



**ECO 209Y – L0101  
MACROECONOMIC THEORY**

**Term Test #2**

LAST NAME \_\_\_\_\_

FIRST NAME \_\_\_\_\_

STUDENT NUMBER \_\_\_\_\_

**INSTRUCTIONS:**

1. The total time for this test is 1 hour and 50 minutes.
2. Aids allowed: a simple calculator.
3. Use pen instead of pencil.

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Part I \_\_\_\_\_/30

Part II \_\_\_\_\_/15

Part III 1. \_\_\_\_\_/10

2. \_\_\_\_\_/10

3. \_\_\_\_\_/10

TOTAL \_\_\_\_\_/75

**PART I (30 marks)**

**Instructions:** Enter your answer to each question in the table below. Only the answers recorded in the table will be marked. Table cells left blank will receive a zero mark for that question. Each question is worth 2.5 marks. No deductions will be made for incorrect answers.

1	2	3	4	5	6	7	8	9	10	11	12
D	B	E	E	B	D	C	B	E	A	A	D

- An increase in the interest-sensitivity of investment will make
  - fiscal and monetary policy more effective.
  - fiscal and monetary policy less effective.
  - fiscal policy more effective and monetary policy less effective.
  - fiscal policy less effective and monetary policy more effective.
  - monetary policy more effective but will not affect the effectiveness of fiscal policy.
- We can expect the *IS* curve to become flatter as
  - the supply of money decreases.
  - the marginal propensity to consume increases.
  - money demand becomes more interest sensitive.
  - investment becomes less sensitive to interest rate changes.
  - None of the above.

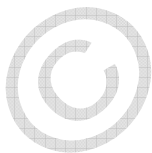
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3. Consider the *IS-LM* framework in a fixed-price model of a closed economy. An increase in the rate of interest will cause
- A) the *IS* curve to shift up to the right.
  - B) the *IS* curve to shift down to the left.
  - C) the *LM* curve to shift up to the left.
  - D) the *LM* curve to shift down to the right.
  - E) none of the above.
4. Consider a fixed price model of a closed economy, and suppose that the money supply varies directly with the interest rate. Then, all else equal,
- A) both the *IS* and the *LM* curves will be steeper than when the money supply is fixed.
  - B) the *IS* curve will be flatter and the *LM* curve will be steeper than when the money supply is fixed.
  - C) the *IS* curve will be steeper and the *LM* curve will be flatter than when the money supply is fixed.
  - D) the *LM* curve will be steeper than when the money supply is fixed.
  - E) none of the above is correct.
5. A reduction in savings at each level of disposable income
- A) shifts the *IS* curve down to the left.
  - B) shifts the *IS* curve up to the right.
  - C) shifts the *LM* curve down to the right.
  - D) shifts the *LM* curve up to the left.
  - E) causes none of the above since savings are not included in the expressions for the *IS* and the *LM* curves.

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6. Considering its impact on equilibrium national income, the steeper the LM curve
- A) the less effective will monetary policy be.
  - B) the more effective will fiscal policy be.
  - C) the more effective will both monetary and fiscal policy be.
  - D) the more effective will monetary policy be and the less effective will fiscal policy be.
  - E) the less effective will monetary policy be and the more effective will fiscal policy be.
7. Consider the *IS-LM* framework in a fixed-price model of the economy. Any point below the *LM* curve depicts a situation of
- A) excess demand in the goods market and excess supply in the money market.
  - B) excess supply in the money market.
  - C) excess demand in the money market.
  - D) excess demand in both the goods and money markets.
  - E) excess supply in the money market but equilibrium in the goods market.
8. If the economy is experiencing a liquidity trap, then
- A) contractionary monetary policy will cause a large decrease in equilibrium output.
  - B) expansionary monetary policy will have little or no impact on equilibrium output.
  - C) expansionary monetary policy will cause a large decrease in the equilibrium rate of interest.
  - D) contractionary fiscal policy will have little or no impact on equilibrium output.
  - E) expansionary fiscal policy will cause a large increase in the equilibrium rate of interest.

