAL SCORE \_\_\_\_\_

MC \_\_\_\_\_

EXE 1 \_\_\_\_\_

EXE 2 \_\_\_\_\_

**Econ 002- INTRO MACRO Prof. Luca Bossi September 29, 2014**  
**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) Suppose your management professor has been offered a corporate job with a 30 percent pay increase. He has decided to take the job. For him, the marginal
- a. **benefit of leaving was greater than the marginal cost.**
  - b. cost of leaving was greater than the marginal benefit.
  - c. benefit of teaching was greater than the marginal cost.
  - d. All of the above are correct.
- 2) Hamid spends an hour studying instead of watching TV with his friends. The opportunity cost to him of studying is
- a. the improvement in his grades from studying for the hour.
  - b. the improvement in his grades from studying minus the enjoyment of watching TV.
  - c. **the enjoyment he would have received if he had watched TV with his friends.**
  - d. zero. Since Hamid chose to study rather than to watch TV, the value of studying must have been greater to him than the value of watching TV.
- 3) In the circular-flow diagram, which of the following items flows from firms to households through the markets for the factors of production?
- a. goods and services
  - b. land, labor, and capital
  - c. dollars spent on goods and services
  - d. **wages, rent, and profit**
- 4) 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
- 5) A good is produced by a firm in 2009, added to the firm's inventory in 2009, and sold to a household in 2010. As a result, on net,
- a. 2009 GDP increased and 2010 GDP decreased.
  - b. 2009 GDP decreased and 2010 GDP increased.
  - c. 2009 GDP did not change and 2010 GDP increased.
  - d. **2009 GDP increased and 2010 GDP did not change.**
- 6) 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.

**7)** 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)**

**8)** In the economy of Wrexington in 2008, consumption was \$4000, exports were \$800, GDP was \$9500, imports were \$200, and investment was \$1000. What were Wrexington's government purchases in 2008?

- a. \$3700
- b. **\$3900**
- c. \$5100
- d. \$5500

**9)** 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.

**10)** A German citizen buys in his own country an automobile produced in the United States by a Japanese company. As a result,

- a. U.S. net exports increase, U.S. GDP is unaffected, Japanese GNP increases, German net exports decrease, and German GNP and GDP are unaffected.
- b. U.S. net exports and GDP increase, Japanese GNP increases, German net exports decrease, German GNP is unaffected, and German GDP decreases.
- c. **U.S. net exports and GDP increase, Japanese GNP increases, German net exports decrease, and German GNP and GDP are unaffected.**
- d. U.S. net exports and GDP are unaffected, Japanese GNP increases, and German net exports, GNP, and GDP decrease.

**11)** 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.

**12)** Social Security payments are indexed for inflation using the CPI. A recent newspaper editorial claimed that Social Security recipients are harmed by years of low inflation because they do not receive as large an increase in their payments as they do in years of high inflation. Which of the following statements is correct?

- a. The newspaper editorial is correct under all circumstances.
- b. The newspaper editorial is correct if the market basket consumed by Social Security recipients is the same as the market basket used to compute the CPI.
- c. **The newspaper editorial could be correct if the prices of the goods consumed by Social Security recipients change at a different rate than the prices of the goods in the typical basket used to compute the CPI**

d. The newspaper editorial is incorrect under all circumstances.

**13)** Assume most athletic apparel bought by U.S. consumers is imported from other nations. If all else is constant, an increase in the price of foreign-made athletic apparel will cause the U.S.

- a. consumer price index and GDP deflator to increase by exactly the same amount.
- b. GDP deflator to increase more than the consumer price index.
- c. **consumer price index to increase more than the GDP deflator.**
- d. GDP deflator to decrease less than the consumer price index.

**Table 1** The table below applies to an economy with only two goods — hamburgers and hot dogs. The fixed basket consists of 4 hamburgers and 8 hot dogs.

