Department of Economics University of Toronto Prof. Gustavo Indart June 22, 2015



ECO 209Y – L0101 MACROECONOMIC THEORY

Term Test #2

LAST NAME	

FIRST NAME —

STUDENT NUMBER			

INSTRUCTIONS:

- 1. The total time for this test is 2 hours.
- 2. Aids allowed: a simple calculator.
- 3. Use pen instead of pencil.

DO NOT WRITE IN THIS SPACE

	Part I	/36
6	Part II	/14
$\overline{\mathbf{O}}$	Part III	1/10
		2/10
		3/10

TOTAL ____/80

PART I (36 marks)

Instructions:

- Enter your answer to each question in the table below.
- Each correct answer is worth 2 marks. *Note that a deduction of 0.5 mark will be made for each incorrect answer.* Table cells left blank will receive a zero mark (i.e., no deduction).
- Do NOT guess your answers!

1	2	3	4	5	6	7	8	9
Е	Α	С	D	D	Е	C A		С
10	11	12	13	14	15	16	17	18
Е	В	С	С	В	D	В	Α	D
C	Correct: Incorrect:						Blank:	

- 1. Consider the model of a closed economy with a fixed price-level. If the interest-sensitivity of investment increased, which one of the following statements would be correct with respect to income?
 - A) Both fiscal and monetary policy would become more effective.
 - B) Both fiscal and monetary policy would become less effective.
 - **C)** Fiscal policy would become less effective and monetary policy would become neither more nor less effective.
 - **D)** Fiscal policy would become more effective and monetary policy would become less effective.
 - E) Fiscal policy would become less effective and monetary policy would become more effective.
- 2. If bond holders expect the price of bonds to fall, they will
 - A) reduce their demand for bonds and increase their demand for money.
 - B) reduce their demand for both bonds and real balances.
 - **C)** reduce their demand for money and increase their demand for bonds.
 - D) also expect the rate of interest to drop.
 - E) reduce their money holdings.

- **3.** Consider the fixed-price level model of a closed economy. If the central bank tightens monetary policy so that the interest rate increases and GDP decreases,
 - A) tax revenues will decrease, decreasing the government's actual deficit, and increasing the full-employment deficit.
 - **B)** tax revenues will increase, decreasing the government's actual deficit, and decreasing the full-employment deficit.
 - **C)** tax revenues will decrease, increasing the government's actual deficit, but not changing the full-employment budget balance.
 - **D)** tax revenues will increase, decreasing the government's actual deficit, but not changing the full-employment budget balance.
 - E) tax revenues will increase, decreasing the government's actual deficit, and increasing the full-employment budget balance.
- **4.** When the economy is in a liquidity trap, expansionary monetary policy is ineffective with respect to income because
 - A) investment is insensitive to changes in the rate of interest.
 - B) the public already holds all the money they want.
 - C) the real demand for money is insensitive to changes in the rate of interest.
 - **D)** the public is willing to hold any amount of money being offered at the current rate of interest.
 - E) none of the above.
- 5. If bond holders attempt to sell bonds in order to increase their money holdings, at the end of the process of adjustment
 - A) the money held by individuals and businesses will increase by the same amount as their bond holdings will decrease.
 - **B)** the money held by individuals and businesses will decrease by the same amount as their bond holdings will increase.
 - **C)** individuals and business will reduce their bond holdings but will keep their money holdings unchanged.
 - **D)** individuals and businesses will keep both their total money holdings and their total bond holdings unchanged.
 - E) individuals and business will reduce both their bond holdings and their money holdings by the same amount.
- **6.** In the fixed-price model of a closed economy, fiscal policy is more effective in increasing national income when
 - A) money demand is very responsive to income changes.
 - B) consumption is very responsive to interest rate changes.
 - C) money demand is not very responsive to interest rate changes.
 - D) the income tax rate is very high.
 - E) investment is not very responsive to interest rate changes.