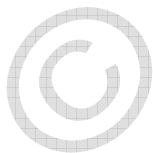
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9. Assume the government reduces its purchases, and the Bank of Canada responds by increasing the money supply. Which of the following is the most likely result?
- A) Unemployment and interest rates will both go up.
  - B) Unemployment will go down but interest rates will stay the same.
  - C) Investment and consumption will both remain the same.
  - D) Interest rates and consumption will both increase.
  - E) Interest rates will decrease.
10. In the short-run, with fixed prices and unemployment, the effect of a tax increase on real GDP will be neutralized if the Bank of Canada
- A) loosens monetary policy, which shifts the  $LM$  curve down to the right and lowers interest rates.
  - B) tightens monetary policy, which shifts the  $IS$  curve to the left and raises interest rates.
  - C) tightens monetary policy, which shifts the  $LM$  curve up to the left and raises interest rates.
  - D) loosens monetary policy, which shifts the  $IS$  curve to the right and raises interest rates.
  - E) loosens monetary policy, which shifts the  $LM$  curve down to the right and raises interest rates.

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11. If consumption expenditure declines as the interest rate increases, which of the following statements is correct regarding the slope of the *IS* curve?
- A) The slope of the *IS* curve will be flatter the more sensitive consumption demand is to changes in the interest rate.
  - B) The slope of the *IS* curve will be flatter if the interest sensitivity of consumption is greater than the interest sensitivity of investment.
  - C) The slope of the *IS* curve will be steeper if the interest sensitivity of consumption is greater than the interest sensitivity of investment.
  - D) The slope of the *IS* curve does not depend on the interest sensitivity of consumption.
  - E) The slope of the *IS* curve depends on the interest sensitivity of consumption but it is not possible to answer the question from the information provided.
12. Consider a fixed price model of the economy. Those economists who believe that fiscal policy is more effective in increasing output than monetary policy argue that the
- A) *IS* curve is nearly horizontal.
  - B) *LM* curve is nearly vertical.
  - C) responsiveness of money demand to interest rate changes is small.
  - D) responsiveness of investment to the interest rate changes is small.
  - E) responsiveness of investment to the interest rate changes is large.

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## PART II (15 marks)

**Instructions:** Answer the following questions in the space provided.

Consider a closed economy with fixed prices, characterized by the following behavioural equations:

$$C = 200 + 0.8 YD - 5 i$$

$$I = 200 - 5 i$$

$$G = G_1$$

$$TA = 20 + 0.25 Y$$

$$TR = 0$$

$$L = 0.2 Y - 25 - 10 i$$

$$M/P = M_1/P_1$$

$$Y_{fe} = 1450$$

- a) What is the equation for the *IS* curve in this model? [Note: Your equation for the *IS* curve should be expressed as a function of  $G_1$ .] (2 marks)

$$AE = C + I + G$$

$$= 200 + 0.8 (Y - 20 - 0.25 Y) - 5 i + 200 - 5 i + G_1$$

$$= 200 - 16 + 200 + G_1 + 0.6 Y - 10 i$$

$$= 384 + G_1 + 0.6 Y - 10 i$$

To get the equation for the *IS* curve we must  $Y$  and  $AE$ :

$$Y = AE$$

$$Y = 384 + G_1 + 0.6 Y - 10 i$$

$$384 + G_1 - 0.4 Y - 10 i = 0$$

$$10 i = 384 + G_1 - 0.4 Y$$

And thus the equation for the *IS* curve is:

$$i = 38.4 + 0.1 G_1 - 0.04 Y$$

- b) What is the equation for the *LM* curve in this model? [Note: Your equation for the *LM* curve should be expressed as a function of  $M_1/P_1$ .] (2 marks)

To get the equation for the *LM* curve we must *L* and *M/P*:

$$0.2 Y - 25 - 10 i = M_1/P_1$$

$$10 i = - M_1/P_1 - 25 + 0.2 Y$$

And thus the equation for the *LM* curve is:

$$i = -0.1 (M_1/P_1) - 2.5 + 0.02 Y$$

- c) What is the value of *Y* when the goods market and the money market are simultaneously in equilibrium? [Note: The value of *Y* should be expressed as a function of  $G_1$  and  $M_1/P_1$ .] (2 marks)

We get the equilibrium level of *Y* by equating the *IS* and the *LM* curves:

$$IS = LM$$

$$38.4 + 0.1 G_1 - 0.04 Y = -0.1 (M_1/P_1) - 2.5 + 0.02 Y$$

$$0.06 Y = 40.9 + 0.1 G_1 + 0.1 (M_1/P_1)$$

And thus equilibrium *Y* is:

$$Y = 409 / 0.6 + (1 / 0.6) G_1 + (1 / 0.6) (M_1/P_1) = (5/3) (409 + G_1 + M_1/P_1)$$



- d) If  $G_1 = 196$  and  $M_1/P_1 = 145$ , what are the values of  $Y$  and  $i$  when the goods market and the money market are simultaneously in equilibrium? **(2 marks)**