Year	Price of hamburgers	Price of hot dogs
2009	\$5.00	\$3.00
2010	5.50	3.30
2011	5.61	3.63

**14) Refer to Table 1.** If the base year is 2009, then the economy's inflation rate is

- a. **10 percent in 2010 and 6.36 percent in 2011.**
- b. 10 percent in 2010 and 17 percent in 2011.
- c. 9.2 percent in 2010 and 6 percent in 2011.
- d. 8.22 percent in 2010 and 5 percent in 2011.

**15) Refer to Table 1.** If the base year is 2010, then the consumer price index is

- a. 100 in 2009, 109 in 2010, and 115 in 2011.
- b. 95.90 in 2009, 100 in 2010, and 107.44 in 2011.
- c. **90.91 in 2009, 100 in 2010, and 106.36 in 2011.**
- d. 88.82 in 2009, 100 in 2010, and 107.44 in 2011.

**16) Refer to Table 1.** If the base year is 2010, then the economy's inflation rate in 2010 is

- a. 8 percent.
- b. **10 percent.**
- c. 10.91 percent.
- d. 11.11 percent.

**17)** Other things the same, an increase in wages above their equilibrium level

- a. increases frictional unemployment but leaves the natural rate of unemployment unchanged.
- b. increases frictional unemployment and increases the natural rate of unemployment.
- c. increases structural unemployment but leaves the natural rate of unemployment unchanged.
- d. **increases structural unemployment and increases the natural rate of unemployment.**

**18)** Suppose that an anti-smoking campaign in Moscow, Russia, is successful so that Muscovites smoke less and chew gum more. Tobacco companies lay off workers, while chewing gum manufacturers employ more workers. This is an example of

- a. structural unemployment created by efficiency wages.
- b. structural unemployment created by sectoral shifts.
- c. frictional unemployment created by efficiency wages.
- d. **frictional unemployment created by sectoral shifts.**

**19)** Shannon is a full-time homemaker not currently searching for paid work. Noah is a full-time student who is not looking for a job. Who is included in the labor force by the Bureau of Labor Statistics?

- a. only Shannon
- b. only Noah
- c. both Shannon and Noah
- d. neither Shannon nor Noah

**20) (2 POINTS)** According to the assigned reading I gave you: “The Lady Gaga Fix: How the U.S. Is Rethinking GDP for the 21<sup>st</sup> Century”, the BEA will start to incorporate into GDP:

- a. all the creative, innovative work that is the backbone of much of what the United States now produces.
- b. Not all the creative, but just the innovative work that is the backbone of much of what the United States now produces.
- c. all the creative, but not the innovative work that is the backbone of much of what the United States now produces.
- d. All of the above are correct.

**21) (1 POINT) CAREFUL!! CHOOSE THIS ONE WISELY 😊😊 (Social Security style)**

When was the Social Security system first established in the US with the Social Security Act?

- a. 1935
- b. 1900 + 35
- c. 1970 - 35
- d. 3870/2

**EVERYONE GETS ONE POINT HERE. 😊**

**To get full credits in the 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 credits 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)**

Information about an economy for the past three years was recently released and is given below. All products are consumed or invested within the country. Except for Tylenol, which is imported, all products are produced within the country. The base year is 2009.

	Price of Industrial Tractors	Quantity of Industrial Tractors	Price of Pens	Quantity of Pens
2008	\$ 500	100	\$ 0.80	500
2009	\$ 350	120	\$ 0.60	700
2010	\$ 550	145	\$ 1.00	1,000

	Price of Tylenol	Quantity of Tylenol	Price of gums	Quantity of gums
2008	\$ 0.50	30	\$ 0.50	60
2009	\$ 0.60	55	\$ 1.00	80
2010	\$ 0.70	65	\$ 3.00	100

- (9 POINTS)** Calculate the inflation rate for 2008, 2009, and 2010 using the GDP Deflator. Round to the nearest tenth of a percent.
- (2 POINTS)** Did GDP increase between 2008 and 2009? Explain.
- (9 POINTS)** Calculate the inflation rate for 2008, 2009, and 2010 using the PCED (personal consumption expenditure deflator). Round to the nearest tenth of a percent.