- 7. Consider the IS-LM framework in a fixed-price level model of a closed 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 a country chooses to have free capital flows and to conduct an independent monetary policy, then it must:
 - A) live with exchange-rate volatility.
 - B) restrict its citizens from participating in world financial markets.
 - C) give up the use of monetary policy for purposes of domestic stabilization.
 - **D)** have a fixed exchange rate.
 - E) have a managed exchange rate.
- **9.** Consider an open economy with a fixed price-level, flexible exchange rates, and infinitely elastic capital flows (i.e., perfect capital mobility). An increase in government expenditure will cause
 - A) output and interest rate to increase, and domestic currency to depreciate.
 - B) output and interest rate to increase, and domestic currency to appreciate.
 - **C)** domestic currency to appreciate, while output and interest rate will remain unchanged.
 - **D)** domestic currency to appreciate, output to rise, but interest rate will remain unchanged.
 - E) domestic currency to appreciate, interest rate to rise, but output will remain unchanged.
- **10.** Consider a fixed-price model of an open economy with perfect capital mobility and flexible exchange rates. If the foreign interest rate increases by 3 percentage points and the exchange rate is expected to appreciate by 2 percent, in the new equilibrium the domestic interest rate will
 - A) increase by 2 percentage points.
 - **B)** increase by 1 percentage point.
 - C) decrease by 1 percentage point.
 - D) increase by 3 percentage points .
 - E) increase by 5 percentage points.

- **11.** Consider the fixed-price level model of an open economy with flexible exchange rates and perfect capital mobility. Which of the following incidents will lead to an improvement in the balance of the current account?
 - A) An expansionary fiscal policy.
 - B) A decrease in consumer's confidence.
 - C) A contractionary monetary policy.
 - D) A decrease in foreign interest rate.
 - E) A decrease in foreign income.
- **12.** Consider the fixed-price level model of an open economy with fixed exchange rates and perfect capital mobility. Which of following events will cause the real supply of money to contract in the new equilibrium?
 - A) A revaluation of the exchange rate.
 - B) An increase in foreign income.
 - C) A rise in the foreign rate of interest.
 - **D)** The Central Bank sells bonds.
 - E) The government increases its spending.
- **13.** Suppose that income per capita in Brazil is 27,500 reales and that the nominal exchange rate for Brazilian reales is 0.40. Further suppose that a given consumption basket of goods and services costs \$8,100 in Canada and 15,000 reales in Brazil. Using the PPP exchange rate, income per capita in Brazil is
 - **A)** \$5,090.
 - **B)** \$11,000.
 - **C)** \$14,850.
 - **D)** \$50,925.
 - **E)** \$68,750.

14. The BP curve will be flatter,

- A) the larger the marginal propensity to import.
- B) the larger the interest responsiveness of capital flows.
- C) the larger the money supply.
- **D)** the larger the marginal propensity to consume.
- E) the smaller the interest sensitivity of investment.

- **15.** In a fixed-price model of an open economy with perfect capital mobility and **fixed** exchange rates, a decrease in autonomous taxes will
 - A) partially crowd out investment due to the interest rate increase.
 - **B)** crowd out net exports due to a currency appreciation.
 - C) increase net exports due to a currency depreciation.
 - D) increase consumption and net exports but leave investment unchanged.
 - E) cause none of the above.
- **16.** In a fixed-price model of an open economy with perfect capital mobility and **flexible** exchange rates, a decrease in autonomous taxes will
 - A) partially crowd out investment due to the interest rate increase.
 - B) crowd out net exports due to a currency appreciation.
 - C) increase net exports due to a currency depreciation.
 - D) increase consumption and net exports but leave investment unchanged.
 - E) cause none of the above.
- **17.** Consider a fixed-price level model of an open economy with flexible exchange rates and imperfect capital mobility. An increase in the tax rate will cause
 - A) output and interest rate to fall, and exchange rate to rise.
 - B) output to fall, and interest rate and exchange rate to rise.
 - C) output, rate of interest and the exchange rate to fall.
 - **D)** output, rate of interest and exchange rate to rise.
 - E) output to rise, and rate of interest and exchange rate to fall.
- **18.** Consider a fixed-price level model of an open economy with flexible exchange rates and imperfect capital mobility. If the government wishes to reduce interest rates without reducing the value of the Canadian dollar, the government should
 - A) increase its expenditure and cut the money supply.
 - B) raise its expenditure and raise the money supply.
 - C) leave its expenditure unchanged while increasing the money supply.
 - **D)** lower its expenditure and cut the money supply.
 - E) lower its expenditure and raise the money supply.

