

Economics 102  
Summer 2018  
Second Midterm with Answers  
Date: June 18, 2018

Name ANNOTATED KEY

This exam consists of three parts: I) ten binary choice questions worth 2 points each; II) twenty multiple choice questions worth 3 points each; and III) two short answer problems worth 20 points total. All answers should be clearly and legibly recorded on the exam booklet: any answer that is not legible will be counted as a wrong answer. All answers should be presented in a neat, logical fashion in the short answer portion of the exam.

**Honor Code Statement:**

I, \_\_\_\_\_, understand that it is important for me to do my own work. It is also important that I not provide help, either intentionally or unintentionally, to my fellow students. Therefore I will keep my answers covered and I will not provide answers to my classmates or take answers from my classmates. I also acknowledge that on this exam I may not have access to a calculator or a cellphone.

\_\_\_\_\_ (Signed)

I. Binary Choice Questions (out of a possible 10 points) \_\_\_\_\_  
II. Multiple Choice Points (out of a possible 60 points) \_\_\_\_\_  
III. Problems

1. Problem 1 (out of a possible 10 points) \_\_\_\_\_

2. Problem 2 (out of a possible 10 points) \_\_\_\_\_

3. Problem 3 (out of a possible 10 points) \_\_\_\_\_

TOTAL (out of a possible 100 points) \_\_\_\_\_

Work Space Page

**I. Binary Choice Questions: (5 Questions worth 2 points each for a total of 10 points)**

**EASY:  
DEFINITION**

1. Sally and Joan live in Salisbury, North Carolina. They are each 25 years old and neither one of them currently has a job. Sally is available to work and is applying for positions every week. She does plan to travel for three weeks in July to take her grandmother on a long-planned trip back to the ancestral home. Joan is also available to work and is applying for positions that are a good fit for her when they come up. Her last job application was submitted two months ago. For purposes of computing the unemployment rate:

- a. Sally would be counted as unemployed and Joan counted as not in the labor force.
- b. Sally and Joan would both be counted as not in the labor force.

**DEFINITIONAL**

2. When the economy produces at full employment this implies that:

- a. Cyclical unemployment is a negative number.
- b. Frictional and structural unemployment are at levels consistent with the economy being at its natural unemployment rate.

**NOT HARD**

3. Suppose that the government enacts a new tax bill that results in lower tax rates for everyone and a reduction in tax revenue of 10%. At the same time the government implements a spending plan that increases government spending by 20%. Prior to these changes this government had a balanced budget. With these changes, government saving will:

- a. increase.
- b. decrease.

1. SALLY  $\Rightarrow$  GOING ON VACATION  $\Rightarrow$  NOT IN LABOR FORCE  
JOAN  $\Rightarrow$  HASN'T APPLIED FOR A JOB IN PAST 4 WEEKS  $\Rightarrow$   
NOT IN LABOR FORCE

3. TAX REV  $\downarrow$   
GOVT SPENDING  $\uparrow$   
 $SG = (T - TR) - G$   
 $SG = \downarrow - \uparrow \Rightarrow SG \downarrow$

EASY

4. Holding everything else constant, when the marginal propensity to save increases this implies that:

- a. the simple expenditure multiplier gets smaller.
- b. the simple expenditure multiplier gets larger.

NOT  
TOO  
BAD

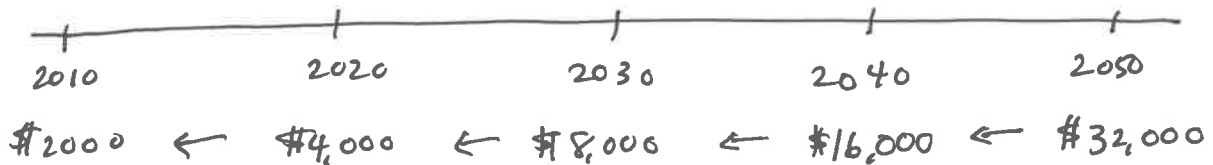
5. It is 2050. Suppose that China's real GDP per capita has been growing at 7% a year for the past 40 years. Today China's real GDP per capita is \$32,000. Given this information and holding everything else constant, approximate China's real GDP per capita in 2010. Real GDP per capita in China in 2010 was approximately:

- a. \$4000
- b. \$2000

$$4. \text{ Multiplier} = \frac{1}{1-MPC} = \frac{1}{MPS}$$

As  $MPS \uparrow \Rightarrow \text{MULTIPLIER} \downarrow$

5.  $70/7 \approx 10$  YEARS TO DOUBLE



## II. Multiple Choice Questions (20 questions worth 3 points each for a total of 60 points)

CAREFUL  
HERE!

6. In 2015 Micah built 100 canoes that he sold for \$500 per canoe to people living in his community. In addition, Micah built 20 kayaks and he sold 15 of them for \$400 per kayak. He ate \$5000 worth of groceries that included \$1000 of imported cheese and \$500 of Belgian beer (imported as well). He purchased a \$500 coat manufactured in Italy. Micah lives in the United States. How much did his actions contribute to US GDP for 2015?

- a. \$58,000
- b. \$60,000
- c. \$63,500
- d. \$61,500

ABIT  
HARD!

7. Sarah knows that the CPI in 2017 is equal to 100 and she expects the CPI in 2018 to be equal to 120. Sarah has negotiated a one year loan from Herman in 2017 where she will pay a nominal interest rate of 23%. If the actual CPI for 2018 is lower than the expected CPI for 2018 then Sarah will be:

- a. better off than she anticipated.
- b. worse off than she anticipated.
- c. convinced that the Fisher equation is not correct.
- d. paying a different, and lower real interest rate than she anticipated.

$$\begin{aligned}
 6. \quad C &= (100 \text{ canoes})(\$500/\text{canoe}) + (15 \text{ kayaks})(\$400/\text{kayak}) + \\
 &\quad \$5000 \text{ IN GROCERIES} + \$500 \text{ COAT MADE IN ITALY} \\
 C &= \$50,000 + \$6,000 + \$5,000 + \$500 = \$61,500 \\
 I &= (15 \text{ KAYAKS})(\$400/\text{KAYAK}) = \$2,000 \\
 G &= \$0 \\
 X-IM &= -\$1,000 \text{ IMPORTED CHEESE} - \$500 \text{ BELGIAN BEER} \\
 &\quad - \$500 \text{ ITALIAN COAT}
 \end{aligned}$$

$$X-IM = -\$2,000$$

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

$$\text{GDP FROM MICAH} = \$61,500 + \$2,000 + 0 + (-\$2,000)$$

$$\text{GDP FROM MICAH} = \$61,500$$

7. REAL = NOM - EXPECTED INFLATION

$$\text{REAL} = 23 - 20 = 3\% \text{ IS AGREEMENT}$$

$$\text{REAL} = 23 - <20 > 37\% \Rightarrow \text{REAL INTEREST RATE } \uparrow$$

↳ GOOD FOR LENDER  
BAD FOR BORROWER

EASY:  
APPLYING  
FORMULA

8. Tony wants to save \$5000 a year in constant dollars. He anticipates that inflation next year is going to be 2%. In order for Tony to meet his goal of saving \$5000 in real dollars or constant dollars, he will need to:
- save the nominal amount of \$5000 next year.
  - save the nominal amount of \$5100 next year.
  - save the nominal amount of \$5200 next year.
  - save the nominal amount of \$5300 next year.

SOME  
WORK

9. It is 2018. India's real GDP per capita is growing at 7% a year while US real GDP per capita is growing at 2% a year. These growth rates are assumed to persist indefinitely into the future. In 2018 US real GDP per capita is \$50,000 while India's real GDP per capita is \$8,000. Given this information and holding everything else constant, how many of the following statements are true?

- In thirty years India's real GDP per capita will exceed US real GDP per capita. **F**
- In 2068 India's real GDP per capita will be more than \$50,000 greater than US real GDP per capita. **T**
- In 2053 India's real GDP per capita will be slightly greater than US real GDP per capita. **F**

- One statement is true.
- Two statements are true.
- Three statements are true.
- None of the statements are true.