**Solutions**

**a) Because Tylenol is imported, it will not be included in GDP calculations.**

**First, calculate nominal and real GDP for each year, using 2009 as the base year:**

	Nominal GDP	Real GDP (Use 2009 Prices)
<b>2008</b>	$(\$500)*(100) + (\$0.80)*(500) + (\$0.50)*(60) = \$50,430$	$(\$350)*(100) + (\$0.60)*(500) + (\$1)*(60) = \$35,360$
<b>2009</b>	$(\$350)*(120) + (\$0.60)*(700) + (\$1)*(80) = \$42,500$	$(\$350)*(120) + (\$0.60)*(700) + (\$1)*(80) = \$42,500$
<b>2010</b>	$(\$550)*(145) + (\$1)*(1,000) + (\$3)*(100) = \$81,050$	$(\$350)*(145) + (\$0.60)*(1,000) + (\$1)*(100) = \$51,450$

**Next, calculate the GDP Deflator for each year using:**

**GDP Deflator = (Nominal GDP / Real GDP)\*100**

	GDP Deflator
<b>2008</b>	$(\$50,430 / \$35,360) * 100 = 142.6$
<b>2009</b>	$(\$42,500 / \$42,500) * 100 = 100$
<b>2010</b>	$(\$81,050 / \$51,450) * 100 = 157.5$

Finally, calculate inflation for each year using the values for GDP Deflator in the growth formula:  

$$[(\text{new} - \text{old}) / \text{old}] * 100\%$$

Inflation for 2008 cannot be calculated, and any answer similar to that for the year 2008 is acceptable. However, INFLATION IS NOT 0% IN 2008.

	Inflation Rate
2008	N/A, Not available, Cannot be calculated, etc.
2009	$[(100 - 142.6) / 142.6] * 100\% = - 29.9\%$
2010	$[(157.5 - 100) / 100] * 100\% = 57.5\%$

b) Nominal GDP decreased between 2008 and 2009, but real GDP increased. Because production increased for all products produced in the country, real GDP, which reflects production increases only, increased.

Despite the production increases, prices decreased between 2008 and 2009. These decreases were enough to outweigh the increases in production, so nominal GDP decreased.

c) Recall the definition of PCED

$$\text{PCED} = \frac{\text{Value of consumption component of NGDP}}{\text{Value of consumption component of RGDP}} \times 100$$

Notice that the PCED contains only consumption goods and does not contain the prices of goods used in production or the prices of investment goods. Here in this economy, only pens, Tylenol, and gums are consumption components. Industrial tractor machines are used in production and should be excluded from the calculation.

Recall that Year 2009 is the Base year. So we need to use the prices of 2009 for the Value of consumption component of RGDP.

Year 2008

Value of consumption component of NGDP =  $(500 * \$0.80) + (30 * \$0.50) + (60 * \$0.50) = \$445$

Value of consumption component of RGDP =  $(500 * \$0.60) + (30 * \$0.60) + (60 * \$1) = \$378$

So PCED of year 2008 =  $100 * 445 / 378 = 117.7$

Year 2009:

PCED of year 2009 = 100 because it is the base year.

Year 2010:

Value of consumption component of NGDP =  $(1000 * \$1.00) + (65 * \$0.70) + (100 * \$3.00) = \$1,345.5$

Value of consumption component of RGDP =  $(1000 * \$0.6) + (65 * \$0.60) + (100 * \$1.00) = \$739$

So PCED of year 2010 =  $100 * 1,345.5 / 739 = 182.1$

Finally, calculate inflation for each year using the values for PCED in the growth formula:

$$[(\text{new} - \text{old}) / \text{old}] * 100\%$$

Inflation for 2008 cannot be calculated, and any answer similar to that for the year 2008 is acceptable. However, INFLATION IS NOT 0% IN 2008.