PART II (14 marks)

Consider an open economy with fixed prices, flexible exchange rates, and imperfect capital mobility. This economy is characterized by the following equations:

C = 100 + 0.8 YD	TA = 0.25 Y
I = 150 - 20 i + 0.1 Y	<i>TR</i> = 50
G = 250	L = 0.2 Y - 10 i
X = 100 + 200 e	<i>M/P</i> = 200
Q = 200 - 100 e + 0.1 Y	CF = 10 (i - 21)

a) What is the equation for the IS curve in this economy? Show all your work. (2 marks)

Let's first write C as a function of Y:

$$C = 100 + 0.8 YD = 100 + 0.8 (Y + TR - TA) = 100 + 0.8 (Y + 50 - 0.25 Y) = 140 + 0.6 Y$$

Let's now find the expression for the AE curve:

$$AE = C + I + G + X - Q$$

= (140 + 0.6 Y) + (150 - 20 *i* + 0.1 Y) + 250 + (100 + 200 *e*) - (200 - 100 *e* + 0.1 Y)
= 440 - 20 *i* + 0.6 Y + 300 *e*

To find the expression for the IS curve we must equate Y and AE:

$$Y = AE$$

= 440 - 20 *i* + 0.6 Y + 300 e
20 *i* = 440 - 0.4 Y + 300 e

i = 22 – 0.02 Y + 15 e

b) What is the equation for the *LM* curve in this economy? Show <u>all</u> your work. (2 marks)

To find the expression for the LM curve we must equate L and M/P:

L = M/P

0.2 Y - 10 *i* = 200

10 i = -200 + 0.2 Y

i = -20 + 0.02 Y

c) What is the equation for the BP curve in this economy? Show <u>all</u> your work. (2 marks)

To find the equation for the BP curve we must add NX and CF and equate it to zero:

BP = NX + CF= (100 + 200 e) - (200 - 100 e + 0.1 Y) + 10 (i - 21) = - 310 + 300 e - 0.1 Y + 10 i

And equating it to zero:

-310 + 300 e - 0.1 Y + 10 i = 0

10 *i* = 310 - 300 *e* + 0.1 Y

i = 31 – 30 e + 0.01 Y

d) What are the equilibrium values of Y, i and e in this economy? (3 marks)

We have a set of three equations and three unknowns:

IS → i = 22 - 0.02 Y + 15 e LM → i = -20 + 0.02 Y BP → i = 31 - 30 e + 0.01 Y

Equating the IS and LM curves we obtain:

22 - 0.02 Y + 15 e = -20 + 0.02 Y0.04 Y = 42 + 15 eY = 1050 + 375 e(1)

And equating the *BP* and *LM* curves we obtain:

31 - 30 e + 0.01 Y = -20 + 0.02 Y0.01 Y = 51 - 30 e Y = 5100 - 3000 e (2)

And equating (1) and (2) we obtain:

1050 + 375 e = 5100 - 3000 e3375 e = 4050 $e^* = 1.2$

And plugging this value for e^* in either equations (1) or (2) we obtain:

Y* = 1050 + 375 (1.2) = 1050 + 450 = 1500

And plugging this value for Y* in the equation for the *LM* curve we obtain:

i^{*} = − 20 + 0.02 (1500) = − 20 + 30 <mark>= 10</mark>

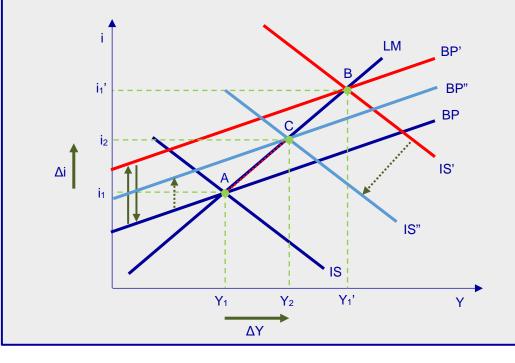
e) Suppose that the international rate of interest increases. What will be the impact on the values of Y, i and e you estimated above? What will be the impact on the balances of the current and capital account? <u>Explain</u> your answers. [Note: Although not necessary, a graphical analysis of this situation might be helpful when answering the question.] (5 marks)

An increase in the international rate of interest causes a deterioration in the balance of the capital account. Therefore, at e = 1.2 there is now an excess demand in the exchange market and *e* appreciates (i.e., the domestic currency depreciates).

The depreciation of the domestic currency makes domestic goods more competitive in the international market and thus *NX* rises (i.e., *X* increases and *Q* decreases). The increase in *NX* creates a situation of excess demand in the goods market (i.e., AE > Y) and *Y* rises. As *Y* increases, the demand for money rises and *i* increases.

Therefore, as a result of the increase in i^* , e^* rises, Y^* increases and so does i^* . In turn, the balance in the current account improves because of the increase in e, and the balance in the capital account deteriorates because of the increase in i^* .

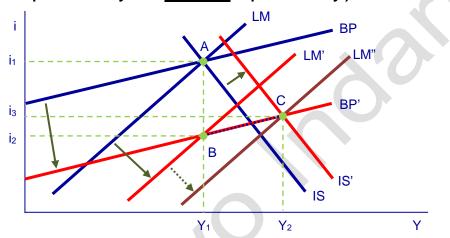
The above results are shown in the diagram below. The increase in *i** causes the *BP* to shift up by exactly Δi^* to BP' (i.e., external balance will now be achieved at a higher *i*). The increase in *i** causes the balance of the capital account to deteriorate. Therefore, the domestic currency depreciates (i.e., *e* increases) and *NX* increases. The increase in *NX* causes the *IS* curve to shift to *IS*' and the *BP*' curve to shift back to *BP*. The economy is still at point *A* — there is equilibrium in the money market and the external sector, but an excess demand in the goods market. Therefore, *Y* starts to increase. As *Y* rises, the demand for money increases and *i* also increases. The increase in *i* causes the balance in the capital account to improve, and the domestic currency starts to appreciate (i.e., *e* falls). As *e* decreases, *NX* also decreases and the *BP*' starts shifting up and the *IS*' curve starts shifting down. This process continues until the excess demand in the goods market is eliminated at point *C*, where the *BP*' curve shifts to *BP*" and the *IS*' curve shifts to *IS*". Therefore, as a result of the increase in *i**, *e** rises, *Y** increases and so does *i**. In turn, the balance in the current account improves because of the increase in *e*, and the balance in the capital account deteriorates because of the increase in *i**.



PART III (30 marks)

Instructions: Answer the following three questions in the space provided. You may continue your answer on page 12 if additional space is required (*but clearly indicate that your answer continues on page 12*). Each question is worth 10 marks.

1. Critically evaluate the following statement: "A devaluation of the domestic currency will cause the level of income to increase, the rate of interest to rise, the balance in the current account to improve, and the balance in the capital account to deteriorate." (Show your answer with the help of a diagram and <u>explain</u> the economics. Consider the fixed-price model of an open economy with <u>imperfect</u> capital mobility.)



Suppose that the economy is initially in equilibrium at point *A*. The devaluation of the domestic currency increases the international competitiveness of domestic goods, and thus *N*X increases. Therefore, the *IS* curve shifts to the right to *IS*' and an excess demand arises in the goods market.