Given the result of part c) for equilibrium  $Y$ :

$$Y = (5/3) (409 + G_1 + M_1/P_1) = (5/3) (409 + 196 + 145) = (5/3) (750) = 1250.$$

And plugging this value of  $Y$  either in the equation for the  $IS$  curve or the equation for the  $LM$  curve:

$$IS: \quad i = 38.4 + 0.1 G_1 - 0.04 Y = 38.4 + 0.1 (196) - 0.04 (1250) = 38.4 + 19.6 - 50 = 8$$

$$LM: \quad i = -0.1 (M_1/P_1) - 2.5 + 0.02 Y = -0.1 (145) - 2.5 + 0.02 (1250) = -14.5 - 2.5 + 25 = 8$$

- e) If the government decides to implement expansionary fiscal policy to eliminate the recessionary gap, by how much should it increase government purchases ( $G$ )? What would be the value of the rate of interest at the level of full-employment output? **(2 marks)**

Since  $Y_{fe} = 1450$  and  $Y^* = 1250$ , the recessionary gap is 200. That is,  $\Delta Y = 200$  is required to close this gap.

In section c) above we determined that  $Y = (5/3) (409 + G_1 + M_1/P_1)$ . Therefore, a change in  $G$  will cause  $Y$  to change as follows:

$$\Delta Y = (5/3) \Delta G$$

And since  $\Delta Y = 200$ ,

$$200 = (5/3) \Delta G$$

and thus  $\Delta G = 200 (3/5) = 120$ .

Plugging  $Y = 1450$  into the expression for either the  $IS$  curve or the  $LM$  curve we get that the rate of interest would be:

$$IS: \quad i = 38.4 + 0.1 G_2 - 0.04 Y = 38.4 + 0.1 (316) - 0.04 (1450) = 38.4 + 31.6 - 58 = 12$$

$$LM: \quad i = -0.1 (M_1/P_1) - 2.5 + 0.02 Y = -0.1 (145) - 2.5 + 0.02 (1450) = -14.5 - 2.5 + 29 = 12$$

- f) Go back to the equilibrium situation of part d) above. If the government (through its central bank) decides to implement expansionary monetary policy to eliminate the recessionary gap, by how much should it increase the money supply ( $M/P$ )? What would be the value of the rate of interest at the level of full-employment output? **(2 marks)**

Since  $Y_{fe} = 1450$  and  $Y^* = 1250$ , the recessionary gap is 200. That is,  $\Delta Y = 200$  is required to close this gap.

In section c) above we determined that  $Y = (5/3) (409 + G_1 + M_1/P_1)$ . Therefore, a change in  $M/P$  will cause  $Y$  to change as follows:

$$\Delta Y = (5/3) \Delta M/P$$

And since  $\Delta Y = 200$ ,

$$200 = (5/3) \Delta M/P$$

and thus  $\Delta M/P = 200 (3/5) = 120$ .

Plugging  $Y = 1450$  into the expression for either the IS curve or the LM curve we get that the rate of interest would be:

$$\text{IS: } i = 38.4 + 0.1 G_1 - 0.04 Y = 38.4 + 0.1 (196) - 0.04 (1450) = 38.4 + 19.6 - 58 = 0$$

$$\text{LM: } i = -0.1 (M_2/P_1) - 2.5 + 0.02 Y = -0.1 (265) - 2.5 + 0.02 (1450) = -26.5 - 2.5 + 29 = 0$$

- g) Go back to the equilibrium situation of part d) above. If the government decides to eliminate the recessionary gap without causing the rate of interest to change, what combination of expansionary fiscal policy and expansionary monetary policy should it implement? **(3 marks)**

If the rate of interest is to remain at  $i = 8$  when  $Y = 1450$ , then plugging these values into our equation for the IS curve of part a) above will determine the required size of  $G$ :

$$i = 38.4 + 0.1 G - 0.04 Y$$

$$8 = 38.4 + 0.1 G - 0.04 (1450)$$

$$0.1 G_1 = 8 - 38.4 + 0.04 (1450) = 8 - 38.4 + 58 = 27.6$$

$$G = 27.6 / 0.1 = 276$$

Similarly, if the rate of interest is to remain at  $i = 8$  when  $Y = 1450$ , then plugging these values into our equation for the LM curve of part a) above will determine the required size of  $M/P$ :

$$i = -0.1 (M/P) - 2.5 + 0.02 Y$$

$$8 = -0.1 (M/P) - 2.5 + 0.02 (1450)$$

$$0.1 (M/P) = -8 - 2.5 + 29 = 18.5$$

$$M/P = 18.5 / 0.1 = 185$$

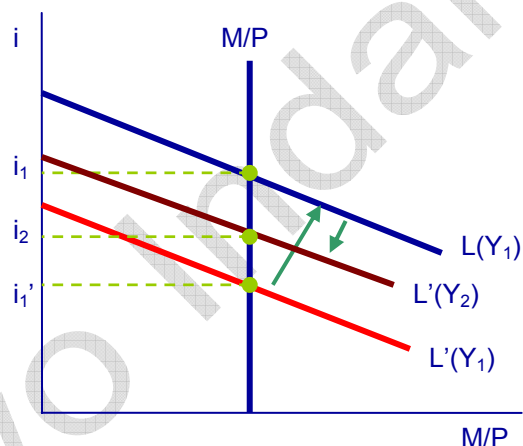
## PART III (30 marks)

**Instructions:** Answer true or false to the following statement. Marks will be given entirely for your explanation. Each question is worth 10 marks.

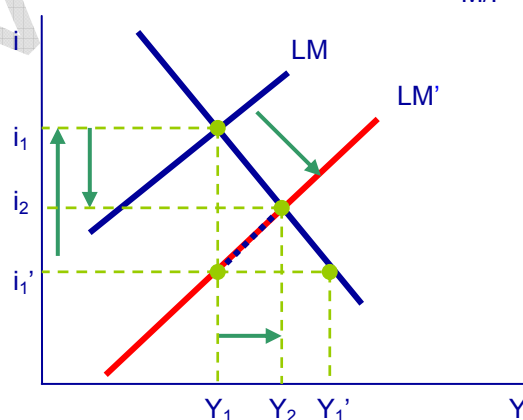
1. "A decrease in the demand for money — e.g., perhaps as a result of greater use of automatic teller machines — will have an expansionary effect on the level of equilibrium income." (Show your answer with the help of graphs and explain the economics. Consider the IS-LM model developed in class. Assume that there is initially a recessionary gap in the economy.)

**True**

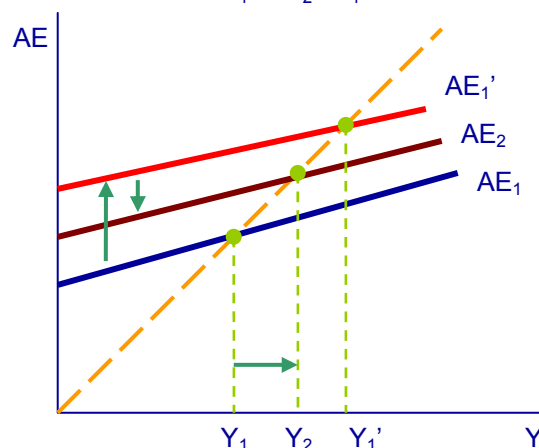
A decrease in the demand for money means that the liquidity preference curve corresponding to each level of income shifts down to the left. Therefore, as the demand for money falls, the rate of interest decreases. This can be observed in the diagram on the right – the liquidity preference curve  $L(Y_1)$  shifts down to  $L'(Y_1)$  and the rate of interest falls to  $i_1'$ . The money market now is in equilibrium at the rate of interest  $i_1'$  when income is  $Y_1$ , which means that the LM curve has shifted to  $LM'$  (see diagram).



The drop in the rate of interest causes desired investment to increase, and thus the AE curve shifts up to  $AE_1'$ . A situation of excess demand develops in the goods market and thus  $Y$  starts to increase. As  $Y$  increases, the liquidity preference curve starts shifting up and the rate of interest starts to rise. Since the money market is assumed to be always in equilibrium, the adjustment path is a movement up along the LM curve. At the level of income  $Y_2$  the goods market is again in equilibrium and the new equilibrium rate of interest is  $i_2$ .



This can also be observed in the bottom diagram – the AE curve starts shifting down as  $i$  increases until a new equilibrium is achieved in the goods market at  $Y_1$  and  $i_1$ .



Therefore, the statement is false. A decrease in the demand for real balances has an expansionary effect on the economy because it causes the rate of interest to fall.

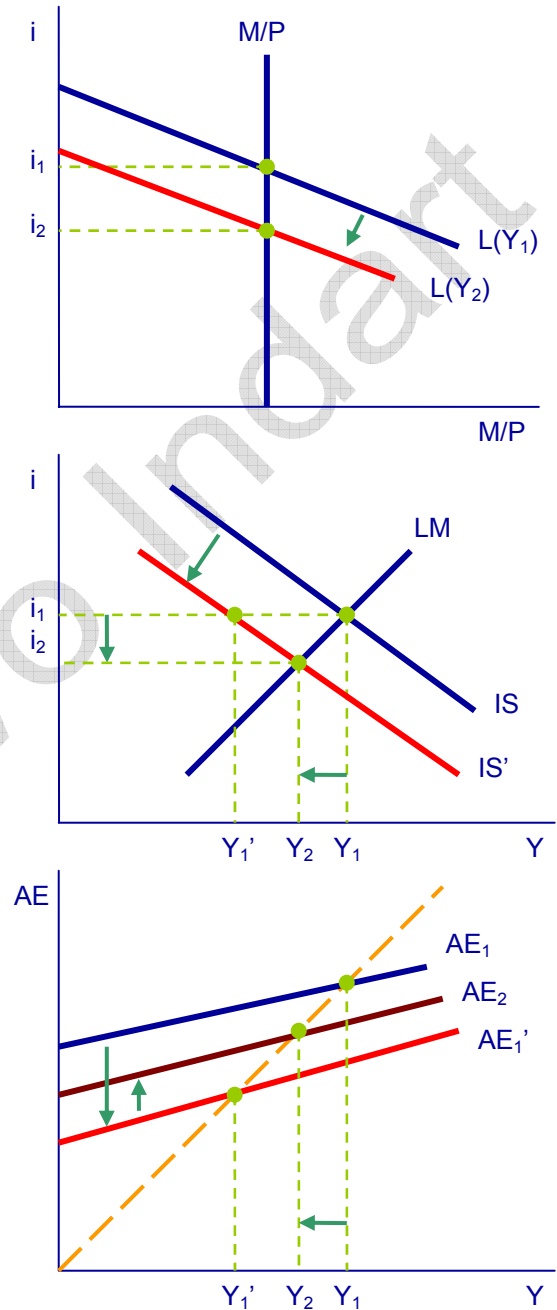
2. "A decrease in autonomous exports will reduce equilibrium income but leave all other components of aggregate expenditure unchanged." (Show your answer graphically and explain the economics. Consider the IS-LM model developed in class.)

**False**

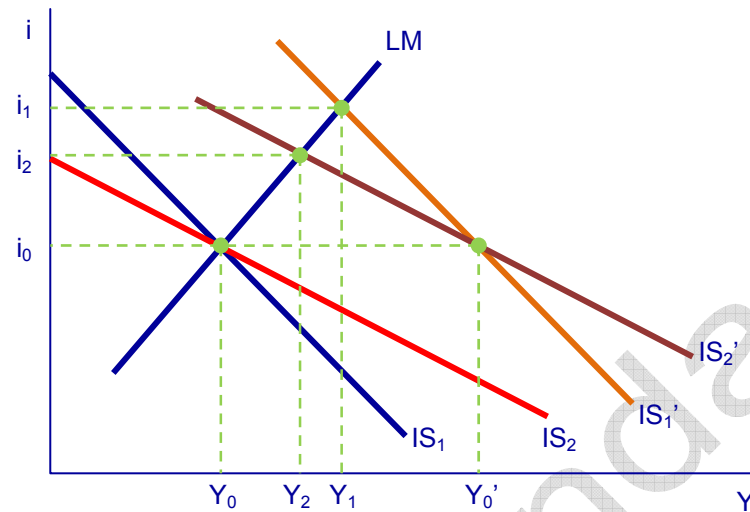
A decrease in autonomous exports will have a contractionary effect on the economy.  $AE$  will decrease by the change in autonomous exports and thus the  $AE$  curve will shift down to  $AE_1'$  and the  $IS$  curve will also shift down to  $IS'$  (see diagram). Note that the horizontal shift of the  $IS$  curve is equal to the change in autonomous exports times the simple expenditure multiplier. As a result, a situation of excess demand arises in the goods market since now  $Y > AE$  at  $Y_1$ .

Firms will start experiencing unexpected increases in inventories and will eventually cut down production, thus decreasing  $Y$  towards the new lower equilibrium level  $Y_2$ . As  $Y$  decreases, the demand for real balances also decreases and the rate of interest starts to fall. The adjustment path, therefore, is represented by a movement down along the  $LM$  curve. This process continues until the new equilibrium is achieved at  $Y_2$ , at which point the demand for real balances is given by  $L(Y_2)$  and the equilibrium rate of interest is  $i_2$ . Note that as the rate of interest falls,  $AE$  increases because desired investment increases, and thus the  $AE$  curve starts shifting up until a new equilibrium is reached at the level of aggregate expenditure  $AE_2$  in the goods market.

Since the rate of interest is now lower than before, investment is higher than in the previous equilibrium. Similarly, since  $Y$  is now also lower than before,  $C$  and  $Q$  are lower than in the previous equilibrium. Therefore, the statement is false: as autonomous exports falls, investment increases (because of the fall in the rate of interest) while consumption and imports fall (because of the fall in  $Y$ ). The only component of  $AE$  that remains unchanged is government expenditure.



3. "In the IS-LM model of a closed economy, an increase in government purchases would have a greater impact on the level of income if consumption expenditure were a decreasing function of the rate of interest." (Show your answer graphically and explain the economics.)



### False

An increase in government purchases will have the largest expansionary effect on the level of income when the rate of interest remains unchanged as  $Y$  increases. However, as long as the rate of interest increases when  $Y$  rises (due to the income-sensitivity of the demand for real balances), there will be some crowding out effect on those components of  $AE$  that depend on the rate of interest. Note that the size of this crowding out effect will depend on the interest-sensitivity of these components of  $AE$ . If only investment is assumed to depend on the rate of interest, then the crowding out effect is limited to a decrease in  $I$  as  $G$  increases. However, if consumption is also assumed to depend on the rate of interest, then the crowding out effect represents a decrease in both  $I$  and  $C$  as  $G$  increases. In the latter case, therefore, the interest-sensitivity of  $AE$  is greater. This is shown in the above diagram.

The  $IS$  curve  $IS_1$  corresponds to the situation when only  $I$  is assumed to depend on the rate of interest. In this case, the absolute value of the slope of the  $IS$  curve is  $1/b \cdot \alpha_{AE}$ , where  $b$  is the interest-sensitivity of investment and  $\alpha_{AE}$  is the simple expenditure multiplier. As  $G$  increases, therefore, the  $IS_1$  curve shifts to the right to  $IS_1'$  — where the horizontal shift of the  $IS$  curve is equal to  $\alpha_{AE} \Delta G$ . If the rate of interest were to remain unchanged at  $i_0$ , then equilibrium income would increase to  $Y_0'$ . However, since the rate of interest increases as  $Y$  rises, there will be some crowding out effect (i.e., a decrease in  $I$ ) and  $Y$  will increase to  $Y_1$  only.

The  $IS$  curve  $IS_2$  corresponds to the situation when both  $I$  and  $C$  are assumed to depend on the rate of interest. In this case, the absolute value of slope of the  $IS$  curve is  $1/(b+d) \alpha_{AE}$ , where  $d$  is the interest-sensitivity of consumption. (Note that the interest-sensitivity of  $AE$  is now greater, and thus the  $IS_2$  curve is flatter than the  $IS_1$  curve.) As  $G$  increases, the  $IS_2$  curve shifts to the right to  $IS_2'$ , where the horizontal shift is also equal to  $\alpha_{AE} \Delta G$ . Again, if the rate of interest were to remain unchanged at  $i_0$ , then equilibrium income would increase to  $Y_0'$ . However, since the rate of interest increases as  $Y$  rises, there will be a greater crowding out effect (i.e., a decrease on both  $I$  and  $C$ ) and  $Y$  will increase to  $Y_2$  only.

Therefore, the statement is false — an increase in government purchases will have a smaller impact on the level of income if consumption expenditure is assumed to be a decreasing function of the rate of interest.

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