8. REAL =  $\left[ \frac{\text{NOM}}{\text{INFLATION INDEX}} \right]$  (SCALE)

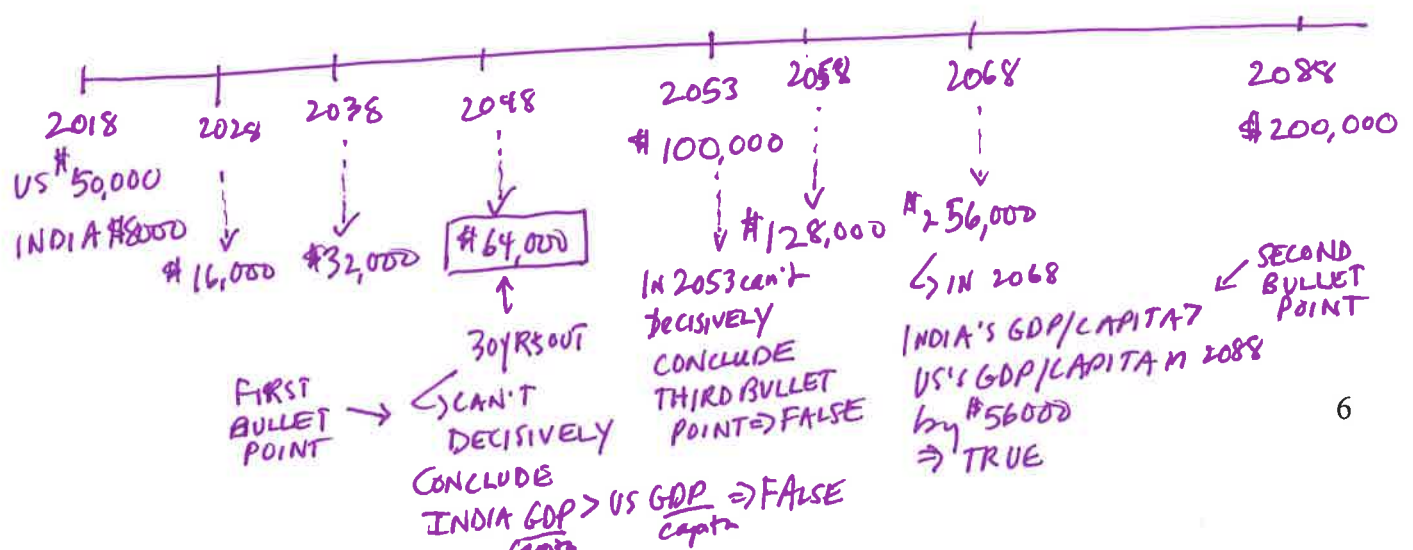
$$5000 = \left[ \frac{\text{NOM}}{102} \right] 100$$

$$\frac{5000(102)}{100} = \text{NOM}$$

$$50(102) = \text{NOM}$$

$$5100 = \text{NOM}$$

9. INDIA:  $70/7 \approx 10$  YEARS TO DOUBLE  
US:  $70/2 \approx 35$  YEARS TO DOUBLE



NOT HARD - BUT THERE'S WORK TO DO

10. Suppose that the natural rate of unemployment in an economy is 5% but that the economy is currently operating with an unemployment rate of 7% and its real GDP is equal to \$5 million. You know that for every 0.5% decrease in the unemployment rate this economy puts 50,000 people back to work. You also know that for every 0.5% change in the unemployment rate that real GDP responds by changing by 1% from its initially given level. If this economy moves back to full employment you anticipate that holding everything else constant, that \_\_\_\_\_ people will go back to work and that real GDP will be equal to \_\_\_\_\_.

- a. 100,000; increase to \$5,203,020
- b. 100,000; increase to \$5,200,000
- c. 200,000; increase to \$5,200,000
- d. 200,000; increase to \$5,203,020 ✓

10. WHAT HAPPENS TO UNEMPLOYMENT?

7 to 6.5% ⇒ 50,000 PEOPLE BACK TO WORK  
 6.5 to 6% ⇒ "  
 6 to 5.5% ⇒ "  
 5.5 to 5% ⇒ "  
 200,000 PEOPLE BACK TO WORK ⇒ ELIMINATES (A) & (B)

OUTPUT Δ:

7 to 6.5% ⇒  $5,000,000 \times (1.01) = 5,050,000$   
 6.5 to 6% ⇒  $5,050,000 \times (1.01) = 5,100,500$   
 6 to 5.5% ⇒  $5,100,500 \times 1.01 = 5,151,505$   
 5.5 to 5% ⇒  $5,151,505 \times 1.01 = 5,203,020.05 \approx 5,203,020$

Use the following information to answer the next two (2) questions.

An economy's aggregate production function is given by the equation:

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

where Y is real GDP, K is the number of units of capital and L is the number of units of labor. You are provided the following information about the labor market in this economy where W is the wage rate per unit of labor:

$$\text{Demand for Labor: } L = 86 - (1/2)W$$

$$\text{Supply of Labor: } L = 76 + (1/2)W$$

You are also told that capital in this economy is equal to 16 units. Assume that this economy is currently producing at its full employment level of real GDP.

SOME  
WORK

11. Given the above information, how many statements in the box are correct?

- |   |
|---|
| <ul style="list-style-type: none"><li>• Labor productivity is less than one unit of output per unit of labor. <b>TRUE</b></li><li>• Labor productivity is greater than capital productivity in this economy. <b>FALSE</b></li><li>• This economy is currently producing 72 units of output. <b>TRUE</b></li><li>• For a minimum wage to be effective in this economy it would need to be set at a level greater than \$12 per unit of labor. <b>FALSE</b></li></ul> |
|---|

- a. Four statements are correct.
- b. Three statements are correct.
- c. Two statements are correct.
- d. One statement is correct.

HARD

12. Suppose the amount of labor supplied at every wage rate decreases by 10 units. Which of the following statements is true given this new information and holding everything else constant?

- a. The equilibrium amount of labor will decrease, the equilibrium wage rate will increase, and capital productivity will fall. ✓
- b. The equilibrium amount of real GDP will decrease, the equilibrium amount of labor will decrease, labor productivity will decrease, and the equilibrium wage rate will decrease. ✗
- c. Labor productivity and capital productivity will move in opposite directions and capital productivity will definitely be greater than it was before the change in the supply of labor. ✗
- d. Both labor productivity and capital productivity will decrease as real GDP decreases and wages fall. ✗



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11.  $Y = 2\sqrt{K}\sqrt{L}$

$K = 16$

$Y = (2)(4)\sqrt{L}$

$Y = 8\sqrt{L}$

FIND L:  $86 - \frac{1}{2}W = 76 + \frac{1}{2}W$

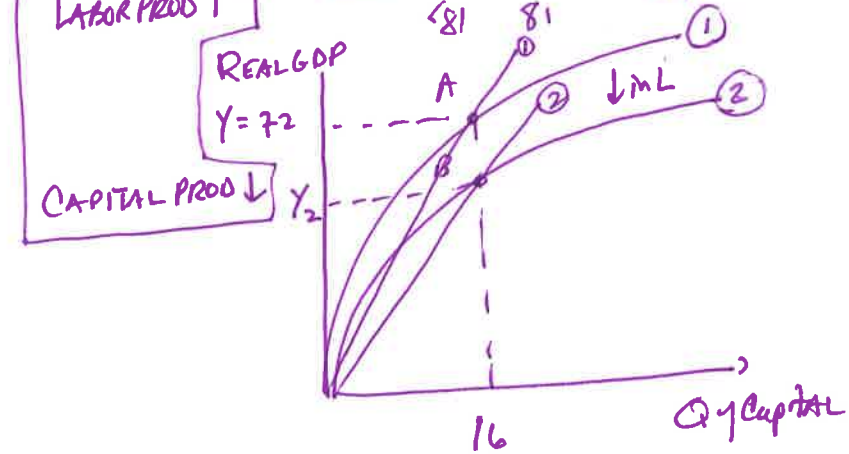
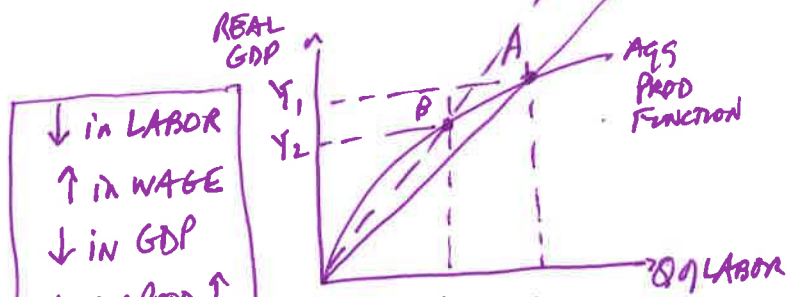
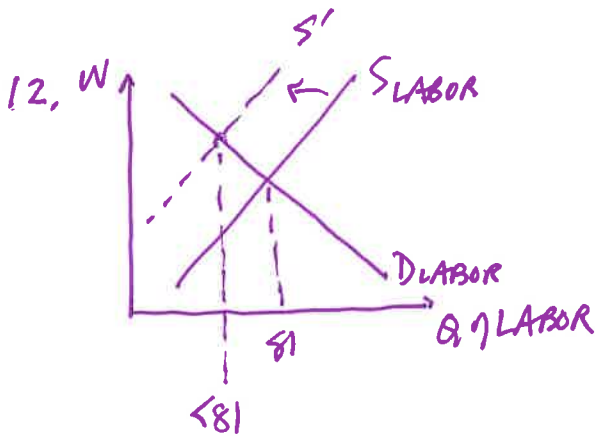
$10 = W \leftarrow$  FOURTH BULLET POINT FALSE  $\Rightarrow$  MIN WAGE TO BE EFFECTIVE NEEDS TO BE  $> 10$

if  $W = 10 \Rightarrow L = 76 + \frac{1}{2}(10)$   
 $L = 81$

$Y = 8\sqrt{81} = 8(9) = 72 \leftarrow$  THIRD BULLET POINT TRUE

LABOR PRODUCTIVITY =  $\frac{Y}{L} = \frac{72}{81} < 1 \leftarrow$  FIRST BULLET POINT TRUE

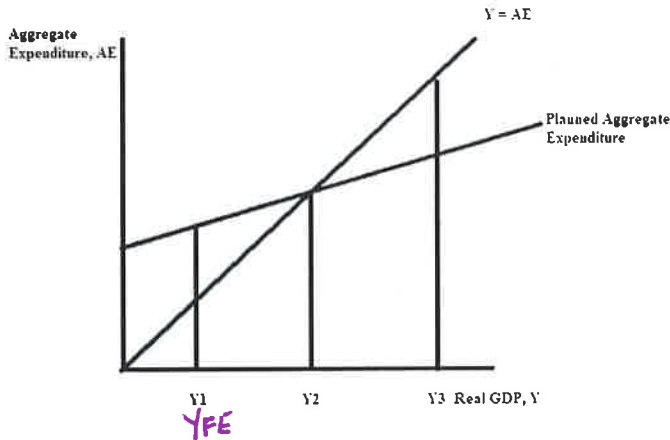
CAPITAL PRODUCTIVITY =  $\frac{Y}{K} = \frac{72}{16} > 1 \leftarrow$  SECOND BULLET POINT FALSE



USE THIS INFO TO DETERMINE CORRECT RESPONSE

NOT  
HARD

13. Consider the following graph that depicts an economy modeled using a short-run Keynesian model where  $Y$  is real GDP.



Suppose full employment for this economy is represented by  $Y_1$  in the above graph. From this information and the graph you conclude that:

- This economy is currently in a recession. **FALSE  $\Rightarrow$  IN A BOOM**
- (b)** This economy's unemployment rate is below the natural rate of unemployment. **TRUE**
- That this economy has too little spending and that an increase in spending will be necessary to return this economy to its full employment level of output.  **$\downarrow$  IN SPENDING NEEDED TO GET TO FE  $\Rightarrow$  FALSE**
- This economy is experiencing an increase in the level of unplanned inventories and this change in inventories will cause producers to decrease their production and return this economy to full employment. **AT  $Y_2 \Rightarrow$  NO UNPLANNED  $\Delta$  IN INVENTORIES  
AT  $Y_1 \Rightarrow$  UNPLANNED INVENTORY  $\Delta$  IS  $\downarrow$ , NOT  $\uparrow \Rightarrow$  FALSE**

IN EQUILIBRIUM, ECONOMY PRODUCES  $Y_2$  WHERE  $AE = Y$   
AT  $Y_1$ ,  $AE > Y_1 \Rightarrow$  INVENTORIES FALL  $\Rightarrow$  ACT AS SIGNAL TO  
PRODUCE MORE  $\Rightarrow$  GO TO  $Y_2$

Use the following information to answer the next two (2) questions.

Consider an economy that can be described by the following information:

Government Spending = \$200

Taxes = T = \$180

Transfers = TR = \$40

Investment Spending = \$40

Consumption Spending = C and where  $C = 80 + .8[Y - (T - TR)]$  where Y is real GDP

Net Exports = \$10

NOT TOO  
BAD

14. Which of the following statements is true given the above information and holding everything else constant?

I. This country has a trade surplus since imports are greater than exports. **FALSE**

II. This country is operating with a budget surplus. **FALSE**

III. This country's equilibrium level of output is 1090. **TRUE**

IV. The multiplier for this country equals 5. **TRUE**

a. Statements I, II and III are all correct statements.

b. Statements I, III, and IV are all correct statements.

c. Statement III is a correct statement.

d. Statements III and IV are both correct statements.

EASY

15. Given the above information suppose that government spending increases by \$20. If this is the only change, what will be the change in real GDP?

a. an increase of \$100

b. a decrease of \$200

c. an increase of \$20

d. an increase of \$50

14. I.  $X - IM > 0 \Rightarrow$  TRADE SURPLUS SINCE  $X > IM \Rightarrow$  I IS FALSE

II. BUDGET SURPLUS =  $(T - TR) - G = (180 - 40) - 200 < 0 \Rightarrow$  BUDGET DEFICIT  $! \Rightarrow$

II IS FALSE

III.  $Y = C + I + G + CX - IM$

$$Y = 80 + .8[Y - (180 - 40)] + 40 + 200 + 10$$

$$Y = 330 + .8Y - .8(140)$$

$$.2Y = 330 - 112$$

$$.2Y = 218$$

$$Y = 1090 \Rightarrow$$
 III IS TRUE

IV. MULTIPLIER =  $\frac{1}{1 - MPC} = \frac{1}{1 - .8} = \frac{1}{.2} = 5 \Rightarrow$  IV IS TRUE

15.  $\Delta Y = \left(\frac{1}{1 - b}\right) (\Delta G)$

$$\Delta Y = 5(20) = \$100$$

OR

$$Y' = C + I + G' + CX - IM$$

$$Y' = 80 + .8(Y' - 140) + 40 + 220 + 10$$

$$.2Y' = 350 - 112$$

$$Y' = \frac{238}{.2} = 1190$$

$$\Delta Y = Y' - Y = 1190 - 1090 = 100$$

Use the following information to answer the next two (2) questions. Assume there is no inflation in this problem.

Jose is getting ready to invest a recent windfall and he has four options:

**Investment A:** He deposits \$1,000 today in investment A and this investment pays 7% a year for the next 40 years. After that the investment will pay no return on the amount in the investment at that time.  $70/7 \approx 10$  YRS TO DOUBLE  $\Rightarrow$  AT 40 YRS OUT, REACHES MAX = \$16,000

**Investment B:** He deposits \$2,000 five years from today in investment B. He earns 2% a year on investment B.  $70/2 \approx 35$  YRS TO DOUBLE

**Investment C:** He deposits \$3,000 today in investment C and this investment pays 10% a year for 14 years and then the investment will no longer pay any return on the amount in the investment at that time.  $70/10 \approx 7$  YRS TO DOUBLE  $\Rightarrow$  AT 14 YRS OUT, REACHES MAX = \$12,000

**Investment D:** He deposits \$3,000 today in investment D and this investment pays 5% a year for however long Jose has his money invested in this investment.

$70/5 \approx 12$  YRS TO DOUBLE

HARD

16. Given the above information and holding everything else constant, how many of the statements in the box are true?

- Jose's best investment if he has a time period of only 30 years is Investment D. TRUE
- If Jose intends to take his money out of the investment in fourteen years then his best investment is Investment C. TRUE
- Jose would need to live an additional 140 years from the time he makes his investment if he invests in Investment B and wants to earn \$32,000 from this investment. TRUE
- Jose's worse investment if he has a time period of only 40 years is Investment B. TRUE
- Investment A will eventually grow to \$18,000. FALSE

- a. One statement is correct.
- b. Two statements are correct.
- c. Three statements are correct.
- d. Four statements are correct.

NOT TOO HARD

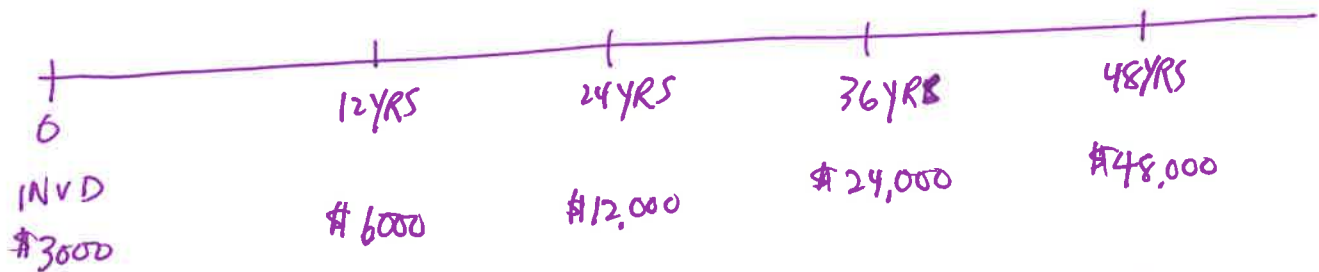
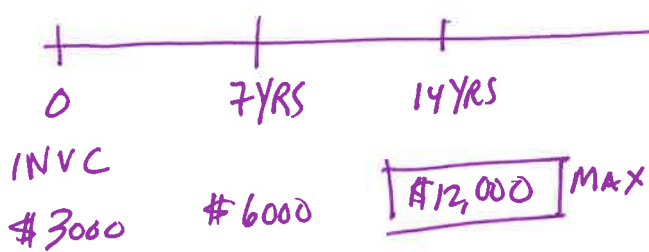
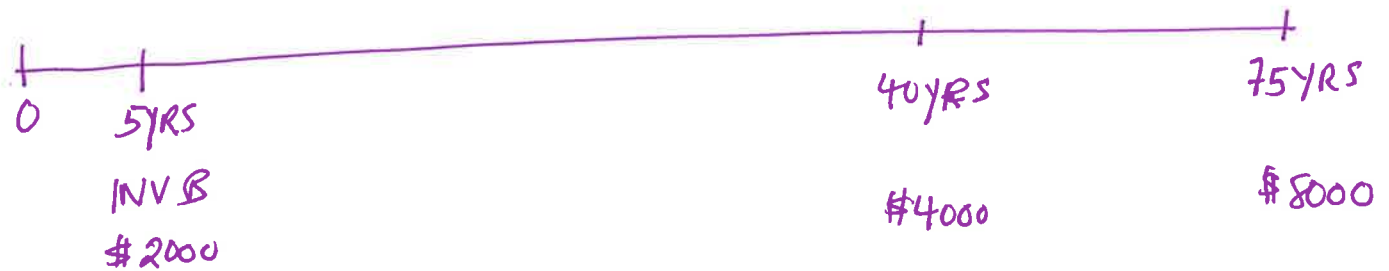
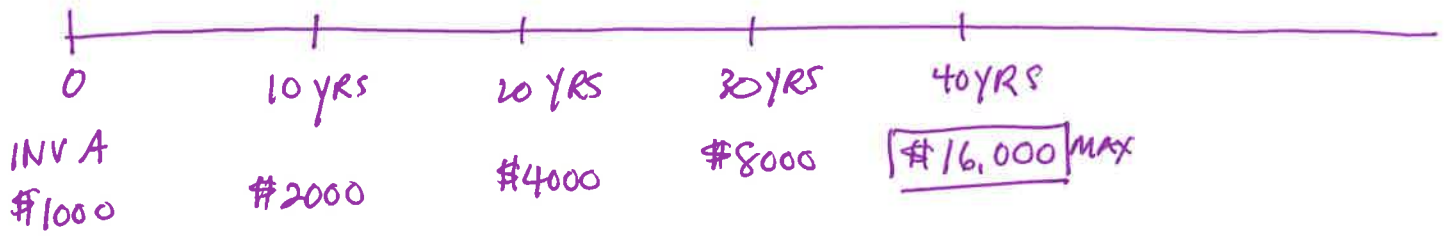
17. Given these options, suppose Jose has a fifteen year time horizon on these investments. Given this perspective and holding everything else constant, which investment should Jose choose if he only cares about the highest accumulated amount from the investment?

- a. A
- b. B
- c. C
- d. D

BULLET POINT FOUR  $\Rightarrow$  TRUE  $\Rightarrow$  SEE TIME LINES

BULLET POINT FIVE  $\Rightarrow$  FALSE

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BULLET POINT ONE: AT 30 YRS  $\Rightarrow$ 

INV A WORTH \$8000	} BULLETPOINT ONE TRUE
INV B WORTH $<$ \$4000	
INV C WORTH \$12,000	
INV D WORTH $>$ \$12,000	

BULLET POINT TWO: AT 14 YRS  $\Rightarrow$ 

INV A WORTH $>$ \$2000 BUT $<$ \$4000	} BULLET PT TWO TRUE
INV B WORTH $>$ \$2000 BUT $<$ \$4000	
INV C WORTH \$12,000	
INV D WORTH $>$ \$6000 BUT $<$ \$12,000	

BULLET POINT THREE: IN 110 YRS INV B WORTH \$16,000  
 IN 145 YRS (140 YRS OUT FROM WHEN INVESTMENT MADE) INV B WORTH \$32,000  $\Rightarrow$  TRUE 13

SOME THOUGHT

18. Suppose an economy is at full employment initially with balanced trade and a balanced budget. Holding everything else constant, when the government runs a surplus and the economy runs a trade deficit this results in:

- a. A decrease in private saving. **TRUE**
  - b. An increase in private saving. **FALSE**
  - c. A decrease in private investment. **FALSE**
  - d. Leakages exceeding injections in this economy. **FALSE, IN EQUILIBRIUM THEY ARE EQUAL**
- } ONE OF THESE IS LIKELY FALSE

Use the following information to answer the next two (2) questions.

You are given the following information about an economy. For this economy you are told that the market basket for purposes of computing the inflation rate in the economy has been defined as 10 notebooks and 4 pizzas.

	Quantity in 2016	Price in 2016	Quantity in 2017	Price in 2017
Notebooks	100	\$2 per notebook	120	\$3 per notebook
Pizzas	200	\$20 per pizza	150	\$30 per pizza

NOT TOO BAD

19. If the base year is 2016, what is the rate of inflation using the CPI between 2016 and 2017?

- a. 20%
- b. 30%
- c. 50%
- d. 60%

<u>YEAR</u>	<u>COST OF MKT BASKET</u>	<u>YEAR</u>	<u>CPI BY 2016</u>
2016	$20 + 80 = 100$	2016	$(100/100)(100) = 100$
2017	$30 + 120 = 150$	2017	$(150/100)(100) = 150$

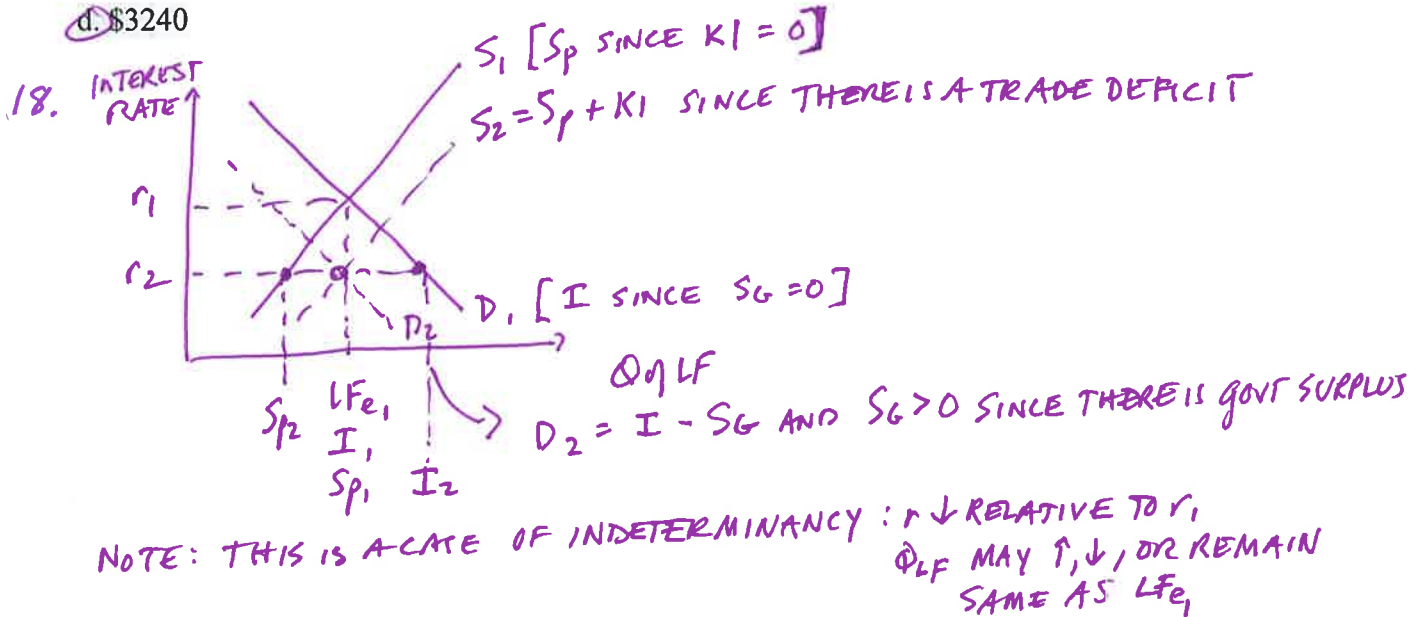
  
 RATE OF INFLATION =  $\left[ \frac{150 - 100}{100} \right] (100\%) = 50\%$

NOT HARD

20. If the base year is 2016, what is the value of real GDP for 2017?

- a. \$100
- b. \$150
- c. \$4860
- d. \$3240

$$REAL\ GDP_{2017} = (\$2 \times 120) + (\$20 \times 150) = 240 + 3000 = \$3240$$



Use the information below to answer the next two (2) questions.

Consider the loanable funds market where we assume that the economy is operating at the full employment level of output and that net taxes ( $T - TR$ ) are held constant. Initially this economy's government is operating with a balanced budget and there is balanced trade. Thus, initially private saving is equal to investment spending.

21. Given this information suppose that this economy starts to run a trade surplus at the same time that its government runs a budget deficit. You know with certainty that the size of the trade surplus is smaller than the size of the budget deficit. How many of the following statements are true given these changes?

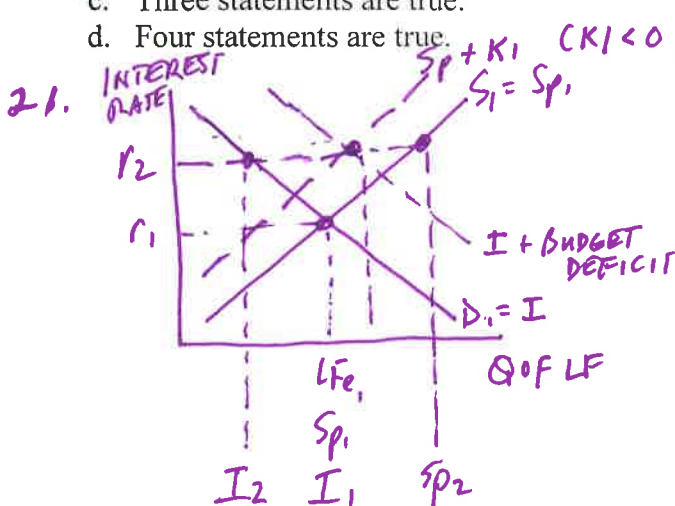
- The equilibrium interest rate in the loanable funds market will increase with these changes. **TRUE**
- Private saving will exceed investment spending in this market after these changes. **TRUE**
- The new equilibrium quantity of loanable funds in this market relative to the initial equilibrium quantity of loanable funds in this market will be indeterminate after these changes. **FALSE**  $\Rightarrow$  SINCE TRADE SURPLUS < BUDGET DEFICIT  $\Rightarrow Q_{LF_e} \uparrow$
- Government spending must have decreased relative to its initial level when these changes occur. **FALSE**  $\Rightarrow$  GOVT SPENDING  $\uparrow$

- a. One statement is true.  
**b.** Two statements are true.  
 c. Three statements are true.  
 d. Four statements are true.

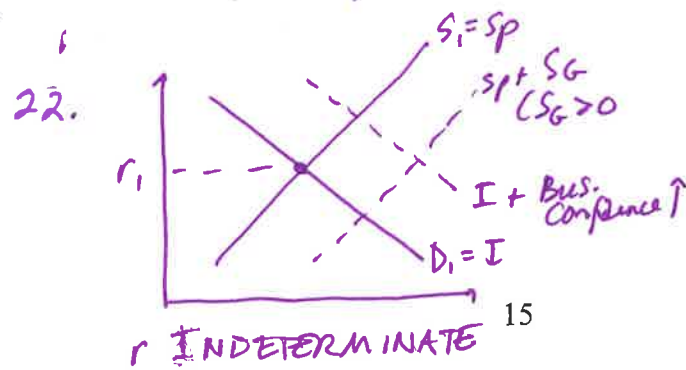
22. Return to the initial situation. Suppose that in this economy business confidence increases at the same time that the government decides to run a budget surplus. Given this information and holding everything else constant, how many of the following statements are true?

- F** • Private savings will increase when these changes occur.  $S_p$  MAY  $\downarrow$ ,  $\uparrow$ , OR STAY SAME
- F** • Consumption spending will increase when these changes occur.  $C$  MAY  $\uparrow$ ,  $\downarrow$ , OR STAY SAME
- T** • The equilibrium interest rate will be indeterminate when these changes occur.
- T** • The level of private savings will be indeterminate when these changes occur.

- a. One statement is true.  
**b.** Two statements are true.  
 c. Three statements are true.  
 d. Four statements are true.



$r \uparrow$  relative to  $r_1$



SOME WORK

23 Consider a community that has ten individuals:

- Mary who is 25 and works fifteen hours a week as a waitress at the local coffee shop **E**
- Roscoe who is 35 and works for pay for five hours a week at a local restaurant **E**
- Tricia who is 25 and who is currently not working and is looking for a job: she is available to work and she is applying for jobs and she recently graduated from her graduate degree studies at the university **U ⇒ FRICTIONALLY U**
- Mitchell who is 15 who is looking for work: he is available to work and he is applying for jobs **NOT IN LF ⇒ TOO YOUNG**
- Susie who is 54 and is currently unhappily employed as a part-time worker; she is looking for full-time work but she has been unable to find this type of job because of the state of the economy **E ☹**
- Michelle who is 29 and who has been recently institutionalized due to debilitating mental illness **NOT IN LF**
- Nancy who is 52 and who has recently lost her job due to changes in the technology used to produce widgets: Nancy is looking for work, available to work, and is applying for jobs **U ⇒ STRUCTURALLY U**
- James who is 20 who is currently not working, is available to work and he submitted his last job application six weeks ago **NOT IN LF: MUST APPLY DURING PREVIOUS 4 WEEKS**
- Carolyn who is 73 and plays golf every day since retiring four years ago
- Xun who is 44 and works for pay for a bakery fifty hours a week **↳ E**

Given the above information, the frictional unemployment rate is equal to \_\_\_\_\_ and the employment rate is \_\_\_\_\_ the unemployment rate.

- a. 17%; greater than
- b. 33%; equal to
- c. 33%; less than
- d. 17%; less than

$$\text{FRICTIONAL U RATE} = \left[ \frac{\text{FRICT U}}{U+E} \right] (100\%) = \left[ \frac{1}{2+4} \right] 100\%$$

$$\text{FRICTIONAL U RATE} = \frac{1}{6} (100\%) \approx 17\% \Rightarrow \text{ELIMINATES (b) \& (c)}$$

REVIEW QUESTION

24. Consider a country that funds its government services through an income tax. The size of the underground economy grew this year as did the number of people working in the underground economy. Holding everything else constant we would expect to see this country's:

- a. GDP fall and its government tax revenue increase.
- b. GDP fall and its government tax revenue decrease.
- c. GDP rise and its government tax revenue increase.
- d. GDP rise and its government tax revenue decrease.

$$E \text{ RATE} = \left[ \frac{E}{U+E} \right] (100\%)$$

$$E \text{ RATE} = \frac{4}{6} (100\%) = 67\%$$

$$U \text{ RATE} = \left[ \frac{U}{U+E} \right] (100\%)$$

$$U \text{ RATE} = 33\%$$

UNDERGROUND ECONOMY ACTIVITIES  
NOT COUNTED IN GDP &  
ARE NOT TAXED

$$\begin{array}{r} 16 \frac{2}{3} \approx 17\% \\ 6 \overline{) 100} \\ \underline{60} \\ 40 \\ \underline{36} \\ 4 \end{array}$$



**NOTHARD 25.** Eugenia in her last semester at college applied for many jobs. At the end of this process she was pleased to have four job offers as provided in the table below where all job offers are measured in "Philadelphia dollars":

Job Offer	Real Annual Salary	NOM SALARY
Job in Philadelphia	\$100,000	\$100,000 ①
Job in Des Moines	\$64,680	< \$52,000 ③
Job in Topeka	\$81,000	\$72,900 ②
Job in Eau Claire	\$64,000	\$38,400 ④

Eugenia in her Economics class learned the importance of looking at nominal and real values. Suppose that Eugenia collects data on the CPI for these four communities and finds the following data.

City	CPI for this year
Philadelphia	100
Des Moines	80
Topeka	90
Eau Claire	60

Given this data, rank these job offers from highest nominal salary to lowest nominal salary.

- Philadelphia, Des Moines, Topeka, and Eau Claire
- Philadelphia, Topeka, Eau Claire, and Des Moines
- Philadelphia, Topeka, Des Moines, and Eau Claire
- Topeka, Philadelphia, Des Moines, and Eau Claire

$$\text{REAL} = \frac{\text{NOM}}{\text{CPI}} [\text{SCALE}] \Rightarrow \text{NOM} = \frac{\text{REAL} (\text{CPI})}{\text{SCALE}}$$

$$\textcircled{1} \text{ PHILLY: } \text{NOM} = \frac{(100,000)(100)}{(100)}$$

$$\textcircled{2} \text{ DES MOINES: } \text{NOM} = \frac{64,680(80)}{100} = 6468(8) \approx 6500(8) = \$52,000$$

$$\textcircled{3} \text{ TOPEKA: } \text{NOM} = \frac{81,000(90)}{100} = 8100(9) = \$72,900$$

$$\textcircled{4} \text{ EAU CLAIRE: } \text{NOM} = \frac{64,000(60)}{100} = 6400(6) = \$38,400$$

### III. Problems (Three Problems Worth a Total of 30 Points)

1. (worth a total of 10 points) Consider an economy whose aggregate production function can be described by the following equation where  $Y$  is real GDP,  $K$  is units of capital, and  $L$  is units of labor:

$$Y = 2K^{0.5} L^{0.5}$$

Furthermore, in this economy you know that the level of capital is constant. You also know that the labor market for this economy can be described as consisting of a downward sloping demand for labor curve and an upward sloping supply of labor curve. You are told that the labor market is initially in equilibrium.

a. (5 points) Given the above information, suppose that at every wage rate the supply of labor decreases. Based upon the information you have been given and holding everything else constant, what happens to the following?

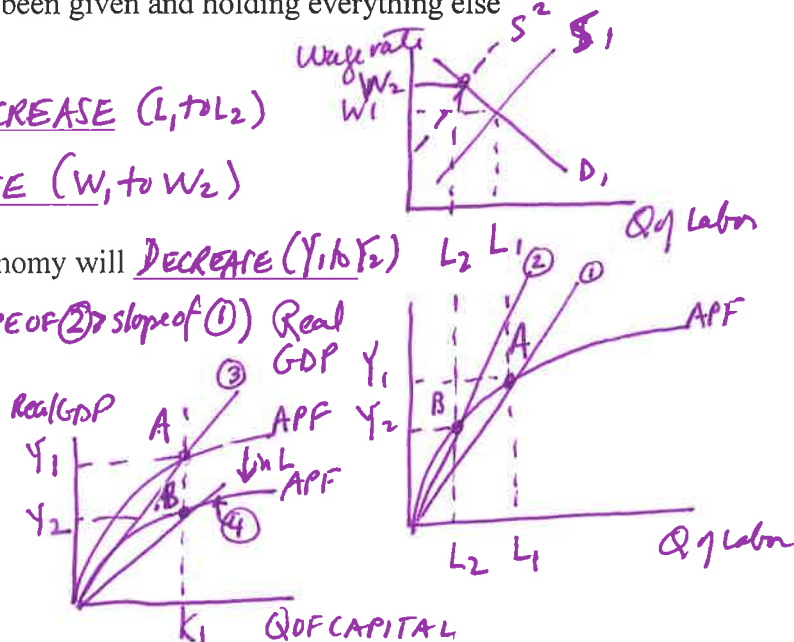
i. The equilibrium quantity of labor will DECREASE ( $L_1$  to  $L_2$ )

ii. The equilibrium wage rate will INCREASE ( $W_1$  to  $W_2$ )

iii. The level of real GDP produced in this economy will DECREASE ( $Y_1$  to  $Y_2$ )

iv. Labor productivity will INCREASE (slope of ② > slope of ①)

v. Capital productivity will DECREASE (slope of ③ > slope of ④)



b. (5 points) Return to the initial situation. Suppose that the government in this economy implements an effective program that provides incentives for firms to hire more labor at every wage. Based upon the information you have been given and holding everything else constant, what happens to the following?

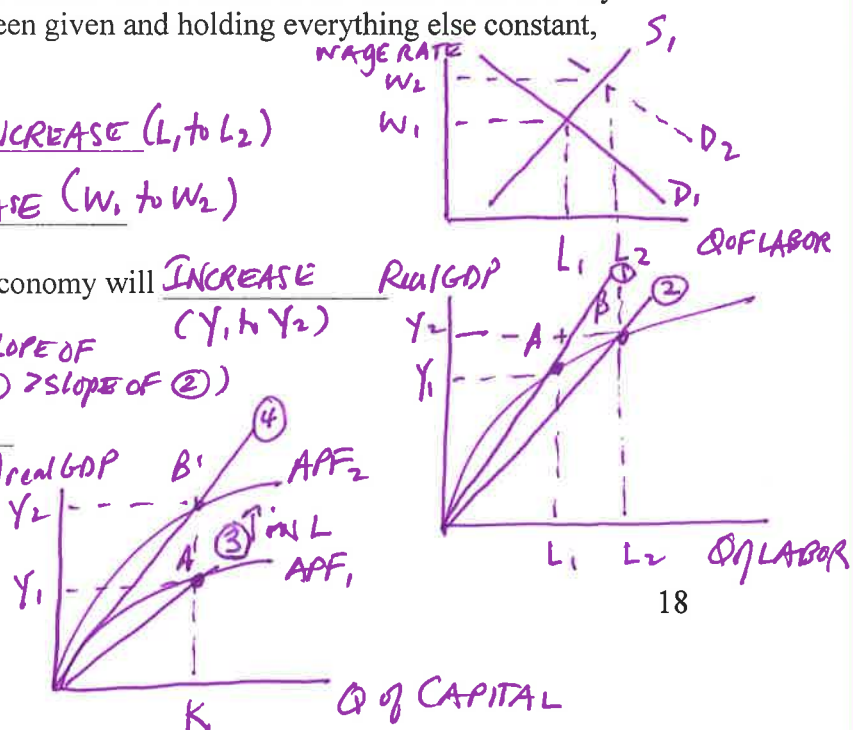
i. The equilibrium quantity of labor will INCREASE ( $L_1$  to  $L_2$ )

ii. The equilibrium wage rate will INCREASE ( $W_1$  to  $W_2$ )

iii. The level of real GDP produced in this economy will INCREASE ( $Y_1$  to  $Y_2$ )

iv. Labor productivity will DECREASE (slope of ① > slope of ②)

v. Capital productivity will INCREASE (slope of ③ < slope of ④)



2. (worth a total of 10 points) You are provided the following information about an economy:

Year	Cost of Market Basket
2014	\$60
2015	\$90
2016	\$180
2017	\$120

a. (5 points) Fill in the following table measuring each CPI on a 100 point scale. Provide a general formula in the space below for how you will calculate the CPI value for each cell.

General Formula: 
$$CPI \text{ for year } n = \left[ \frac{\text{Cost of Market Basket in Year } n}{\text{Cost of Market Basket in Base Year}} \right] (\text{Scale Factor})$$

Year	CPI with 2014 base year	CPI with 2015 base year	CPI with 2016 base year	CPI with 2017 base year
2014	$\frac{60}{60}(100) = 100$	$\frac{100}{150}(100) = 67$	$\frac{100}{300}(100) = 33$	$\frac{100}{200}(100) = 50$
2015	$\frac{90}{60}(100) = 150$	$\frac{150}{150}(100) = 100$	$\frac{150}{300}(100) = 50$	$\frac{150}{200}(100) = 75$
2016	$\frac{180}{60}(100) = 300$	$\frac{300}{150}(100) = 200$	$\frac{300}{300}(100) = 100$	$\frac{300}{200}(100) = 150$
2017	$\frac{120}{60}(100) = 200$	$\frac{200}{150}(100) = 133$	$\frac{200}{300}(100) = 67$	$\frac{200}{200}(100) = 100$

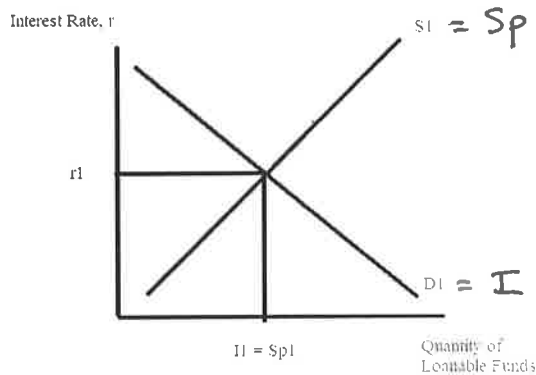
b. (2 points) You wish to calculate the annual rate of inflation in this economy. Does it matter which year you choose as your base year if you use the CPI to calculate the annual inflation rate? Explain your answer.

No: Choice of BY affects the CPI Index # But you will get THE SAME ANNUAL INFLATION RATE IRRESPECTIVE OF YOUR CHOICE OF BASE YEAR.

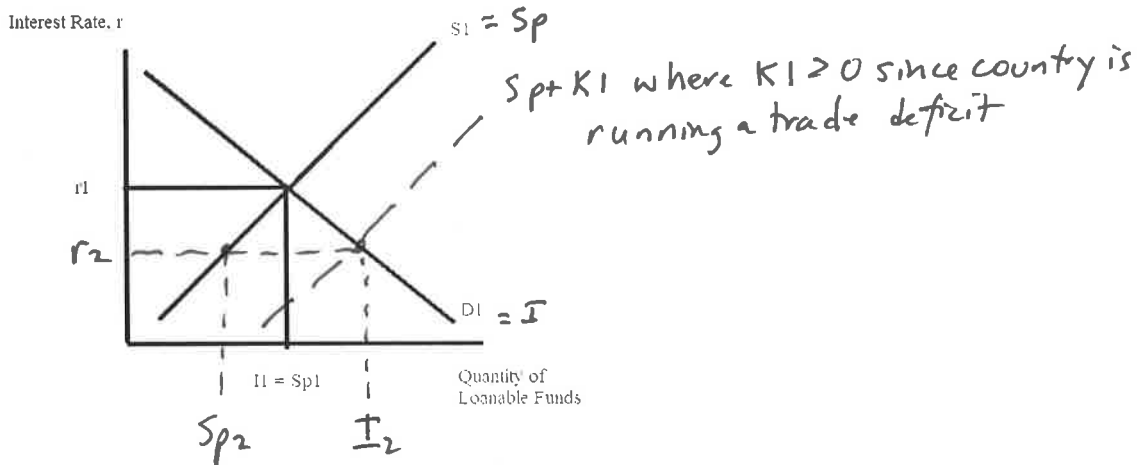
c. (3 points) Suppose your boss is paying you \$39,900 a year in 2014 and does not change the nominal amount she pays you over this four year period. Using 2015 as your base year, what will be your real income in 2017? Show your work.

YEAR	Nom SALARY	CPI BY 2015	REAL SALARY
2014	39,900	67	
2015	39,900	100	
2016	39,900	200	
2017	39,900	133	$\frac{39,900 (100)}{133} = 30,000$

3. (10 points) Consider the loanable funds market. The graph below illustrates the loanable funds market when there is balanced trade and a balanced government budget. The supply of loanable funds curve under these conditions represents the relationship between private savings and the interest rate. The demand for loanable funds curve under these conditions represents the relationship between the demand for funds for investment and the interest rate.

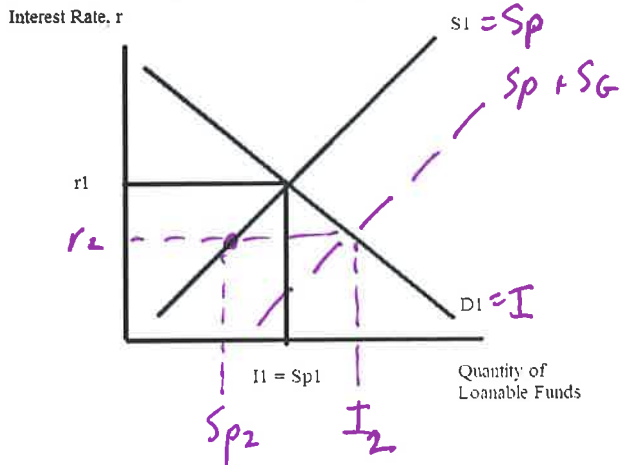


a. (2.5 points) Suppose that this economy runs a trade deficit. Illustrate this trade deficit's effect on the initial loanable funds situation in the graph below. Label the new equilibrium level of the interest rate ( $r_2$ ), the new level of private investment ( $I_2$ ), and the new level of private savings ( $Sp_2$ ) that occur because of this change. If any of these three variables is indeterminate make a note of that in your answer.



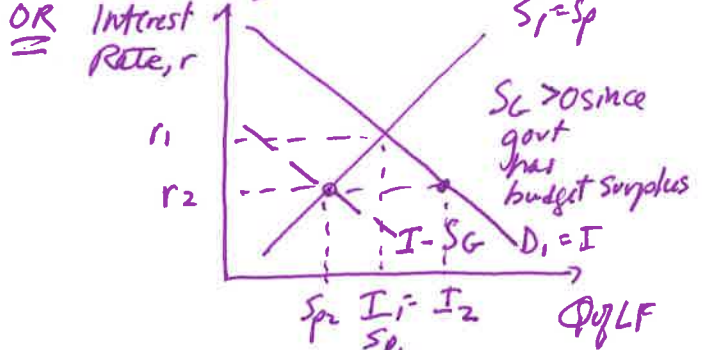
b. (2.5 points) Return to the initial situation. Suppose that this economy's government decides to run a government budget surplus. Illustrate this budget surplus' effect on the initial loanable funds situation in the graph below. Label the new equilibrium level of the interest rate ( $r_2$ ), the new level of private investment ( $I_2$ ), and the new level of private savings ( $Sp_2$ ) that occur because of this change. If any of these three variables is indeterminate make a note of that in your answer.

Modeling on the Supply side:



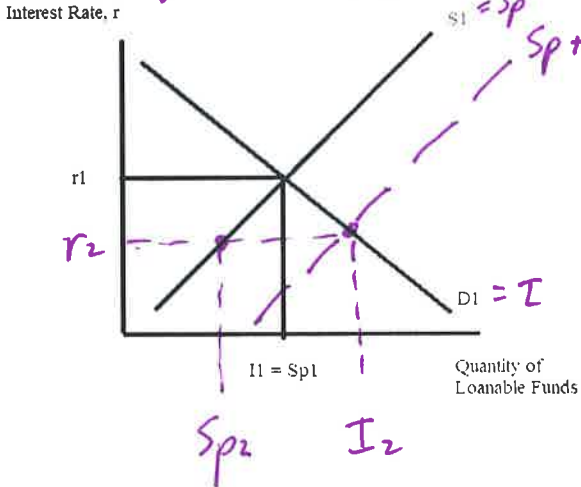
( $S_G > 0$  since govt running a trade surplus)

Modeling on the demand side:



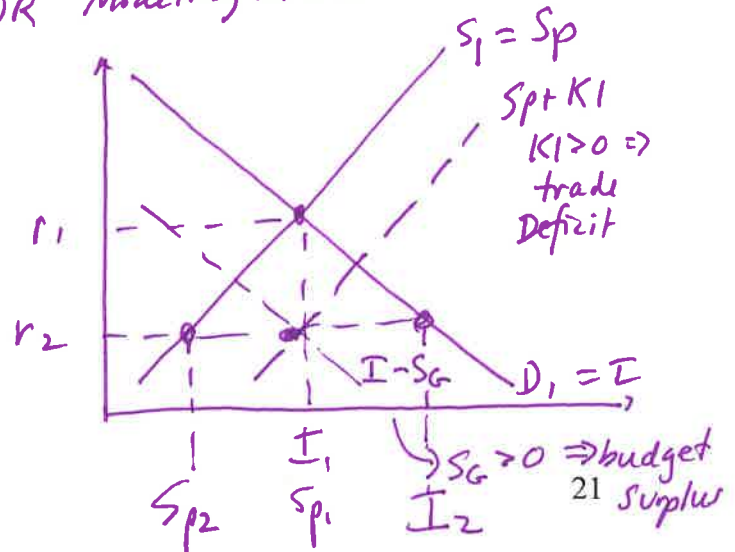
c.(2.5 points) Return to the initial situation. Suppose that this economy's government decides to run a government budget surplus and at the same time the trade situation becomes a trade deficit. Illustrate the impact of these changes on the initial loanable funds situation in the graph below. Label the new equilibrium level of the interest rate ( $r_2$ ), the new level of private investment ( $I_2$ ), and the new level of private savings ( $Sp_2$ ) that occur because of this change. If any of these three variables is indeterminate make a note of that in your answer.

Modeling on the Supply side:



where  $S_G > 0$  since there is a budget surplus and  $KI > 0$  since there is a trade deficit

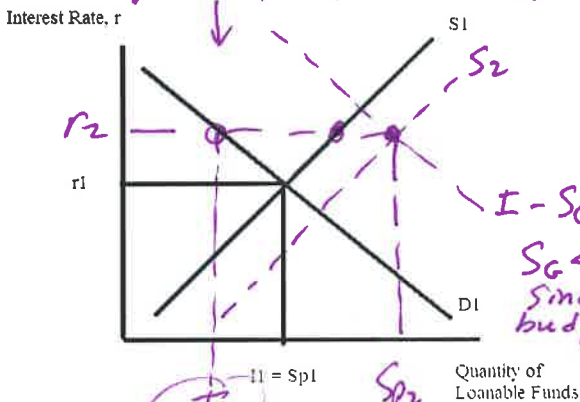
OR Modeling on both sides:



$S_G > 0 \Rightarrow$  budget surplus

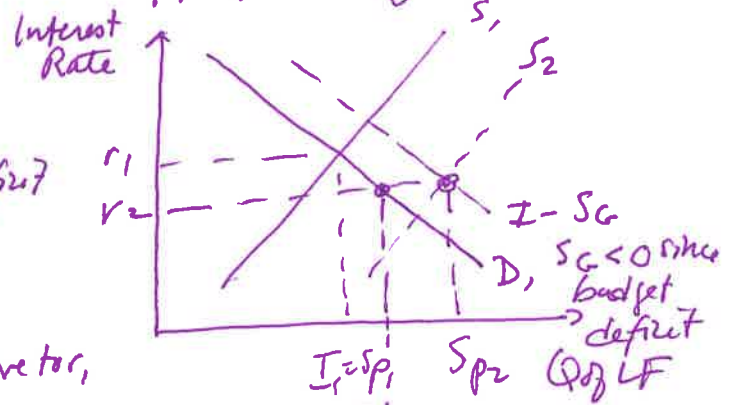
d. (2.5 points) Return to the initial situation. Suppose that this economy's government decides to run a government budget deficit and at the same time the household preferences for saving increases. Illustrate the impact of these changes on the initial loanable funds situation in the graph below. Label the new equilibrium level of the interest rate ( $r_2$ ), the new level of private investment ( $I_2$ ), and the new level of private savings ( $Sp_2$ ) that occur because of this change. If any of these three variables is indeterminate make a note of that in your answer.

*Modeling where |budget deficit| > |preferences for saving|*



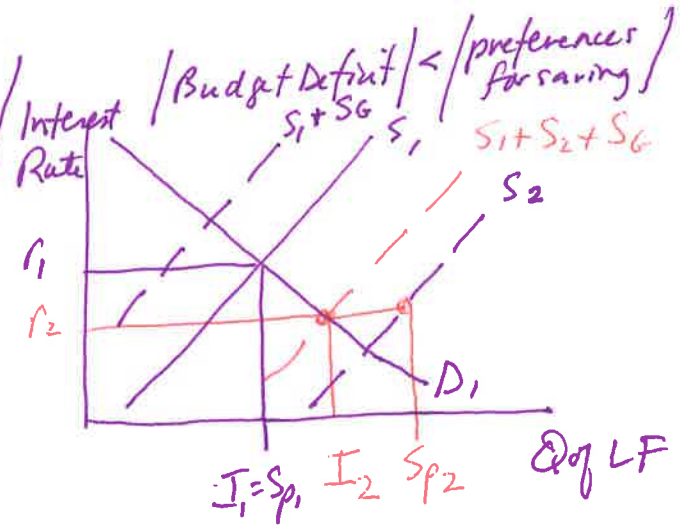
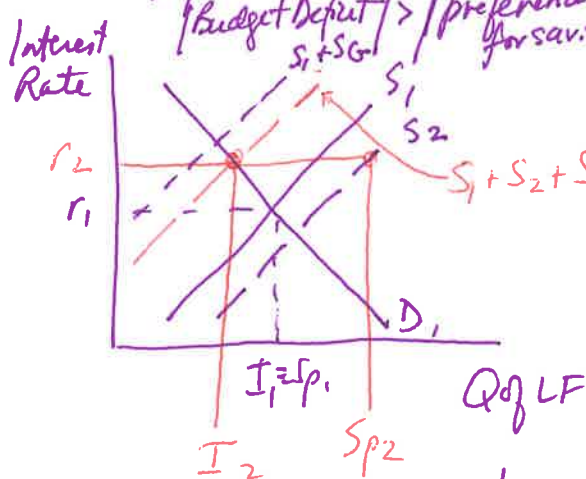
*Modeling on both sides of market:*

*Modeling where |budget deficit| < |preferences for saving|*



$\Rightarrow$   $r$  is indeterminate relative to  $I$ ,  
 $I$  is indeterminate relative to  $I$ ,  
 $Sp \uparrow$  relative to  $Sp_1$

*Modeling on supply side*



$\Rightarrow$   $r$  is indeterminate relative to  $I$ ,  
 $I$  is indeterminate relative to  $I$ ,  
 $Sp \uparrow$  relative to  $Sp_1$