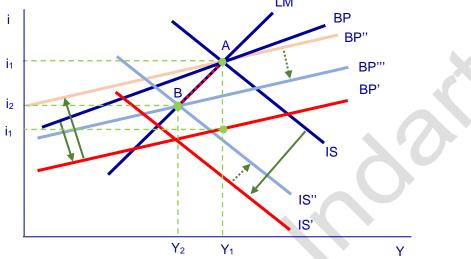
The devaluation of the currency causes the balance in the current account to improve while leaving the balance in the capital account unchanged. Therefore, at point *A* there is now a surplus in the external sector (i.e., BP > 0 and thus the supply of foreign currency is greater than its demand). For the external sector to be in equilibrium at Y_1 , the rate of interest must be lower (i.e., the balance in the capital account must deteriorate by the same amount as the balance in the current account improved). Therefore, BP would be zero at Y_1 when the rate of interest is i_2 — i.e., the BP curve shifts down to BP'.

The economy is still at point *A*. Since there is a surplus in the external sector, the central bank buys foreign currency to maintain the exchange rate fixed at the new level. Therefore, the supply of money increases and the *LM* curve shifts to *LM*'. Now the economy is at point B — both the money market and the external sector are in equilibrium but there is an excess demand in the goods market. (Note that the fall in the interest rate to i_2 causes the balance in the capital account to deteriorate by the same absolute amount as the previous improvement in the current account due to the devaluation.)

Now Y starts to increase to eliminate the excess demand in the goods market and *i* starts to rise (because of the increase in demand for real balances). The increase in *i* improves the balance in the capital account and creates now a surplus in the external sector, which the central bank eliminates by buying foreign currency. Therefore, the money supply increases and the *LM*' curve shifts further to the right. This process continues as long as there is an excess demand in the goods market, i.e., until the *LM*' curves shifts all the way to *LM*''. Note that the money market is always in equilibrium (by assumption) and that the intervention of the central bank in the exchange market helps maintaining equilibrium in the external sector at all times as well. Therefore, during the process of adjustment, the economy is always at a point of intersection between the (shifting) *LM*' curve and the (static) *BP*' curve, i.e., the adjustment path is represented by a movement up along the *BP*' curve.

The statement is therefore true: the level of income rises, the rate of interest falls, the balance in the current account improves, and the balance in the capital account deteriorates.

2. Critically evaluate the following statement: "If, due to greater uncertainty in the world economy, foreign investors choose to invest more in a safe country such as Canada, then Canada's GDP will rise, its rate of interest will fall, the balance in its capital account will improve, and the balance in its current account will deteriorate." (Show your answer with the help of a diagram and <u>explain</u> the economics. Consider the model of an open economy with a fixed-price level, <u>flexible</u> exchange rates, and <u>imperfect</u> capital mobility.)



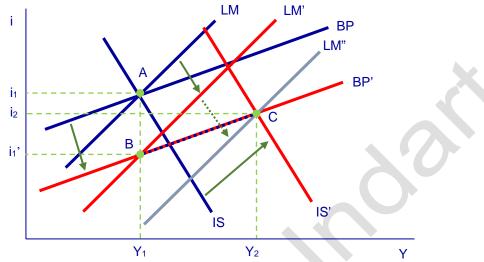
The economy is initially in equilibrium at Y_1 and i_1 (point *A* in the diagram). Foreign investors' greater preference to invest in Canada implies an improvement in the capital account and thus at point *A* there is now a surplus in the external sector. Therefore, assuming for the time being no change in the exchange rate, the domestic rate of interest should be i_1 ' for the external sector to be in equilibrium (i.e., the *BP* curve shifts down to *BP*'). (Note that the BP' curve is flatter than the BP curve since the degree of capital mobility, "a", has increased.) However, since the economy is at point *A* and there is a surplus in the balance of payments, the Canadian dollar appreciates and the balance in the current account deteriorates (i.e., *NX* falls) by the same absolute amount as the improvement in the capital account. The appreciation of the Canadian dollar causes the *BP*' and *IS* curves to shift: the *BP*' curve to *BP*" — and thus the external sector is now again in equilibrium at point *A* — and the *IS* curve to *IS*'.

