Department of Economics
University of Toronto

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SOLUTIONS

**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 45 minutes.
2. Aids allowed: a simple calculator.
3. Use pen instead of pencil.

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DO NOT WRITE IN THIS SPACE

Part I ⎯⎯⎯⎯⎯⎯ /40

Part II ⎯⎯⎯⎯⎯⎯ /10

Part III   1. ⎯⎯⎯⎯⎯⎯ /10

2. ⎯⎯⎯⎯⎯⎯ /10

3. ⎯⎯⎯⎯⎯⎯ /10

TOTAL ⎯⎯⎯⎯⎯⎯ /80

PART I (40 marks)

Instructions:
- Enter your answer to each question in the table below.
- Each correct answer is worth 2.5 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
C	B	C	C	B	B	C	C
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
A	A	D	E	D	C	B	B

1. Suppose that average income per capita in Uruguay is 240,000 pesos per year and that the nominal exchange rate for Uruguayan pesos is 0.04. Further suppose that a given consumption basket of goods and services costs $3,750 in the Canada and 75,000 pesos in Uruguay. Using the *PPP* exchange rate, income per capita in Uruguay is:
   A) $11,500.
   B) $11,750.
   C) $12,000.
   D) $12,250.
   E) none of the above.

2. If capital mobility is imperfect and import demand is completely insensitive to changes in the level of domestic output, which one of the following statements is correct?
   A) The *BP* curve is vertical.
   B) The *BP* curve is horizontal.
   C) The *BP* curve is downward sloping.
   D) The *BP* curve is upward sloping.
   E) The *BP* curve is not determinable.

Use this space for rough work.

3. China is being accused by Western countries of setting the value for its domestic currency too low. All else equal, which one of the following statements might describe the impact of an undervalued domestic currency on the Chinese economy?
   A) The prices of imported goods would be artificially low for Chinese consumers.
   B) Inflation pressure would tend to decrease in the Chinese economy.
   C) The Chinese money supply would tend to increase.
   D) China will experience greater capital inflows.
   E) None of the above is correct.

4. 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) An increase in exogenous exports will increase net exports.
   E) None of the above is correct.

5. Consider the model of an open economy with a fixed-price level, fixed exchange rates and perfect capital mobility. Suppose the economy is initially in a situation of internal and external balance and the government now implements contractionary fiscal policy. Which one of the following statements better describes the changes once the new equilibrium is achieved?
   A) The exchange rate will appreciate.
   B) The balance in the current account will improve.
   C) The money supply will increase.
   D) The balance of the capital account will improve.
   E) Both output and the interest rate will increase.

6. Consider a fixed-price level model of an open economy with flexible exchange rates and imperfect capital mobility. If the government wishes to raise interest rates without increasing 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.

Use this space for rough work.

7. Consider the model of an open economy with a fixed-price level, flexible exchange rates and perfect capital mobility. A decrease in government expenditure will cause
- **A)** output, interest rates, and the exchange rate to increase.
- **B)** output and interest rates to increase, but the exchange rate to fall.
- **C)** the exchange rate to rise, but the level of output and the interest rate will remain unchanged.
- **D)** the exchange rate and the level of output to rise, but the interest rate will remain unchanged.
- **E)** output to rise and the exchange rate to fall while the interest rate will remain unchanged.

8. Consider the model of an open economy with a fixed-price level, flexible exchange rates and imperfect capital mobility, where the BP curve is flatter than the LM curve. An increase in the money supply will cause
- **A)** output, the interest rate, and the exchange rate to increase.
- **B)** output and the interest rate to increase, while the exchange rate will decrease.
- **C)** output and the exchange rate to increase, while the interest rate will decrease.
- **D)** output to decrease while the exchange rate and the interest rate will increase.
- **E)** output to increase while the exchange rate and the interest rate will decrease.

9. Consider the model of an open economy with a fixed-price level, flexible exchange rates, and perfect capital mobility. Given an increase in autonomous exports, which one of the following statements is true with respect to its impact on the domestic economy?
- **A)** The domestic currency will appreciate and imports will rise, leaving net exports and the level of output unchanged.
- **B)** The domestic currency will appreciate and the rate of interest will rise, and therefore imports will increase and investment will fall.
- **C)** The domestic currency will depreciate and imports will fall, thus increasing both net exports and the level of output.
- **D)** The domestic currency will depreciate and the rate of interest will rise, and therefore both imports and investment will fall.
- **E)** None of the above are true.

Use this space for rough work.

10. Consider a small open economy with fixed prices, fixed exchange rates, and no capital mobility. Assume that BP = 0 in the initial equilibrium. If the government imposes an import quota, in the new equilibrium:

    A) net exports will remain unchanged, but the money supply and income will both be higher.

    B) net exports, the money supply, and income will all remain unchanged.

    C) net exports, the money supply, and income will all be lower.

    D) net exports, the money supply, and income will all be higher.

    E) net exports will remain unchanged, the money supply will be lower, and income will be higher.

11. Suppose money and bonds are the only two assets in the economy. 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 decrease by the same amount as their bond holdings will increase.

    B) the money held by individuals and businesses will increase by the same amount as their bond holdings will decrease.

    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.

12. If the money multiplier is 2 and the Bank of Canada buys $1 million of bonds in the open market at the same time that it sells $1.5 million of foreign exchange, then the M1 money supply will

    A) increase by $5 million.

    B) increase by $2 million.

    C) increase by $1 million.

    D) fall by $5 million.

    E) fall by $1 million.

13. Assume that the currency-deposit ratio is 0.20, the desired reserve-deposit ratio is 0.05, and total money supply is $3.6 billion. What is the amount of high-powered money if there are no excess reserves in the banking system?

    A) $500 million.

    B) $650 million.

    C) $700 million.

    D) $750 million.

    E) None of the above is correct.

Use this space for rough work.

14. You have just learned that the Bank of Canada has bought for $1 million a collection of painting by the Group of Seven to decorate its boardroom. Once monetary equilibrium is restored, which one of the following statements will be correct?
- **A)** The monetary base and the money supply will both decrease by $1 million.
- **B)** The monetary base and the money supply will both increase by $1 million.
- **C)** The monetary base will increase by $1 million but the money supply will increase by more than $1 million.
- **D)** The monetary base will increase by $1 million but the money supply will not change.
- **E)** The moneys supply will increase by $1 million but the monetary base will not change.

15. Consider a closed economy with a flexible-price level and currently at full employment. If workers decided to supply more labour at any level of the real wage rate, which one of the following statements would be correct?
- **A)** Both the real wage and the price level would increase.
- **B)** Both the real wage and the price level would decrease.
- **C)** The real wage would increase and the price level would decrease.
- **D)** The real wage would decrease and the price level would increase.
- **E)** The real wage would increase while the price level would remain unchanged.

16. It has recently been reported in the news that Canada's unemployment rate has fallen from 6.9 percent in May to 6.8 percent in June. Which of the following statements best explains this labour market outcome?
- **A)** The level of employment increased.
- **B)** The participation rate decreased while the level of employment rose slightly.
- **C)** Both the participation rate and the level of employment decreased.
- **D)** The Canadian economy is improving.
- **E)** Both A) and D) are correct.

Use this space for rough work.

PART II   (10 marks)

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

$$C = 60 + 0.8\,YD \qquad\qquad P^f = 2$$
$$I = 200 - 20i + 0.1\,Y \qquad P = 1$$
$$G = 300$$
$$TA = 0.25\,Y \qquad\qquad L = 0.2\,Y - 10i$$
$$TR = 50 \qquad\qquad\qquad M/P = 200$$
$$X = 250 + 100\ eP^f/P \qquad CF = 25\ (i - i^*)$$
$$Q = 400 - 50\ eP^f/P + 0.1\,Y \qquad i^* = 9$$

a) What is the equation for the *IS* curve in this model? **(2 marks)**

C = 60 + 0.8YD

  = 60 + 0.8 (Y – TA + TR)

  = 60 + 0.8 (Y – 0.25Y + 50)

  = 60 + 0.6Y + 40

  = 100 + 0.6Y

NX = X – Q

  = 250 + 200e – 400 + 100e – 0.1Y

  = – 150 + 300e – 0.1Y

AE = C + I + G + NX

  = 100 + 0.6Y + 200 – 20i + 0.1Y + 300 – 150 + 300e – 0.1Y

  = 450 + 300e + 0.6Y – 20i

Y = AE

Y = 450 + 300e + 0.6Y – 20i

450 + 300e – 0.4Y – 20i = 0

i = 22.5 + 15e – 0.02Y

b) What is the equation for the *LM* curve in this model? **(2 marks)**

L = M/P

0.2Y – 10i = 200

10i = – 200 + 0.2Y

i = – 20 + 0.02Y

c) What is the equation for the *BP* curve in this model? **(2 marks)**

$NX + CF = 0$

$-150 + 300e - 0.1Y + 25(i - 9) = 0$

$-150 + 300e - 0.1Y + 25i - 225 = 0$

$-375 + 300e - 0.1Y + 25i = 0$

$25i = 375 - 300e + 0.1Y$

$i = 15 - 12e + 0.004Y$

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

IS: $i = 22.5 + 15e - 0.02Y$ *(1)*

LM: $i = -20 + 0.02Y$ *(2)*

BP: $i = 15 - 12e + 0.004Y$ *(3)*

(1) – (2) → $42.5 + 15e - 0.04Y = 0$ *(4)*

(1) – (3) → $7.5 + 27e - 0.024Y = 0$ *(5)*

15 *(5)* – 27 *(4)* → $112.5 + 405e - 0.36Y - 1147.5 - 405e + 1.08Y = 0.72Y - 1035 = 0$

→ $Y = 1035/0.72$ → $Y = 1437.5$

(2) → $i = -20 + 0.02Y = -20 + 0.02\,(1437.5) = -20 + 28.75 = 8.75$ → $i = 8.75$

(3) → $i = 15 - 12e + 0.004Y$ → $8.75 = 15 - 12e + 0.004\,(1437.5)$
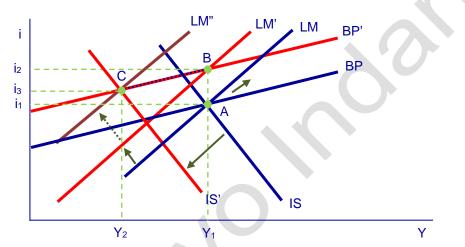
→ $12e = 15 + 5.75 - 8.75 = 12$

→ $e = 1$

e) What are the balances in the current account and the capital account in this equilibrium? **(1 mark)**

$NX = -150 + 300e - 0.1Y = -150 + 300 - 0.1\,(1437.5) = 150 - 143.75 = 6.25$

$CF = 25\,(i - i^*) = 25\,(8.75 - 9) = -6.25$

PART III (30 marks)

1. **Critically evaluate the following statement:** *"If a small country unilaterally reduces its import tariffs, its level of income decreases, its rate of interest falls, and the balances in both its current and capital accounts deteriorate."* **(Show your answer with the help of a diagram and** underline **explain the economics. Consider the fixed-price level model of an open economy with** underline **imperfect capital mobility and** underline **fixed exchange rates.)**

Suppose that the economy is initially in equilibrium at point *A*. A reduction in imports tariffs increases imports and thus reduces *NX*. Therefore, the *IS* curve shifts to the left to *IS'* and an excess supply arises in the goods market.