	Inflation Rate
2008	N/A, Not available, Cannot be calculated, etc.
2009	$[(100 - 117.7) / 117.7] * 100 = - 15.1\%$
2010	$[(182.1 - 100) / 100] * 100 = 82.1\%$

PAPER FOR YOUR USE



**EXERCISE II (20 points total)**

This economy of Pennland has two class of citizens class A and class B. You are given the following data in the table below. Base year is 2013. Note that the CPI in 2013 is normalized to one rather than to 100. In other words, use the CPI as it is given in the table for your computations and do not make your life harder.

Year	CPI	Nominal Income		Real Income	
		Class A	Class B	Class A	Class B
2012	1/3	1	1		
2013	1	2	4		
2014	2	3	6		

**a) (8 POINTS)** For all years calculate Real Income for class A and class B expressed in base year prices and fill in table.

**b) (8 POINTS)** Calculate Pennland Real GDP and Real GNP for each year given the following additional information:

- All individual in class A are citizens of Pennland. An Individual in class A setup a mega-business abroad and sends his daughter abroad to put her in charge of it. This business yields 1/3 units of nominal income in Year 2012, 2 units of nominal income in Year 2013, and 0 units of nominal income in Year 2014.
- In each and every year, half of the class B population is composed of individuals who are not citizens of Pennland, but that work within the country as legal immigrants. Every year those individuals produce exactly half of the real income generated by class B.

**c) (4 POINTS)** You are now given some statistics on the population for PennLand. Those are reported in the table below. Given this information, compute RGNP per capita for Pennland in each year. Live your numerical answers expressed as a fraction. (**Hint to solve this part:** recall the information given in part b) above).

YEAR	Pop in Class A	Legal immigrants in class B
2012	100	10
2013	110	11
2014	132	11

**Answers:**

**a) Use the formula: real variable = nominal variable / Price index. The price index in this case is the CPI**

Real Income	
Class A	Class B
$\frac{1}{\frac{1}{3}} = 3$	3
$\frac{2}{1} = 2$	$\frac{4}{1} = 4$
$\frac{3}{2} = 1.5$	$\frac{6}{2} = 3$

**b) RGDP is unaffected by those two pieces of information. Money earned abroad is not included in the calculation of GDP, and the fact that some individuals in class B are citizens does not matter as those legal**

immigrants produce and earn within the boundaries of the country. So we just need to add the real income of class A and B.

For year 2012 RGDP = 3 + 3 = 6

For year 2013 RGDP = 2 + 4 = 6

For year 2014 RGDP = 3/2 + 3 = 9/2

For GNP things are different though. Recall the formula:

$RGNP = RGDP + \text{real income earned by its citizens located abroad (RIECA)} - \text{real income of non-residents located in that country (RINRLC)}$

Key is to compute the RIECA by dividing the nominal income information for the business abroad by the CPI of each year. Also you are told that RINRLC is (1/2) of RGDP (= Real Income) for class B in each year.

YEAR	RGDP	RIECA	RINRLC	RGNP
2012	6	(1/3)/(1/3)	(1/2)*(3)	11/2
2013	6	2	(1/2)*(4)	6
2014	9/2	0	(1/2)*(3)	3

c)

You are reminded of the info in part b) above: there it says that half of the class B is composed by legal immigrants. Class B population is double that of legal immigrants. So total population for PennLand is the sum of the population in Class A and in Class B. Since you already know RGNP for each year, we get:

YEAR	Pop in Pennland	RGNP per capita
2012	100 + 2*10 = 120	11/240
2013	110 + 2*11 = 132	6/(132) = 1/22
2014	132 + 2*11 = 154	6/(308) = 3/154

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**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. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 14. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
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| 16. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 17. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 18. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 19. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 20. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 21. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |