



# SOLUTIONS

## ECO 209Y MACROECONOMIC THEORY AND POLICY

# Term Test #3

February 13, 2020

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SURNAME  
(LAST NAME): 

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GIVEN NAME  
(FIRST NAME): 

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### INSTRUCTIONS:

- The total time for this test is **1 hour and 45 minutes**.
- The only aid allowed is a **non-programmable** calculator.
- **Write your name and identifying information above but keep this test paper closed until the start of the test is announced.**
- There are three parts to the test: **Part I** consists of 16 multiple-choice questions (40 points); **Part II** consists of one quantitative problem (15 points); and **Part III** includes 2 short-answer questions (20 points). The **total** point-value of the test is **75 points**.
- The answers to the 16 multiple-choice questions of **Part I** must be recorded in the **bubble sheet** provided on **page 10** of this test paper. Only the answers recorded in the bubble sheet will be marked. Cells left blank will receive a zero mark for that question. No deductions will be made for incorrect answers.
- In **Parts II and III**, write your answers clearly and concisely in the space provided immediately after each question. **Your entire answer must fit in the designated space.** No extra space/pages are possible and you cannot use blank space for other questions.
- **It is best to write in PENCIL and use an ERASER as needed.** This way you can make sure to fit your final answer in the appropriate space.
- **Please write legibly.** If I can't read your handwriting, I can't award you any marks!

## PART I (40 points)

### **Instructions:**

Enter your answer to each of the 16 multiple-choice questions in the **bubble sheet** provided on **page 10** below. Each correct answer is worth **2.5 points**. **Note that no deduction will be made for incorrect answers**. Table cells left blank will receive zero points. **Do NOT guess your answers! Manage your time properly!**

1. Consider an open economy with a fixed-price level, **flexible** exchange rates, and **imperfect** capital mobility. If the government wishes to decrease interest rates without causing a depreciation of the Canadian dollar, it should
  - A) increase its spending and cut the money supply.
  - B) lower its spending and cut the money supply.
  - C) raise its spending and raise the money supply.
  - D) lower its spending and raise the money supply.
  - E) cut the money supply and leave spending unchanged.
2. In a **flexible** exchange rate system with **perfect** capital mobility, which one of the following statements is correct?
  - A) Expansionary monetary policy will appreciate the domestic currency.
  - B) Fiscal expansion is very effective in stimulating aggregate expenditure.
  - C) Fiscal expansion causes an appreciation of the domestic currency.
  - D) A decrease in autonomous imports will increase net exports.
  - E) None of the above is correct.
3. Consider the fixed-price model of an open economy with **flexible** exchange rates and **no** capital mobility. If autonomous exports increase, which of the following best describes the situation in the new equilibrium?
  - A) Net exports, the money supply, and equilibrium income will all increase.
  - B) Net exports and the money supply will remain unchanged while equilibrium income will increase.
  - C) Net exports will remain unchanged while both the money supply and equilibrium income will increase.
  - D) Net exports, the money supply, and equilibrium income will all remain unchanged.
  - E) Net exports and equilibrium income will increase while the money supply will not change.
4. Which of the following makes a country more prone to *catching* Dutch disease?
  - A) Having a flexible exchange rate system.
  - B) Having a fixed exchange rate system.
  - C) Exporting mostly commodities.
  - D) Having a diversified export sector.
  - E) None of the above.

5. Consider an open economy with a fixed price level, **flexible** exchange rates, and **imperfect** capital mobility. A decrease in the foreign interest rate would cause
- A) the domestic rate of interest to fall, equilibrium income to rise, and the balance in the current account to deteriorate.
  - B) the domestic rate of interest to fall, equilibrium income to fall, and the balance in the current account to improve.
  - C) the domestic rate of interest to rise, equilibrium income to rise, and the balance in the current account to improve.
  - D) the domestic rate of interest to rise, equilibrium income to fall, and the balance in the current account to improve.
  - E) the domestic rate of interest to fall, equilibrium income to fall, and the balance in the current account to deteriorate.
6. Under a system of **perfect** capital mobility and **flexible** exchange rates, which of the following would be the most likely outcomes following the implementation of contractionary fiscal policy?
- A) Lower interest rate and lower income, currency depreciation, improvement in the current account, and deterioration in the capital account.
  - B) Higher interest rate, lower income, currency depreciation, improvement in the current account, and deterioration in the capital account.
  - C) Lower interest rate, higher income, currency appreciation, deterioration in the current account, and improvement in the capital account.
  - D) No change in interest rate, no change in income, currency depreciation, improvement in the current account, and deterioration in the capital account.
  - E) No change in interest rate, lower income, unchanged currency value, no change in current account, and no change in capital account.
7. Consider a model of an open economy with fixed-price level, **flexible** exchange rates, and **perfect** capital mobility. Which one of the following statements is correct?
- A) Expansionary monetary policy will appreciate the domestic currency.
  - B) Fiscal expansion is very effective in stimulating aggregate demand.
  - C) Fiscal expansion causes a depreciation of the domestic currency.
  - D) An increase in exogenous exports will increase net exports.
  - E) None of the above is correct.
8. The U.S. has been setting tariffs on Chinese goods since early 2018. As a result, which one of the following is true?
- A) American factory production increased in 2019.
  - B) U.S. trade deficit with China decreased in 2019.
  - C) U.S. overall trade deficit was reduced in 2019.
  - D) American companies are moving production back to the U.S.
  - E) All of the above are true.

9. Which of the following actions will lead to an expansion of the money supply?
- A) The government finances a deficit by selling bonds to the Bank of Canada.
  - B) The government finances a deficit by selling bonds to the commercial banks.
  - C) The Bank of Canada buys government bonds from the public.
  - D) Both A) and C) above.**
  - E) All of the above.
10. Consider the *M1* definition of money and suppose that banks are presently paying interest on chequing account deposits. If a change in government regulations now forbids banks to pay interest on chequing accounts, which of the following best describes the most likely outcome?
- A) The demand for money will decrease.**
  - B) The demand for money will increase.
  - C) The demand for money will remain unchanged.
  - D) The demand for currency will fall while the demand for chequing accounts deposits will rise.
  - E) The demand for chequing account deposits will fall but the overall demand for money will not change.
11. Suppose there is monetary equilibrium. The monetary base is \$20 billion, vault cash held by commercial banks is equal to \$3 billion, commercial banks' deposits at the Central Bank are \$7 billion, and the public's deposits at the commercial banks are \$70 billion. Therefore, the money multiplier is equal to
- A) 2.5.
  - B) 3.0.
  - C) 4.0.**
  - D) 5.0.
  - E) 5.5.
12. Suppose there is monetary equilibrium. All else equal, if people decide to reduce the amount of currency they hold,
- A) the money multiplier will remain unchanged but money supply will fall.
  - B) the monetary base and the money supply will both increase.
  - C) the money multiplier will increase but the money supply will not change.
  - D) the money multiplier will decrease and the money supply will fall.
  - E) the money multiplier will increase but the monetary base will not change.**
13. Suppose there is monetary equilibrium. Further suppose households' desired currency-deposit ratio is 0.2 and the commercial banks desired cash-reserve ratio is 0.1. All else equal, if the government borrows \$100 million from the central bank to finance a new expenditure, the commercial banks' loans to the public will
- A) increase by \$300.**
  - B) decrease by \$240.
  - C) remain unchanged.
  - D) increase by \$400.
  - E) decrease by \$300.

14. Suppose there is monetary equilibrium. Further suppose households' desired currency-deposit ratio is 0.2 and the commercial banks desired cash-reserve ratio is 0.4. All else equal, if the government borrows \$100 million from the public to finance a new expenditure, the commercial banks' loans to the public will
- A) increase by \$100.
  - B) increase by \$200.
  - C) increase by \$250.
  - D) decrease by \$200.
  - E) remain unchanged.
15. Suppose you are an adviser to the government and the economy is experiencing a balance-sheet recession. If you must choose only one policy and the objective is to increase GDP, which one of the following policies will you advise the government to implement?
- A) A reduction in corporate taxes to induce investment.
  - B) A reduction in income taxes to increase consumption.
  - C) Open market purchases by the central bank.
  - D) An increase in transfer payments to the provinces to finance new highway construction.
  - E) An increase in transfer payments to municipalities to help pay off their debts.
16. In late 2018, President Trump signed into law a \$1.5 trillion tax overhaul, reducing corporate and income taxes for the rich. Which of the following has materialized since the tax cuts?
- A) Most large companies have increased employment.
  - B) Payouts to shareholders have risen significantly.
  - C) Real wages have increased considerably.
  - D) Most companies have changed their investment decisions.
  - E) All of the above are true.



## PART II (15 points)

Consider the fixed-price level, Neo-Keynesian model of a closed economy where the central bank implements monetary policy following a money supply rule. Suppose this model is characterized by the following behavioural equations:

$$C = 60 + 0.8 YD$$

$$I = 200 - 20 i + 0.2 Y$$

$$G = 300$$

$$TA = 0.25 Y$$

$$TR = 50$$

$$L = 0.2 Y - 10 i$$

$$M/P = 200 + 10 i$$

a) What are the equations for the *IS* and *LM* curves? (4 points) **Show all your work.**

To obtain the equation for the *IS* curve, we must first get the equation for the *AE* curve:

$$AE = C + I + G$$

$$= (60 + 0.8 YD) + (200 - 20 i + 0.2 Y) + 300$$

$$= 560 + 0.8 YD - 20 i + 0.2 Y$$

$$\text{where } YD = Y - 0.25 Y + 50 = 50 + 0.75 Y$$

$$= 560 + 0.8 (50 + 0.75 Y) - 20 i + 0.2 Y$$

$$= 600 + 0.8 Y - 20 i$$

And then we equate  $Y$  and  $AE$  to get the **equation for the *IS* curve**:

$$Y = AE \rightarrow Y = 600 + 0.8 Y - 20 i \rightarrow Y = 3000 - 100 i \text{ or } i = 30 - 0.01 Y$$

The **equation for the *LM* curve** is found by equating  $L$  and  $M/P$ :

$$L = M/P \rightarrow 0.2 Y - 10 i = 200 + 10 i \rightarrow 0.2 Y = 200 + 20 i \rightarrow i = 0.01 Y - 10$$

b) What are the equilibrium levels of income and interest rate? (2 points) What is the size of the money stock in this equilibrium? (1 point) **Show all your work.**

To find the **equilibrium income** we must equate the *IS* and *LM* curves:

$$30 - 0.01 Y = 0.01 Y - 10 \rightarrow 0.02 Y = 40 \rightarrow Y^* = 40 / 0.02 = 2000$$

And the **equilibrium interest rate** is found by substituting  $Y^*$  into either the *IS* or *LM* curve:

$$\text{from the } IS \text{ curve: } i^* = 30 - 0.01 (2000) = 30 - 20 = 10$$

$$\text{from the } LM \text{ curve: } i^* = 0.01 (2000) - 10 = 20 - 10 = 10$$

Since in equilibrium the real demand for money ( $L$ ) is equal to the real supply of money ( $M/P$ ), to find the **size of the money stock** we must plug in the values for  $Y^*$  and  $i^*$  into either the  $L$  function or the  $M/P$  function:

$$\text{from the } L \text{ function: } L = 0.2 (2000) - 10 (10) = 400 - 100 = 300$$

$$\text{from the } M/P \text{ function: } M/P = 200 + 10 (10) = 200 + 100 = 300$$

- c) Suppose that government purchases increase by 120. What are the new equilibrium levels of income and interest rate? (2 points) What is the size of the money stock in this equilibrium? (1 point) **Show all your work.**

If  $G = 420$ , then  $AE = 720 + 0.8 Y - 20 i$ . Therefore, the equation for the  $IS$  curve is:

$$Y = AE \rightarrow Y = 720 + 0.8 Y - 20 i \rightarrow 20 i = 720 - 0.2 Y \rightarrow i = 36 - 0.01 Y$$

To find the **equilibrium income** we must equate the new  $IS$  curve with the  $LM$  curve:

$$36 - 0.01 Y = 0.01 Y - 10 \rightarrow 0.02 Y = 46 \rightarrow Y^* = 46 / 0.02 = 2300.$$

And the **equilibrium interest rate** is found by substituting  $Y^*$  into either the  $IS$  or  $LM$  curve:

from the  $IS$  curve:  $i^* = 36 - 0.01 (2300) = 13$

from the  $LM$  curve:  $i^* = 0.01 (2300) - 10 = 13.$

Since in equilibrium the real demand for money ( $L$ ) is equal to the real supply of money ( $M/P$ ), to find the **size of the money stock** we must plug in the values for  $Y^*$  and  $i^*$  into either the  $L$  function or the  $M/P$  function:

from the  $L$  function:  $L = 0.2 (2300) - 10 (13) = 460 - 130 = 330$

from the  $M/P$  function:  $M/P = 200 + 10 (13) = 200 + 130 = 330.$

- d) Go back to the equilibrium of part b) above (i.e., before the increase in government purchases). Suppose now that the central bank implements monetary policy following an interest rate rule and sets the interest rate at 8. What is the equation for the  $LM$  curve? (2 points) What are the equilibrium levels of income and interest rate? (2 points) What is the size of the money stock in this equilibrium? (1 point) **Show all your work.**

Since the rate of interest is being set at  $i = 8$ , then the  $LM$  curve is horizontal at this level. Therefore, the **equation for the  $LM$  curve** is  $i = 8$ .

To find the new **equilibrium income** we must equate the  $IS$  curve of part a) above with the new  $LM$  curve. Therefore,  $Y^*$  is:

$$30 - 0.01 Y = 8 \rightarrow 0.01 Y = 22 \rightarrow Y^* = 22 / 0.01 = 2200.$$

Since the money market will be in equilibrium only when  $i = 8$ , then the economy's **equilibrium rate of interest** is  $i^* = 8$ .

Since the  $M/P$  curve is perfectly elastic at  $i = 8$ , the money stock is determined by the real demand for money. Therefore, plugging the values for  $Y^*$  and  $i^*$  into the  $L$  function we find the **size of the money stock**:

$$L = 0.2 (2200) - 10 (8) = 440 - 80 = 360.$$



### PART III (20 points)

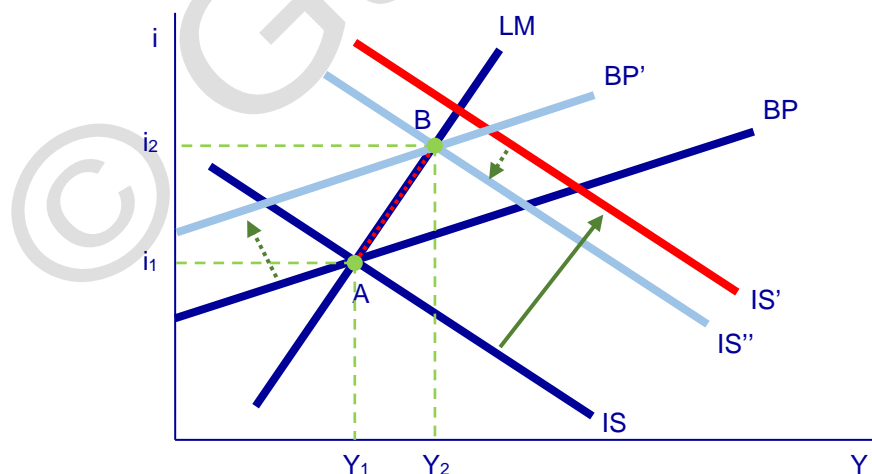
**Instructions:** Answer the following two questions in the space provided. Each question is worth 10 points.

1. **Critically evaluate the following statement:** “Expansionary fiscal policy will cause equilibrium income to increase, the rate of interest to rise, the exchange rate to appreciate, the balance in the current account to improve, and the balance in the capital account to deteriorate.” (Show your answer graphically and explain the economics. Consider the fixed-price model of an open economy with *flexible* exchange rates and *imperfect* capital mobility. Assume that there is initially a recessionary gap in the economy.)

Suppose that the government increases its own expenditure on goods and services ( $G$ ). As shown in the diagram, an increase in  $G$  causes  $AE$  to increase and thus the  $IS$  curve shifts up to  $IS'$ , creating an excess demand in the goods market. Note that as  $Y$  increases to eliminate the excess demand in the goods market, the demand for money also increases and thus the rate of interest ( $i$ ) rises. The increase in  $i$ , in turn, causes the balance in the capital account ( $CF$ ) to improve.

The improvement in  $CF$  creates an excess supply in the exchange market and the exchange rate ( $e$ ) depreciates. The depreciation of  $e$  causes  $NX$  to decrease (i.e., a deterioration in the balance of the current account) and thus the  $IS$  curve shifts down to  $IS''$ . Since at each level of  $Y$  there is a deterioration in the current account, a corresponding improvement must occur in the capital account in order for  $BP = 0$ . Graphically, therefore, this represents a shift upwards of the  $BP$  curve and this process continues as long as  $Y$  keeps increasing to eliminate the excess demand in the goods market. Note that since the money market and the external sector are always in equilibrium, the economy is always at a point of intersection between the static  $LM$  curve and the moving  $BP$  curve, and thus the adjustment path is a movement up along the  $LM$  curve. The final result is an increase in  $Y$  to  $Y_2$  and an increase in the rate of interest to  $i_2$ .

Therefore, the statement is correct in that, as a result of an increase in government expenditure, equilibrium  $Y$  will increase,  $i$  will rise, and  $e$  will depreciate. But the statement is incorrect regarding the changes in the current account and the capital account: the balance in the capital account will improve (due to the increase in  $i$ ) while the balance in the current account will deteriorate (as a result of the depreciation of  $e$ ).

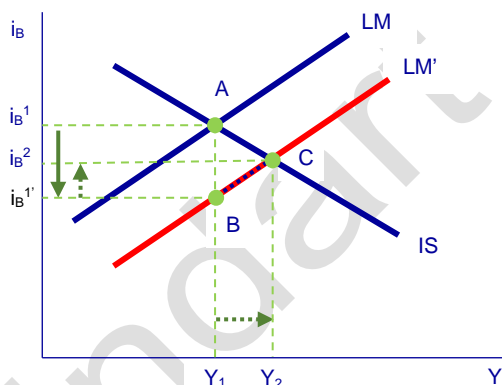




2. Consider the Structuralist Post-Keynesian monetary model. Suppose the central bank reduces the bank rate. Assuming the income elasticity of money demand is greater than the income elasticity of the demand for loans, what will be the impact of such a policy on equilibrium income, equilibrium rate of interest, equilibrium real money stock, and equilibrium monetary base? **(Show your answer with the help of an IS-LM diagram and explain the economics. Consider a closed economy with a fixed-price level and a recessionary gap.)**

Since the income elasticity of money demand ( $\epsilon_M$ ) is greater than the income elasticity of the demand for loans ( $\epsilon_L$ ), the LM has a positive slope as shown in the diagram. Initially the economy is in equilibrium at point A, where the bond rate of interest (i.e., the opportunity cost of holding money) is  $i_B^1$  and the level of income is  $Y_1$ .

Point A is on the LM curve and thus it indicates equilibrium in the money market, i.e., the real supply of money ( $M^S$ ) is equal to the real demand for money ( $M^D$ ) at that combination of  $i_B$  and  $Y$ . Recall that  $M^D$  decreases with  $i_B$  and increases with  $Y$ , and  $M^S$  increases with the level of loans ( $L$ ).



The equilibrium level of  $L$ , in turn, is determined by the supply of loans ( $L^S$ ) and the demand for loans ( $L^D$ ). Recall that  $L^S$  is assumed to be perfectly elastic at the lending rate of interest ( $i_L$ ) set by the banks, and that  $L^D$  increases with  $Y$  and decreases with  $i_L$ . The banks, in turn, set  $i_L$  as a constant mark-up over the bank rate ( $i^*$ ), where the latter is set by the central bank.

Therefore, given the  $i^*$  set by the central bank, the banks set the  $i_L$ . Since banks are willing to provide all the loans demanded at  $i_L$ , the equilibrium level of  $L$  is determined by  $L^D$ . This level of  $L$ , in turn, determines the quantity supplied of money ( $M^S$ ). Given this level of  $M^S$ , the  $M^D$  function determines the equilibrium  $i_B$ . Additionally, given this level of  $M^S$  the banks determine the level of reserves ( $R$ ) they need and, for instance, they might borrow from the central bank if they feel that their reserves are insufficient.

#### What happens when the central bank reduces the bank rate ( $i^*$ )?

As the banks' borrowing costs decrease, the banks reduce their lending rate ( $i_L$ ) and the  $L^S$  curve shifts down. Given the  $L^D$  corresponding to the initial equilibrium income ( $Y_1$ ), the equilibrium  $L$  increases. Therefore,  $M^S$  also increases and – given the  $M^D$  corresponding to  $Y_1$  –  $i_B$  falls from  $i_B^1$  to  $i_B^1$ . This means that at  $Y_1$  the money market is in equilibrium at point B, and thus the LM curve has shifted down to  $LM'$  (i.e., given the increase in  $M^S$ , at each level of  $Y$  the money market is now in equilibrium at a lower  $i_B$  than before).

The economy is now at point B – there is equilibrium in the money market but an excess demand in the goods market (i.e.,  $AE > Y$ ). Therefore,  $Y$  starts to increase causing both  $M^D$  and  $L^D$  to increase – the latter causing  $M^S$  to increase as well as the level of  $L$  rises. Since  $\epsilon_M > \epsilon_L$ , as  $Y$  increases  $M^D$  increases by more than  $M^S$  does and thus  $i_B$  rises (i.e., the LM curve has a positive slope). This process continues as long as  $Y$  is increasing, i.e., the excess demand in the goods market is gradually reduced and is finally eliminated at point C.

**Therefore, as a result of a decrease in  $i^*$ ,  $Y$  increases and  $i_B$  decreases (note that  $i_B$  first decreases and then gradually rises but remains nonetheless below the initial equilibrium). Also note that  $i_L$  decreases as well (since it's set by the banks as a constant mark-up over  $i^*$ ), causing equilibrium  $L$  to rise – which causes the real money stock ( $M^S$ ) to increase. Finally, since the banks set  $R$  as a constant fraction of  $M^S$ ,  $R$  also increases (which might require borrowing from, or selling assets to, the central bank).**