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

The economy is still at point *A*. Since there is an excess demand in the exchange market, the central bank sells foreign currency to maintain the exchange rate fixed at the new level. Therefore, the supply of money decreases 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 supply in the goods market. (Note that the increase in the interest rate to i_2 causes the balance in the capital account to improve by the same absolute amount as the previous deterioration in the current account due to the tariff reduction.)

Now *Y* starts to decrease to eliminate the excess supply in the goods market and *i* starts to fall (because of the decrease in demand for real balances). The decrease in *i* worsens the balance in the capital account and creates a deficit in the exchange market, which the central bank eliminates by selling foreign currency. Therefore, the money supply decreases and the *LM'* curve shifts further to the left. This process continues as long as there is an excess supply 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 down along the *BP'* curve.

The statement is therefore false: the level of income decreases but the rate of interest rises, while the balance in the capital account improves and the balance in the current account deteriorates.
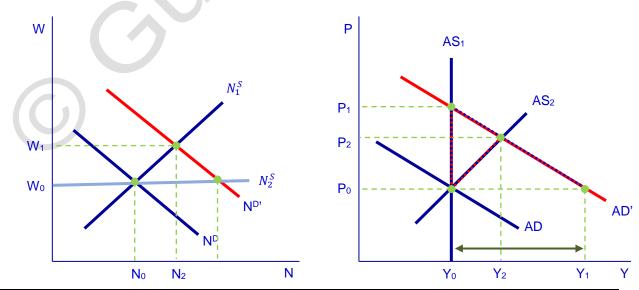
(Continue on page 12 if necessary)

2. Critically evaluate the following statement: *"The more flexible money wages are, the more effective fiscal policy will be."* **(Show your answer with the help of a diagram and underline the economics. Consider a closed economy with a flexible-price level and assume that there is initially a recessionary gap.)**

Money illusion refers to the situation in which people confuse changes in nominal values as if they were changes in real values. For instances, workers suffer from money illusion when they perceive changes in their nominal wages (W) but not in the average price of the goods and services (P) they spend their money wages on. Therefore, when workers suffer from money illusion, they change the quantity supplied of labour according to changes in W that they confuse with changes in real wages (W/P).

On the one hand, if workers suffer from money illusion, then changes in P do not affect their decisions as to how much labour to supply, i.e., an increase in P leaves the position of the labour supply curve (N^S) unchanged. The assumption here, then, is that workers will offer more labour when W increases independently of any possible accompanying change in P. On the other hand, if workers do not suffer from money illusion, then an increase in P decreases W/P at each level of W and thus the quantity supplied of labour falls at each level of W, i.e., the N^S curve shifts to the left. The assumption here, then, is that workers will offer more labour only when W/P increases. Finally, since firms are assumed not to suffer from money illusion, then an increase in P increases the demand for labour (i.e., the N^D curve shifts to the right) since the increase in P reduces W/P at each level of W. Of course, the assumption here is that firms will demand more labour when W/P decreases.

Let's examine the impact of an increase in government expenditure (G) in both cases. The increase in G increases AD (i.e., the AD curve shifts to the right), thus creating a situation of excess demand at P_0 and P will thus start to rise. If workers do not suffer from money illusion, then, both the N^D and N^S curves start shifting up as P increases. Therefore, as P increases, W increases in the same proportion and both N and W/P remain unchanged, i.e., the labour market remains always in equilibrium at the level of full employment (N_0). Note that the excess demand resulting from the increase in AD is eliminated by a decrease in the quantity demanded along the AD curve as P increases from P_0 to P_1 without any change in Y. Therefore, expansionary fiscal policy is ineffective in this case. This is the Classical Model, where the AS curve is vertical at the level of full-employment output — curve AS_1 in the diagram below.

If workers suffer from money illusion, then only the N^D curve shifts up when P increases to P_2 as a result of the increase in G. Here, then, the equilibrium level of N increases to N_2 — i.e., the quantity demanded of labour increases because W/P falls while the quantity supplied of labour increases because W rises. Therefore, Y increases to Y_2. Note that the excess demand resulting from the increase in AD is eliminated by a combination of a decrease in the quantity demanded along the AD curve and an increase in the quantity supplied along the AS curve. Therefore, expansionary fiscal policy is effective in this case. This is the General Model, where the AS curve is positively sloped — curve AS_2 in the diagram below.

(Continue on page 12 if necessary)

3. Describe the main characteristics that differentiate a "balance-sheet-recession" from a more "typical" recession. Comment on the relative effectiveness of both monetary and fiscal policies during balance-sheet-recessions. Clearly describe and explain the most effective type of policy the government could implement to restore the health of the economy in this situation.

A "typical" recession usually arises as a result of: (1) the central bank implementing contractionary monetary policy to reduce inflationary pressure in the economy (and, most particularly, to reduce the public's expectations of inflation); or (2) overinvestment (and thus overproduction) by the business sector due to overoptimistic expectations about the future state of aggregate demand. The source of a "balance-sheet" recession is different—it's neither related to a situation of insufficient aggregate demand forced by the central bank nor to a situation of excessive aggregate supply due to overinvestment and overproduction.

A balance-sheet recession is related to a situation of insufficient aggregate demand but not to one caused by the implementation of contractionary monetary policy. It arises when asset prices collapse (i.e., an asset bubble bursts) and households and businesses suddenly find themselves with their liabilities far outweighing their assets. Understandably, in this situation households and businesses stop borrowing and start paying down their debt, i.e., they start *deleveraging*. This is the classical "paradox of drift" in action, which causes aggregate demand to fall and the economy to move into recession.

What type of government action is required to get the economy out of recessions?

In the case of a typical recession, expansionary monetary policy might be quite effective in restoring household consumption expenditure to pre-recession levels. And this is particularly so when the recession was "created" by the central bank itself by implementing contractionary monetary policy in an attempt to curb inflation. Moreover, combining expansionary monetary policy with expansionary fiscal policy might accelerate the recovery by helping to restore both the business sector's and households' confidence and boost both investment and consumption.

In the case of a balance-sheet recession, expansionary monetary policy will tend to be quite ineffective. Here is not that households and businesses are not borrowing (and thus not spending) because the rate of interest is too high but rather because their liabilities are too high relative to the value of their assets (i.e., they are *overleveraged*). Therefore, in this case monetary policy becomes ineffective even before the rate of interest falls to very low levels and a more "typical" liquidity trap arises. Moreover, private banks are also deleveraging and thus are also unwilling to lend even if the rate of interest is falling—and thus, in any case, only the lucky few will be able to benefit from lower borrowing costs.

So what should the government do during a balance-sheet recession?

When the entire private sector is bent on reducing liabilities by paying down debt, the government must move in the opposite direction—i.e., when the entire private sector is striving to save, the government must dis-save. But fiscal stimulus will not have much effect as long as the financial system is deleveraging. Therefore, the government (and the central bank) must first "clean" the balance-sheet of the banks—for example, by buying some of their risky assets (i.e., risky loans) as it was done both in Canada and the U.S. in 2008-09. Once this problem is more or less solved, the government deficit has to be large enough to offset both the decline in industry investment and the rise in household saving. The stimulus package has to be large enough to convince households and businesses that it will not only slow or stop the decline but that it will also help to "jump start" the economy. In other words, the stimulus package must be enough to restore the private sector's confidence in the economy in order for households and businesses to start spending once again.

What is the most effective composition of such a stimulus package? The point of the stimulus package is to increase spending in the short run with little or no inflationary impact in the long run. Therefore, increasing expenditure on infrastructure is certainly a prime candidate, as is a more generous employment insurance program and other low income households' support programs. Tax cuts, however, will be rather ineffective. Tax cuts will produce considerably less spending per dollar than these other programs since households and business might use the additional disposable income to pay off debts rather than to increase expenditure.

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