At point *A* there is now equilibrium in both the money market and the external sector, but an excess supply in the goods market due to the decrease in *NX*. Therefore, *Y* decreases as firms accumulate inventories and adjust production downwards. The demand for money decreases as *Y* falls, and thus the rate of interest also falls. Since the money market is always in equilibrium by assumption, the adjustment process implies a movement down along the *LM* curve.

As the rate of interest falls, the balance in the capital account deteriorates. This contributes to the depreciation of the Canadian dollar and now *NX* starts to rise. Therefore, the *BP*" and *IS*' curves shift. The *BP*" shifts gradually downward as the Canadian dollar depreciates, and thus the economy is always at a point of intersection between the static *LM* curve and the shifting *BP*" curve — i.e., the money market and the external sector are always in equilibrium while the excess supply in the goods market is reduced. The *IS*' curve also gradually shifts up as *NX* increases and thus the excess supply in the goods market is reduced by both a decrease in *Y* and an increase in *AE*. This process continues until the money market, the external sector, and the goods market are all in equilibrium (point *B* in the diagram).

The statement is thus false: while the balance in the capital account improves and the balance in its current account deteriorates, GDP and the rate of interest both fall.

3. Comment on the following statement: "A decrease in consumers' preference for vacationing abroad will lead to an increase in GDP, an increase in the interest rate, an improvement in the capital account, and a deterioration in the current account." (Show your answer with the help of a diagram and <u>explain</u> the economics. Consider the fixed-price model of an open economy with <u>fixed</u> exchange rates and <u>imperfect</u> capital mobility.)



The economy is initially in equilibrium at point *A*. A decrease in preference for vacationing abroad reduces *Q* (i.e., it increases *NX*), and thus the *IS* shifts to *IS*'. The increase in *NX* improves the balance in the current account, and thus now BP = 0 at a lower *i*— i.e., the *BP* curve shifts to *BP*'. The increase in *NX* creates an excess demand in the goods market (i.e., *AE* > Y now). In addition, the decrease in *Q* causes the balance in the current account to improve and creates an excess supply of foreign currency in the exchange market.

Under a fixed exchange rate system, the central bank buys foreign currency to eliminate the excess supply in the exchange market. Therefore, the money supply increases and the *LM* curve shifts to *LM*. The increase in the money supply decreases the rate of interest to i_1 ', which causes the balance in the capital account to deteriorate — thus offsetting the previous improvement in the current account. The economy is now at point B — i.e., there is equilibrium in the money market and the external sector, but an excess demand in the goods market. Firms experience involuntary decreases in inventories and thus adjust production upwards. As Y starts to increase, the demand for money also starts to increase and *i* starts to rise — thus improving the balance in the capital account and making BP > 0. The central bank buys foreign currency to eliminate the excess supply in the exchange market and the money supply increases and the *LM*' curve keeps shifting down to the right. Also note that imports start to increase as Y rises, thus contributing to reducing the excess supply in the exchange market.

This process continues as long as an excess demand remains in the goods market, i.e., until the economy moves to point *C*. At the end of the process, therefore, the increase in the supply of money causes the *LM*' curve to shift to *LM*' and equilibrium income to increase to Y_2 (and the rate of interest to rise to i_2). Note that the money market is always in equilibrium (by assumption) and that the intervention of the central bank in the exchange market contributes to maintaining equilibrium in the external sector at all times as well. Therefore, during the process of adjustment, the economy is always at a point of intersection between the (shifting) *LM*' curve and the (static) *BP*' curve. Therefore, the adjustment path is represented by a movement up along the *BP*' curve. At the end of the process, *Y* increases from Y_1 to Y_2 , the rate of interest falls from i_1 to i_2 , the balance in the current account improves (due to the initial decrease in autonomous *Q*), and the balance in the capital account deteriorates (due to the fall in *i*). (Continue on this page if necessary)

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